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Abstract

This study aims to apply a technique of machine learning that is known as Online Support Vector Regression to the forecast of travel time on the London road network. Online SVR is a variation of a more well known technique called Support Vector machine (SVM), with two differences. First, where SVM just does the job of classification of the data, SVR models the time series data such that the historical time data is used as an input (independent variable) for regression to determine output (dependent variable). Second and more importantly, it brings in the concept of incremental learning, which is ideally suited to the problem of updating a traffic forecast model in real time. This means that instead of training the system from the start every time, as happens in batch SVR, we are only required to incrementally add or remove data into the system, and the model automatically adapts to the new conditions.

The objective of this study is to demonstrate the usability of online SVR for travel time forecast and show that the accuracy of results of online SVR are comparable to batch SVR. This is achieved by first carrying out analysis of the available data from the London transport network. The experiments are carried out over 10 links strategically selected from the network to represent the whole road network of the capital. It was important to segregate the data into various peak times to better model the trends in the underlying data. Temporal model was devised based on the time series of each of the links. One of the key aims of this study was to actually apply a technique to forecast future values of the time series, not just validate the results using test data. This is attempted with the help of multi-step ahead algorithm, which uses the predicted values iteratively as input in order to forecast future values.

Keywords: Support Vector Machine (SVM), Support Vector Regression (SVR), Online Support Vector Regression (OL-SVR), Time Series Analysis, Travel Time Prediction, Kernel Functions

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CHAPTER 1 : Introduction

Background

The advent of satellite navigation and the improvements in the real time travel data collection has played an important role in the development of sophisticated travel information systems. Travel time data is an important component of such a system, as it helps in the generation of the shortest path. Transport management with accurate travel time predictions provide road users with effective information to avoid the congestion. Alternative route information from these systems make better services available in advance, which in turn reduce the travel cost and time for road users.

Due to the ever changing nature of the road network conditions, the real time transmission and processing of travel time data is very important to the accuracy of a travel forecast system. Most travel time estimation systems are based on the analysis of the time series of historical data, where the forecasts are achieved through regression. The real time data is the dependent variable and the forecast value is the independent variable.

The travel time forecast on the road networks is an area of study that has been widely researched over the years. There are a number of parametric and non parametric techniques that have been applied to this problem, with varying degrees of success. These include moving average methods, artificial neural network and support vector machine.

Support Vector Machine SVM (Vapnik, 1995) is a machine learning algorithms used for pattern recognition and classification. Although SVM is primarily used for classification but it has been adapted to resolve the problem of time series regression so that it can be applied to the problem of forecasting. Using SVM for regression analysis is called Support Vector Regression (SVR). Over the years numbers of studies have shown that SVR performs better than other methods such as Artificial Neural Network. It has shown good performance in many areas, such as forecasting of electricity price (Sansom et al, 2002) and traffic speed prediction (Vanajakshi and Rilett, 2004).

This project will focus on a variant of Support Vector Regression (SVR) that is called Online SVR. Before forecast of any kind can be done, a thorough analysis of the available data has to be carried out to identify patterns hidden within the various time segments.

Importance of study

The field of machine learning has been gaining a lot of popularity over the years, and there are many new technologies that have been developed using its fundamental principles. A more significant algorithm that is based on this concept of machine learning is called support vector regression (SVR).

A drawback in this approach is that it only allows for training to be carried out once and at the start of the process. Online SVR is a variation of the standard SVR that works around this problem by allowing the training to be carried out incrementally. At any time in the process, the system can be trained with new data that will change the set of classification support vectors. Similarly, the impact of the data that has already been trained in the system can be removed at any time. This flexibility is hugely beneficial to any real-time forecast system.

This project aims to demonstrate that the online support vector regression is a feasible technique for the forecast of travel time data. This report will endeavour to show that the accuracy of a SVR based system is not compromised due to the incremental learning. At the same time it will demonstrate the added benefit of continuously training the system with new data, which is more relevant to the conditions of the network, enabling us to make better forecast.

This project attempts to cover all the aspects of a travel time forecast system from training, validation to actually forecast. This includes an experiment to predict the future values based on a multi-step ahead technique. It uses the predicted values as input to determine the future values iteratively till we forecast up to the desired time in the future.

Report Organization

This report is structured in six chapters. The section below gives a brief summary of each of the chapter.

Chapter 1 gives background of the subject along with introduction to the problem of travel time prediction. The later parts highlight the significance of the methodology of incremental support vector regression.

Chapter 2: Literature review section explains the problem of travel time forecast in more detail. This is followed by a description of various parametric and non parametric methods and references to number of studies where they have been applied to the problem.

Chapter 3: This chapter introduces the methodology used for this project. It starts with the explanation of support vector machine and the classification problem followed the role of kernel functions and model parameters. Later sections details the application of SVM using regression and the processing required of online support vector regression as applied in this project.

Chapter 4: This chapter elaborate the experiment plans including the data description. Also detailed are the range of parameters used, description and the objectives of the experiments.

Chapter 5: The results of the experiment are documented in this chapter in detail. This includes the comparison of the results for the links and time period as well as the graphical plots.

Chapter 6: Conclusion and discussion section summarize the whole project. Along with the discussion about the results, the areas for future work are also highlighted in this section.

CHAPTER 2: Literature Review

This chapter gives a description of the problem of traffic forecast and details the recent and related work in the field. Methods of travel time forecasting are discussed in terms of their broad classification and based on their strengths and weaknesses.

The accurate forecast of traffic time is very complex problem and is a function of various parameters such as road conditions, weather, work peak hours and holidays etc. This information is critical for the design of intelligent transportation systems (ITS).

Introduction of Travel Time and Traffic prediction

Travel time information is gaining great importance in a wide range of ATIS (Advance Traveller Information System) and ATMS (Advance Traffic Management System) applications as a performance measure. (Vanjakshi et al, 2007) If travel time information can be easily understood, travellers in a wide variety of areas can get great benefit out of it. Hence, any unusual waits in the travelling time from source to the destinations can be avoided (Zhu et al 2009).

Travel time on the road network is an important consideration in the field of urban transportation. It is the basis of all future planning and failure to address potential problems can lead to congestion and traffic flow problems. At the level of individual users the information about travel time can be significantly helpful as well.

Because of the complex nature of predicting travel time, it is considered a very difficult problem. There can be a whole series of factors that might have an effect on the duration of a given journey. One way to look at this problem is to consider all the input parameters and build forecast model that will predict based on these factors. Such a model will be very complex to build and even more complex to maintain due to the changing nature of the parameters. Another approach for prediction is based on the technical analysis, where we just focus on the data to identify the trends over time, to build a model that can predict future trend. Needless to say, this model will be based on time series analysis. An extension of this problem is the spatio-temporal analysis of the data i.e. to understand how the trend is evolving in space and time.

Traffic forecast related literature can be broadly divided into two categories. The models can be defined as parametric, when the association between dependent and independent variable is apparent. However, when there is no clear relationship between the variables, models are based on data and such models are classified as non parametric methods or machine learning methods (Vlahogianni, 2004).

Parametric Methods

ARIMA models are the most common class of models for forecasting a time series. They can be described as refined versions of random-walk and random-trend models. The fine-tuning is accomplished by adding lags of the differenced series prediction errors to the equation.

ARIMA stands for "Auto-Regressive Integrated Moving Average." In ARIMA, lags of the differenced series appearing in the forecasting equation are called "auto-regressive" terms and are defined by parameter p, lags of the forecast errors are called "moving average" terms that are defined by ‘q’, and a time series which needs to be differenced to be made stationary is said to be an "integrated" version of a stationary series and its order is defined as d.

ARIMA model was first introduced in traffic forecasting in the late 1970s (Box and Jenkins, 1970, Ahmed et al 1979; Levin and Tsao, 1980). ARIMA models were compared later on with seasonal ARIMA (SARIMA) models, because of the inherent seasonality in traffic data (Williams et al, 1998; Smith et al, 2002; Williams and Hoel, 2003; Guin, 2006).

There are other variations of ARIMA model such as GARCH (Generalized Autoregressive Conditional Heteroskedasticity) models that have been applied for traffic forecasting (Kamarianakis et al, 2005)

STARIMA or Space-Time ARIMA methods are designed to consider the spatial aspect of the data with the use of spatial weight matrixes as well as time in a combination of weighted linear trends and errors lagged.

Kamarianakis and Prastacos (2005) have shown that using STARIMA the task of traffic network forecast can be accomplished for the whole of the network using a single model.

Table 1: Summary of Autoregressive models

Model name	**STARIMA**	**ARIMA**		
Fragment	ST	AR	I	MA
Description	Space time is an extension of the standard ARIMA model	Autoregressive: order of the model	Integrated: The number of difference lags required to transform the data to stationary data	Moving Average
Denoted by		P is the order of the autoregressive term	d is the order of the differencing term	q is the order of the moving average term

Nonparametric Methods

Non-parametric methods are like a regression technique, in which the predictor is not based on a pre-established structure. Instead all the information about the model is derived from the data itself. Because of this reason generally a sizeable sample is required to build a non parametric model.

Non-parametric regression techniques have a number of benefits when compared with other methodologies. From a theoretical view point they are simple and can be easily understood. They are temporally dynamic as they automatically access to the most relevant data from the training set based on the currently observed data pattern. However, they rely on all possible situations having been observed in the training set. One drawback is that the number of previous patterns needs to be compared; the embedding dimension and the time lag must be decided

Non parametric models comes in many different classifications, they can be statistical, probabilistic or belonging to the category of pattern recognition and machine learning

Non-parametric regression models

The objective of nonparametric regression is to estimate the regression function without actually having to estimates the parameters. This type of regression is also referred to as scatter plot smoothing, because the objective is to find a smooth curve from the scatter plot of X against Y (Fox, 2002)

Kernel regression is an example of a statistics based non parametric forecast method. It has been applied to short-term traffic flow forecasting by (Sun and Chen, 2008)

Kalman Filtering

Kalman Filter Model is another non parameter model. It has an algorithm that is based on (LQE) Linear Quadratic Estimation. LQE uses a series of observations over a time that contains random variations to produce estimate of unknown variables. This is achieved by attaching weights to the points; higher weights are assigned to values which are certain and lesser weights to more uncertain values. Because of this, estimate is based on more than a single measurement and it tends to be more precise.

Kalman filter method has been applied to the problem of traffic forecast. Okutani and Stephanedes (1984) have applied Kalman filtering to the urban traffic prediction to forecast traffic diversion on freeway entrance area

Using Kalman filtering J.W.C. (2008) proposed a new learning approach for on freeway travel time prediction (Zhu et al, 2009) studied the large scale travel time prediction by selecting adjacent links as input filters. The model was applied to Beijing road network and showed promising results

Bayesian Networks

As the name suggests Bayesian networks are based on probabilistic approach outlined by Bayes formula for conditional independence. These are also called as belief networks or Bayes net. The knowledge about the system is represented in the form of graphical structures such that each node in the graph is a random variable. The links or edges between the nodes represent their respective probabilistic dependency. Even for a large network this approach makes processing efficient, along with the ease to add/remove the nodes due to the changes in the real world problem structure.

Bayesian networks have its application in the field of traffic forecast. It has been applied in a number of studies. One such application is presented by Sun et al (2005). The structure of Beijing road network was transformed in the form of a directional graph with nodes and edges. The author applied a combination of Gaussian mixture model (GMM) to estimate the joint probability distribution and competitive expectation maximisation (CEM) algorithm to identify parameters for the forecast. The results were quite promising as the Bayesian network performed better than autoregressive model for the test conducted on road network. It also performed well under circumstances where the data was not entirely complete. Yu and Cho (2008) and Dong and Pentland (2009) have also suggested traffic prediction models based on the Bayesian network.

Machine Learning Methods

Machine learning is a type of AI (artificial intelligence), where the systems can learn from the data. After learning, it can be used to classify the data and forecast.

Artificial Neural Networks

Artificial Neural network (ANN) falls under the category of data-driven forecast approaches. ANN sees the network nodes as ‘artificial neurons’. An artificial neuron is a computational model inspired by the natural neurons. The models basically consist of weighted inputs, and then computed by a mathematical process which determines when to commence the neuron. Another function determines the output of the artificial neuron.

ANN has been applied to the problem of traffic prediction and it exhibits good results (Zhang et al 1998). One of the problems with ANN is that it does not provide information about the relative significance of various parameters, because of this reason it is difficult to explain the whole network using this technique (Lapedes, 1987). The parameters are assigned in random manner, and ANN largely depends on network structure and complexity of examples, this leads to over fitting. Large amount of data required to train the system is another constraint of this model (Lapedes, 1987).

Vlahogianni et al (2007), Hu et al (2008), Srinivasan et al (2009) have applied ANN to the problem of spatio-temporal forecasting on road network.

Support Vector Machine and Regression

Vapnik (1998) first suggested an algorithm for Support Vector Machine (SVM) based on statistical theory. The main idea behind SVM is to analyze the data to identify pattern that can be used for classification.

Support Vector Regression (SVR) is an application of the SVM. It exploits the concept of support vectors for the purpose of time-series forecasting. There have been many applications of SVM in diverse fields from traffic prediction to rainfall forecast. Some examples are by Kamruzzaman et al, (2003), Wu et al, (2004), Chun et al, (2004), Toth et al, (2000) and Vanajakshi and Rilett (2004).

Vanajakshi et al (2004) compared the performance various methods for traffic forecast including ANN and SVM. The performance was better for SVM when the training dataset was small.

Wu et al (2003; 2004) applied SVR on the road network of Taipei, the travel times over different distance ranges were tested and the results were found to be better then prediction based on other methods.

Vanajakshi and Rilett (2004; 2007) compared SVR with ANN for travel time forecast. The tests were carried out the data from San Antonio's freeway for short time intervals. The results for SVR were found to be superior even when the size of the training data was small when compared to ANN. The performance of ANN improved with the increasing training set.

Online Support Vector Regression

Online Support vector regression is the ability to incrementally train the system rather than starting from the scratch every time new data is available. For the effectiveness of any transport management system, it is important that new information is quickly processed in the system. This is a relatively new technique and has been applied to a limited extent in the field of travel time prediction.

Castro-Neto et al (2009) has done a study for short-term traffic data in both typical and atypical conditions using Online SVR and other techniques. A comparison was done between Online SVR, GML (Gaussian Maximum Likelihood) and Holt exponential smoothing. Online SVR results were the best for atypical traffic conditions and GML results were better for typical traffic conditions.

This kind of approach is most infeasible for a real time traffic forecast system where new data is being generated every second. A more flexible approach is required where a stream of new information seamlessly gets incorporated into the existing model to provide a more relevant model for forecasting.

Summary of the Literature review

The subject of time series forecast has been very widely studied and various methods and techniques have been applied to achieve this, as can been seen in this chapter. These includes most parametric and non-parametric methods. Support vector based regression algorithm has provided some very promising results in a lot areas including traffic prediction and for this reason it has been selected for this project, where a variation of SVR known as online SVR is applied. The next chapter gives all the details about the methodology and processing steps related to this technique.

CHAPTER 3: Methodology

Introduction

This chapter covers the methodology part of the project. The first part of this chapter explains in more details the theory of SVM (classification of data), SVR (forecasting of data using regression) and kernel functions. Second section details how Online SVR works based on the conceptual and mathematical theory. Next section focuses on how will be the model set up during the analysis dealing with the validation problem and various options for the resolution. Last section of the project provides information about available software for this project, the online support vector regression algorithms applied and limitation of the existing application.

Support Vector Machine (SVM) and Kernel Function

Forecasting time-series data using a Support Vector Machine (SVM) is an application of Support Vector Regressions (SVR). It has shown to exhibit good prediction results in various areas. (Kamruzzaman et al., (2003), Toth et al (2000), Chun et al., (2004), Vanajakshi and Rilett (2004)). SVM is inherently a linear algorithm for supervised learning, but it can be converted into a non-linear method with the help of kernel functions.

SVM works by projecting the data into a higher dimensional feature space where a linear answer can be found. SVM separates the data into two distinct categories, by creating a multi-dimensional hyper plane. Instead of trying to fit the nonlinear curve into the given data, the idea is to make use of the kernel function which maps the data into a different space, where a hyper plane can be used to do the separation. The main goal of this model is to separate vectors in such a way that a favourable hyper plane can be found, so that one type of target variables are on one side and the other type of target variables are on the other side of the hyper plane (Parrella, 2009).

Data presentation in low dimensional space creates complexity but mapping the data in higher dimensions can be used to solve nonlinear problems. Kernel function (linear dot product of nonlinear mapping) represents the data in higher dimension in such a way that dimensional complexity is avoided (Lung, 2006).

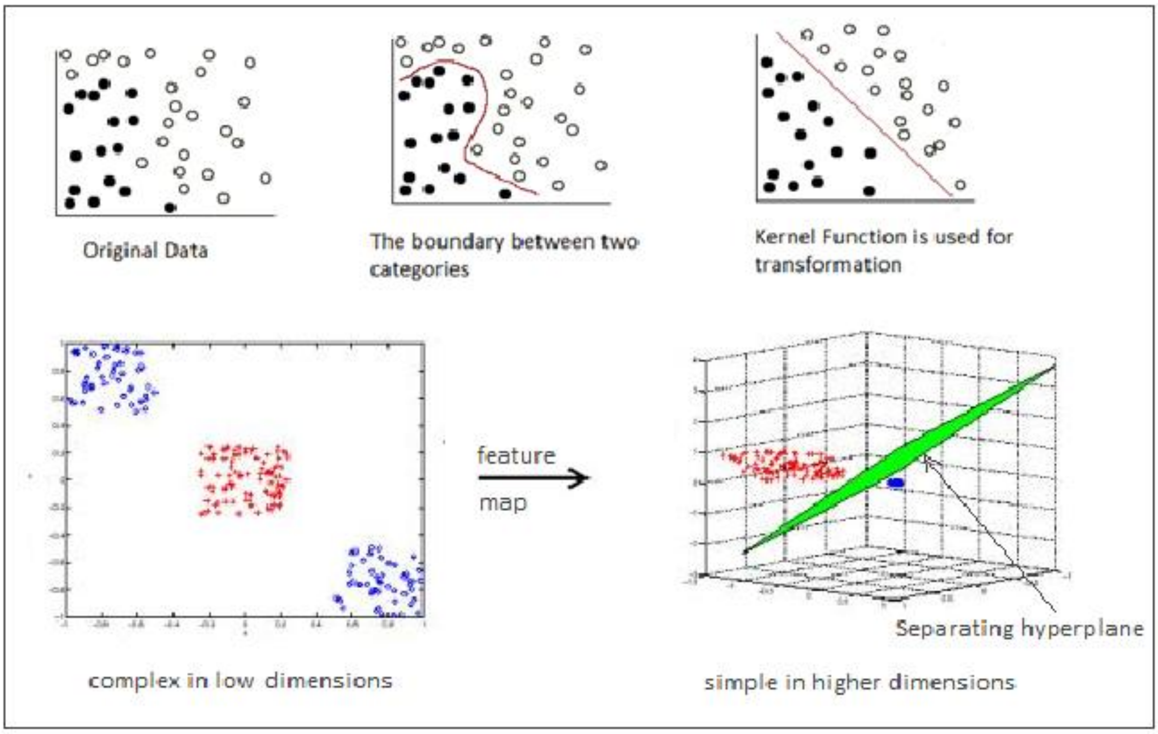


Figure 1: SVM classification

Figure 1 presenting a nonlinear function mapped into feature space. Source:

http://kernelsvm.tripod.com/

Traffic related data is inherently non-linear in nature and various kernels have been used for the prediction of travel time (Wu et al 2004), traffic speed (Vanajakshi and Rilett, 2004) and local forecasting (Chen et al, 2004). These are usually linear, polynomial, RBF Gaussian and Fourier kernel. There is not a single choice of kernel that is applicable to all kind of datasets. Parrado-Harnendez et al (2003) suggested that Gaussian might be good for spatial analysis and Fourier kernel might perform better for temporal analysis.

Table 2: Kernel functions in detail

Kernels	Functions
Linear	$x.y$
Polynomial	$[(x * x_i) + 1]^d$
RBF	$\exp\{-y\|x - x_i\|^2\}$
Fourier	$k_F(x,y) = \frac{1 - q^2}{2(1 - 2q\cos(x - y)) + q^2}$

Table 2 represent the mathematical basis of the kernel functions.

Support Vector Regression SVR and Online SVR

At the very core the processing required for Support Vector Regression is very simple. The process is summarized in the figure 2. SVR system takes a set of input data and train the model. This model is then used along with the independent variable to do the predictions.

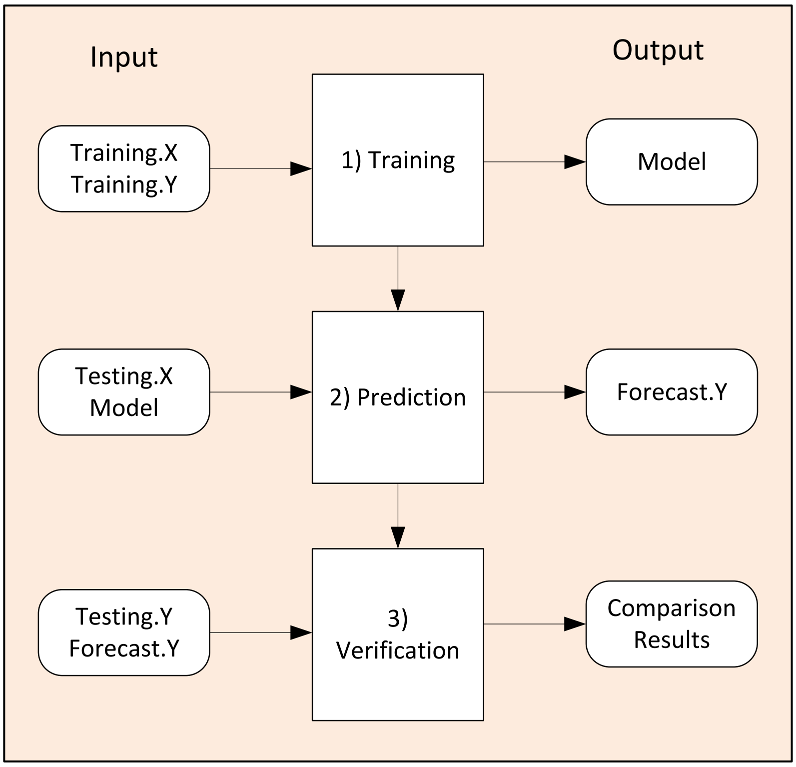


Figure 2: SVR overview

Learning Process: consists of training dataset pair of (X, Y)

Prediction Process: consists of testing X, which is used to find out predicted Y

Table 3: Conceptual and Mathematical Representation

Machine Learning/Conceptual Approach		Mathematical Approach	
Input	Output	X	Y
Data set itself based on dimension	Classified data	a vector of real numbers	A scalar real number

Table 3 shows how the same process is represented conceptually and mathematically. Sections below explains the theory in more detail.

Conceptual Theory for SVR

The SVR uses the similar principles as the SVM for classification. The difference is in output, as SVM only provides binary classification which is good for classification but not very useful for the purpose of regression. To solve regression problem we want the output as a real number.

Regression algorithms have loss function to estimate the quality of regression results. This loss function comes in many forms such as linear/quadratic loss function and ε-intensive loss function. For the purpose of this section, ε-intensive loss function (Vapnik, 1995) is explained in Figure A and B

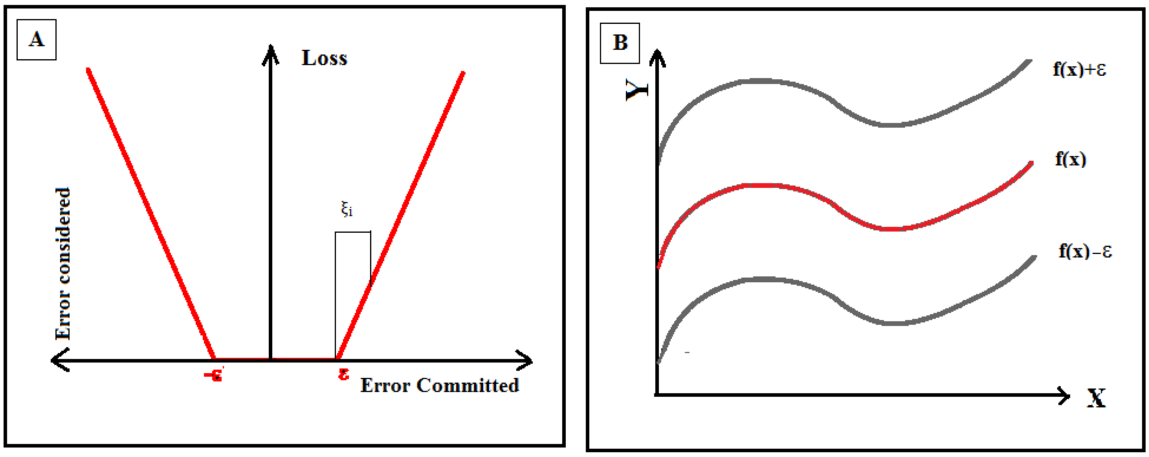


Figure 3 : Epsilon-intensive loss function (Thissen et al (2003), SVR Tube

Mathematical Theory for SVR

Problem Definition:

Basic concept of SVR with kernel function is presented as a convex optimization problem. The main reason is that support vector machine needs a$f(\times)$ function to derive away from all the training data and to prevent over fitting.

The definition of the some parameters in equations below;

Data = (((x_i, y_i),.... (x_n, y_n)), ($x_n \subset R^n$, $y_i \subset R$)

$x_i = input\ data$

$y_i = output\ data$

$W = margin$

$\phi(\times) = kernel\ function$

$Q_{ij} = K(x_i, y_j) = kernel\ matrix$

$a_i, a_i^* = Lagrange\ multipliers$

The generic SVR linear function can be defined as an equation below

$$f(\times) = (W^T.\phi(\times) + b) \quad (1)$$

$f(\times)$ function needs to be minimize with the first constrain equation

$$min_w \frac{1}{2} W^T W \quad (2)$$

The optimal regression function needs the second constrain equation, which means $f(\times)$ function approaches all pairs with ε precision.

$$\text{s.t.} \begin{cases} Y_i - (W^T.\phi(\times) + b) \leq \varepsilon \\ (W^T.\phi(\times) + b) - Y_i \leq \varepsilon \end{cases} \quad (3)$$

Machine needs to be enlarged with some slack-variables c($\xi_i = \text{above } \varepsilon$, $\xi_i^* = \text{below } \varepsilon$), so some error need to be allowed. C is a constant to balance between the model complexity/ the flatness of the function and the amount of larger deviations of tolerance.

$$min_{w,b} \frac{1}{2} W^T W \ + C \sum_{i=0}^{l} \xi_i \ + \ \xi_I^* \tag{4}$$

$$\text{s.t.} \begin{cases} -Y_i \ + \ (W^T.\phi(\times) + b) + \ \varepsilon + \xi_i \ \geq 0 \\ Y_i \ - (W^T.\phi(\times) + b) + \varepsilon + \xi_i \ \geq 0 \\ \xi_i \, , \xi_i^* \geq \ 0 \, , \ i \ = \ 1, .. \, l \end{cases} \tag{5}$$

Equation (4) aims to regularize weight size and penalizes large weights (Thissen et al, 2003). In equation (5) constraints set ≥ 0 to shows that this is a minimization problem.

The existence of double variables and simplify with positivity constraints. To optimize the problem, Lagrange function with all the constraints and Lagrange multipliers can be calculated after the completion of this section. Hence, the quadratic problem (the dual optimization problem) will be solved with the equation below.

$$min_{a_i, a_i^*} \ D = -\frac{1}{2} \sum_{i,j=1}^{l} (a_i - a_i^*)(a_j - a_j^*) < K(x_i \, , y_j) \ > - \ \varepsilon \sum_{i=1}^{l} (a_i + a_i^*) + \sum_{i=1}^{l} y_i (a_i - a_i^*) \tag{6}$$

$$s.t \ \sum_{i=1}^{l} (a_i - a_i^*) = 0 \text{ and } a_i, a_i^* \in [0, C] \tag{7}$$

The $f(\times)$ regression function is now with kernel function

$$f(\times) = \ \sum_{i=1}^{l} (a_i - a_i^*) \, K(x_i \, , y_j) \ + \ b \tag{8}$$

$$Kernel \ Function \ = K(x_i \, , y_j) = \phi(x_i).\phi(y_j) = Q_{\ ij} \ \text{(Smola et al, 1998)} \tag{9}$$

SVM is completed using kernel function and parameter C. The search task focuses on finding a set of parameters (C, σ) that maximize generalization performance.

Slowly changing the values for C and kernel parameters do not drastically alter the results of SVM. To minimize the computation of this search, we need a procedure that utilizes the current SVM solution to find a straightforward solution of the next quadratic program in the search. As new data becomes available, it is integrated into the quadratic program and support vectors are updated. This is a major ability of incremental learning SVR (Diehl et al, 2003).

Karush-Kuhn-Tucker (KKT) Conditions

Incremental learning techniques to help find support vectors over large datasets, have found extensive use in the SVM literature (Osuna et al, 1997, Platt et al, 1998, Friess et al, 1998, Joachims et al, 1999).

Incremental SVM learning is particularly attractive for active learning (Campbell et al, 2000). Most of these techniques need number of iterations to come to the correct support vectors.

The Karush-Kuhn-Tucker (KKT) conditions identify the solution of dual parameters under two conditions;

1. $\mathrm{a_i}, \mathrm{a_i^*} \neq 0$ (nonzero) and $\mathrm{a_i}, \mathrm{a_i^*} > 0$ (nonnegative)

Based on first condition coefficient difference defined $\theta_i = \mathrm{a_i} - \mathrm{a_i^*}$ (10)

2. In that case, margin function $h(x_i)$ is

$$h(x_i) \equiv f(x_i) - y_i = \sum_{i=1}^{l} \mathrm{Q}_{\mathrm{ij}}\, \theta_i - y_i + b \tag{11}$$

Combining Lagrange multipliers with equation (10) and (11), five conditions are appeared below.

$$\begin{cases} h(x_i) \geq \varepsilon, & \theta_i = -C \\ h(x_i) = \varepsilon, & -C < \theta_i < 0 \\ -\varepsilon \leq h(x_i) \leq \varepsilon, & \theta_i = 0 \\ h(x_i) = -\varepsilon, & 0 < \theta_i < C \\ h(x_i) \leq -\varepsilon, & \theta_i = C \end{cases} \tag{12}$$

Compared to support vector machine from equations (4 and 5) (Cauwenberghs et al, 2001) there are there conditions for classification, which are below.

$$Error\ Set\ (Error\ Support\ Vectors): E\ =\ \{i|\ |\theta_i| = C\} \quad (13)$$

$$Support\ Set\ (Margin\ Support\ Vectors):\ S\ =\ \{i|\ 0 < |\theta_i| < C\} \quad (14)$$

$$Remaining\ Set\ (Remaining\ Samples):\ R\ = \{i|\ \theta_i\ = 0\} \quad (15)$$

New sample will add in one of these three sets and the main idea is that condition of KKT has to be consistent.

Online Support Vector Regression Algorithms

Following is the pseudo-code of the algorithm used for online support vector regression. It is based on the work of Junshui et al (2003). The software implementation that has been used in the experimentation of this project is done by (Parrella, 2009).

INPUTS	OUTPUTS
1. TRAININGSET { x_i, y_i, i=1..l}	1. New TrainingSet { x_i, y_i, i=1..l +1}
2. WHEIGHTS θ_i, i=1..l	2. New Coefficients θ_i, i=1..l+1
3. BIAS b	3. New BIAS b
4. TRAININGSET Divided Into SUPPOTSET(S) , ERRORSET(E) and REMAININGSET(R)	4. New TrainingSet Division
5.PARAMS: ε, C , KERNELTYPE AND KERNELPARAM*s*	5. New R MATRIX
6. R MATRIX	
7. NEW SAMPLE C = (x_c, y_c)	

At the start Training Set, Coefficients, Support Set, Error Set, Remaining Set and R Matrix are initialized empty and the Bias is set to 0.

The output contains all the values given in input updated.

NEW TRAINING ALGORITHM

1. ADD (x_c, y_c) AT THE TRAININGSET
2. SET θ_c = 0

3. COMPUTE $f(x_c)$ and $h(x_c)$

4. IF $(|h(x_c)| < \varepsilon$

4.1 ADD NEWSAMPLE TO THE REMAININGSET AND EXIT

5. COMPUTE $h(x_i)$, i=1..l

6. WHILE (NEWSAMPLE IS NOT ADDED INTO A SET)

6.1 UPDATE THE VALUES β AND γ

6.2 FIND LEAST VARIATIONS (L_{c1}, L_{c2}, L_s, L_e, L_r)

6.3 FIND MIN VARIATION $\Delta\theta_c$ = min(L_{c1}, L_{c2}, L_s, L_e, L_r)

6.4 LET FLAG THE CASE NUMBER THAT DETERMINATES $\Delta\theta_c$

(L_{c1}=1, L_{c2}=2, L_s=3, L_e=4, L_r=5)

6.5 LET x_l THE SAMPLE THAT DETERMINES $\Delta\theta_c$

6.6 UPDATE θ_c , θ_i, i=1..l AND b

6.7 UPDATE $h(x_i)$, $i \in E \cup R$

6.8 SWITCH FLAG

6.8.1 (FLAG = 1)

6.8.1.1 ADD NEWSAMPLE TO SUPPORTSET

6.8.1.2 ADD NEWSAMPLE TO R MATRIX

6.8.1.3 EXIT

6.8.2 (FLAG = 2)

6.8.2.1 ADD NEWSAMPLE TO ERRORSET

6.8.2.2	EXIT
6.8.3	(FLAG = 3)
6.8.3.1	IF (θ_l = 0)
6.8.3.1.1	MOVE SAMPLE **l** FROM SUPPORT TO REMAININGSET
6.8.3.1.2	REMOVE SAMPLE **l** FROM R MATRIX
6.8.3.1	ELSE [θ_l = | C |]
6.8.3.2.1	MOVE SAMPLE **l** FROM SUPPORT TO ERRORSET
6.8.3.2.2	REMOVE SAMPLE **l** FROM R MATRIX
6.8.4	(FLAG = 4)
6.8.4.1	MOVE SAMPLE **l** FROM ERROR TO SUPPORT
6.8.4.2	ADD SAMPLE **l** TO R MATRIX
6.8.5	(FLAG = 5)
6.8.5.1	MOVE SAMPLE **l** FROM REMAINING TO SUPPORTSET
6.8.5.2	ADD SAMPLE **l** TO R MATRIX

Online SVR tries to check if the new sample can be inserted in the Remaining Set. If this does not happen, it starts a cycle that finishes only when the new sample is added to Support or Error set (cases 1 and 2). After each iteration, a sample migrates from one set to another. (Parrella, 2009).

Model Building:

The model building process comprises of number of steps such as training, grid search, cross validation and testing. Following is description of how these steps are executed for the implementation of the experiments:

1. As each link was to be analysed by the model independently, first step was to select the relevant data from the source files. This included filtering out the data that is not used for the link as well as the time period which is not considered. For example in the first experiment, only 3 months of Tuesday data is used for training and testing in the experiment.
2. The next step is to build the model's data in the form for X (independent variables) and Y (dependent variable) values and divide the data into training and testing parts. The model is based on Auto-regressive time series forecasting. It converts the input data i.e. the time reading taken at a given link into an equation where m previous values are used to predict the next output value. This part of the transformation is carried out using R and it is common for both Online and Offline SVR part of the experiment. As the Online experiment is conducted in a separate C++ based application, the training and testing files for the tests were exported from R software in a text format to be used for online SVR software.
3. As the experiment is comparing the results of online and offline SVR, the next step is to conduct the training for online part of the experiment. This is perhaps the most important of all the steps in the experiment. Once the training and testing files are loaded in the C++ based Online-SVR program. A cross validation process is carried out. Out of various options for cross validation as listed in the chap 3, k-fold cross validation was selected for the experiment. The results of k-fold cross validation and grid search can be found in the appendix of this report.
4. The next step carried out was to build the predictions using the best result of the grid search process. These results were automatically fed into the forecast module of the online SVR program. These forecast values are essentially the Y values for the testing X(x1, x2…xn) values.

5. Next step is the prediction using Offline SVR for the purpose of comparison. One point to reiterate here is that the same model input was used for both online and offline SVR.
6. Error indices are recorded separately for both online and offline SVR by comparing the results with the test Y. These indices include MAPE (Mean absolute percentage error) and NRMSE (Normalized Root Mean Square Error).

Finding Optimum Parameters for Online SVR model

The accuracy of a SVM system depends on the selection of model parameters. These parameters are C, Epsilon and kernel parameters. Other significant parameter is embedding value. As SVR model used in this project is based on autoregressive time series, embedding value m defines the number of previous values that will be used to predict the future value.

There are number of established methods to identify the best parameters for the model, these includes grid and pattern search. Grid search tries each parameter across specific range; hence it is computationally very expensive. Pattern search starts from a point and tries steps in each direction to identify the trend of error. In both cases the error values determines the best solution i.e. the parameter set with the smallest error.

For the main experiment in this project, a combination of the two search methods was carried out. First pattern search was carried out manually for a given link to identify the broad range of parameters values. This was followed by an intensive grid search using a combination of 5 values for each of the three parameters. A total of 5x5x5, a total 125 combination was tested using grid search to come at the best solution for a given experiment. The results of these experiments are detailed in the chapter 4

Below is a brief description of the parameters that were considered in the experiments. As mentioned earlier embedding dimension was not included in the grid search and a fixed value was used in experiment 1.

Table 4: SVR parameters in detail

The name of parameters	Symbology	Information of the parameters
Penalty Factor	C	C is referred to as cost parameter. It trades off between training error and strict margins. A larger value of C increases the cost by increasing the data errors; on the other hand a more accurate model may not be able to predict new data very well. Grid search applied in the experiments can provide the best value for C.
Loss Function	ε	The loss function signifies the small amount of error that is to be ignored. The radius of ε determines the number of the data will be selected as support vectors (Wu et al, 2004). Hence bigger the value of loss function fewer the number of support vector chosen (Cherkassky and Muiler, 1998). As a rule of thumb ε value should have a small value in order to get a good prediction
RBF Gaussian kernel	σ	Kernel parameter plays an important role in the prediction performance. For regression problems, (Wang, et al., 2003) demonstrate the existence of a certain range within which the generalization performance is stable. Finding that optimal value is carried out through a combination of grid search and cross validation.

Cross Validation

Cross-validation is statistical technique for evaluating the results of learning process in a way that it will generalize to an independent data set.

The **holdout method** is the simplest form of cross validation. The data set is divided into training and testing set. An estimator function is trained using only the training data. This function is then used to predict the output values for testing dataset. Errors for each data point are accumulated to give a mean absolute error (MAE). This method doesn't take longer to compute but has the drawback of high variance. The evaluation is significantly biased based on the dataset in the training data.

K-fold cross validation is an improvement on holdout method. The data set is divided into k subsets, and the holdout method is repeated k times. On each occasion one of the k subsets are used for testing and k-1 sets are used for the training. The final result is an average of all the accumulated errors. The obvious advantage of this method is that the division of the data in training and testing is not as significant as holdout method. Every data point gets tested once and used in the training set k-1 times resulting in lower variance. This method is computationally more expensive when compared to holdout cross validation. K-fold cross validation is applied for the experiments in this project to commute the error terms. Cross validation was carried out for each of the combination of parameters tested in the experiment.

Multi-Step forecasts

In building any advance travel information system the obvious goal is to be able to predict multiple values in the future to provide timely information to the users. All previous sections have largely focused on the search for the optimum parameters, training and validation (testing against historical data). In this section we will endeavour to demonstrate how all this modelling can be put to use, with multi-step forecast technique. There are number of variations in the execution of this technique, in this project the focus will be on one-step ahead forecast. In one step a head forecast, one new prediction is made and the results are used as input in the model to predict one value in the future for the time series. This process is iteratively repeated till the desired data points in the future have been predicted.

Software Evaluation

Numbers of software tools were evaluated in the course of the project. The main requirement was to have an implementation of Online Support Vector Regression, which is efficient enough so that extensive tests can be carried out using it. Majority of the available software provides online binary classification. Options such as 'one versus rest' and 'one versus one' classifiers to transform the binary classification into a multi-class output were considered, but not implemented because of time constraints

- R based 'kernlab' package provides ksvm function, it supports class-probabilities output and confidence intervals which is very useful to solve a regression problem, but it was not flexible enough to be used for incremental training.
- Matlab based implementation of Online SVR by (Francesco Parrella, 2009) does provide the exact functionality that was required for the testing of the experiment. One major difficulty that came out midway though experiments was that due to the scripting nature of Matlab implementation and high commuting requirement of online support vector regression and cross validation in this project, it was not possible to carry out any significant testing in this implementation due to the slowness of the software.
- Cauwenberghs and Poggio (2001) applied Incremental and decremental Support Vector Machine Learning in Matlab. It also provides just the binary classification
- SVM incremental on-line classification, LOO evaluation, and hyperparameter optimization (Diehl, 2003). The implementation in matlab just provides binary classification.
- In the end the C++ based implementation of Online SVR by Parrella (2009) was selected to carry out the tests. The code modifications and test scripts were written in 'Code Blocks' development environment.

Performance Estimation

There are number of errors indices that can be used to judge the effectiveness of any given model. They can be largely classified into two categories scaled and un-scaled. The amount of error in a result is largely dependent upon the input data and the choice of model and parameters used. Along with the numerical measure of accuracy a graphical plot that shows the forecast value alongside the test value is also a good indicator of the performance.

Error terms should have five desirable attributes in order to be effective, as defined by National Research council. These attributes are:

- Measurement validity
- Reliability
- Ease of interpretation,
- Clarity of presentation
- Support of statistical evaluation

(Wu et al, 2004) has used Root Mean Squared Error (RMSE) as performance indicator for travel time prediction. One major disadvantage of this measure is due to the fact that it is not scale-free and hence not possible to compare the results with any other system within the study area.

$$RMSE = \sqrt{\frac{1}{N}\sum_{i=1}^{n}\left|\frac{Y_i - Y_i^*}{Y_i}\right|^2}$$

Y : $observation\ value$, Y_i : $forecast\ values$

Below is a description of some of the measures of errors that have been used in this project along with their relative merits:

Normalised root mean squared error (NRMSE) is good measure, as it allows us to bring the RMSE values within a range The NRMSE is defined as:

$$NRMSE = \frac{RMSE}{y_{max} - y_{min}}$$

(MAPE) Mean Absolute Percentage Error fulfils all of these criteria according to Swanson et al, 2010. MAPE express accuracy as a percentage and is a widely used measure of accuracy. It is fairly simple, and uses all the observations in the calculation of errors. One disadvantage is that it can cause division by zero error in the calculation, in the event of 0 value observation and perfect fit.

Vanajakski (2007) took Mean Absolute Percentage Error (MAPE) to evaluate the results of the trained prediction models for the testing time.

$$MAPE \ = \frac{1}{N} \sum_{i=1}^{n} \frac{\frac{|actual - estimated|}{actual}}{Number} \times \%$$

CHAPTER 4: EXPERIMENT PLANS

Introduction

The effectiveness of support vector machines in comparison with statistical methods and artificial neural networks is well established. Its applications in forecasting using support vector regression in various fields including traffic forecast are also well documented. There are number of studies referenced in the literature review chapter of this report to highlight this.

There are two main objectives that are to be evaluated with the implementation of this project. Firstly weather the results of an online SVR forecasts are comparable with offline SVR forecast. The experiments can be considered a success if the error indices give a similar results. The second objective is to actually predict future values based on historical data.

Regardless of whether the training is done offline or online, the accuracy of the system is largely determined by the parameters of the model i.e. C, Epsilon and kernel parameter. For that purpose in the main experiment, a grid search was carried out on the parameter range to identify the parameters which yield the best accuracy. RBF Gaussian kernel is generally considered as a suitable option in most cases and was selected as a default choice of kernel in all experiments. The testing for various kernels was not in the scope of this project, and for all the experiments the kernel of choice was kept constant at RBF Gaussian. This allowed us to see the effects based on changes in other parameters.

The first section of this chapter details the experiment plans including, study area, data description and the analysis of the data. This is followed by details about the experiment setup for offline and online SVR and the range of parameters used for cross validation and grid searches.

Study Area

London's road network is an important part of London's transport infrastructure. Transport of London has supported a number of studies in the field of travel time forecast to provide improved service and reliable journey times.

Data for this project is sourced from a network of approximately 1500 video cameras that are distributed along the roads of the capital. Individual vehicles are observed continuously, and their travel times are aggregated at the 5 minute level by the these cameras and the data transmitted to the London Transport Control Centre (LTCC), where Automatic Vehicle Identification (AVI) software recognises the number plate of a vehicle and records the journey time.

To organize the information in a structured manner, the road segments are defined by the camera locations called links. There are a total of 342 links available to for analysis in the whole network. A subset of 10 links have been selected to include for analysis in this project. The decision to select 10 links from the total is based on number of factors. Firstly the links are selected from different geographical locations from the network to cover the whole of the road network. Secondly, to test the temporal model, the 10 LCAP links are selected based on the average data frequency (number of vehicles per observation). Table 4 lists the selected links and their relative average frequencies.

Table 5: Average data frequency per link

Link ID	24	26	442	454	1815	1799	453	1798	2448	881
Avg. Frequency	20.95	15.49	14.09	11.74	68.82	31.69	13.74	28.53	9.37	18.96

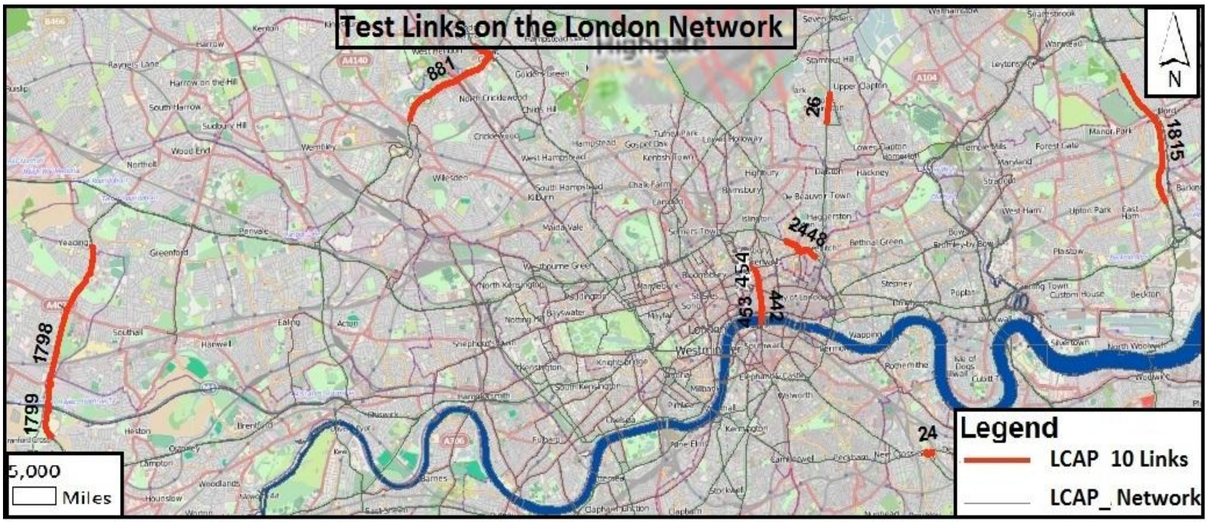


Figure 4: London road network and the selected links

London road network with the links that have been used in this study are highlighted in red colour in figure 4

Data Description

There are a total of 49,321 data entries available for analysis, starting from 1st January 2011 to the 15th of October 2011. These are based on 180 entries recorded every day at 5 minute interval from 6am to 9pm, for 342 segments on the road network. Data for 14 days is missing between the 20th of February and the 5th of March.

Table 6: Data breakdown (I)

Month	Date	The number of days
Jan	1st – 30th Jan	29
Feb	31st Jan – 19th Feb	20
Mar	6th - 30th Mar	24
Apr	Complete month	30
May	Complete month	31
Jun	Complete month	30
Jul	Complete month	31
Aug	Complete month	31
Sep	Complete month	30
Oct	In complete	15

There is a consecutive 6 months period where no data is missing; this is from April to September 2011. This 6 months period is equal to 183 days. The initial tests were done using this six months data; this was reduced to 3 months after some testing was carried out. The reason was that six months data was still quite large for further analysis, especially for checking 125 parameter combinations using grid search and k-fold cross validation.

Three months data is further divided in three peak periods in the data; AM peak (06:00 – 09:55), INTER peak (10:00 – 15:55) and PM peak (16:00 – 21:00). Tuesday was selected for further analysis as it is away from the influence of weekend traffic and has good pattern compared to other days of the week. This can be seen from the data analysis section that will follow in the next section.

Table 7: Data breakdown (II)

Description	Records
(86 days in the total of 183 days is available in three months time (Tuesdays)	15480
Total readings for the 3 months for only Tuesdays (780*3(am, inter, pm)= 2340	2340
AM/INTER/PM readings : (1 readings (AM)/13 days	780
Training data: (624/780)	624
Testing data:(153/780)	153
Forecast/Validation data:	153

Data Analysis:

Before carrying out any modelling using online/offline SVR, some basic analysis was done using line charts of the time series data. This is to show the general trends in the data and seasonality inherent within it.

Link 26 was selected as starting point for the analysis. The idea was to identify very broad trends within the data. This subset of the data is further processed through the model and used in the prediction and experimentation for Online/Offline SVR

Figure 5 shows one month data i.e. June 2011 and 4 weeks of June 2011 separately. The highlighted section is a day's worth of data in each of the chart. As can be seen clearly, there are peaks and troughs from one day to the next showing similar pattern. Further analysis will highlight the variations during the weeks and within the day. All this will help us identify the repeating patterns that can be modelled in a forecast system.

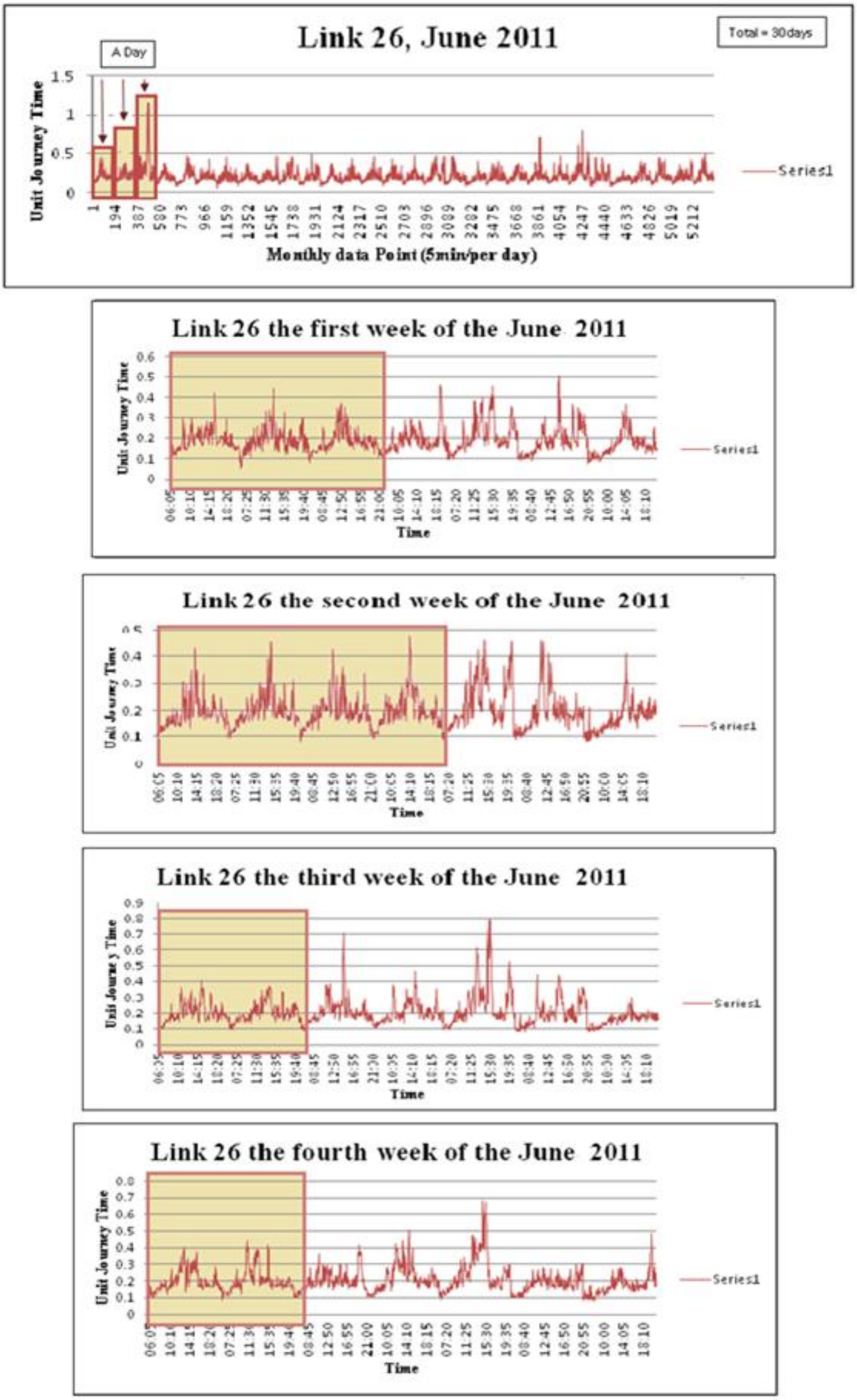
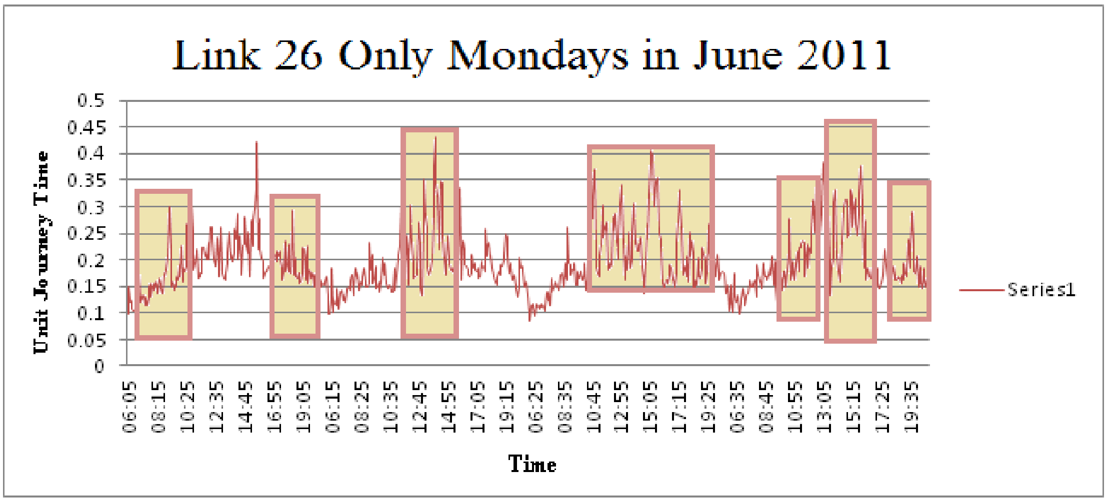


Figure 5: Link 26 data analysis

Mondays and Tuesday's data is more consistent compared to other days for the purpose of modelling. The remaining days have patterns which are influenced by factors such as weekend affect. This same pattern for Monday and Tuesday is present throughout the data.

To understand pattern difference between Monday and Tuesday, the same data is presented one more time based on "all Mondays in June, 2011" and "all Tuesdays in June, 2011" in figure 6



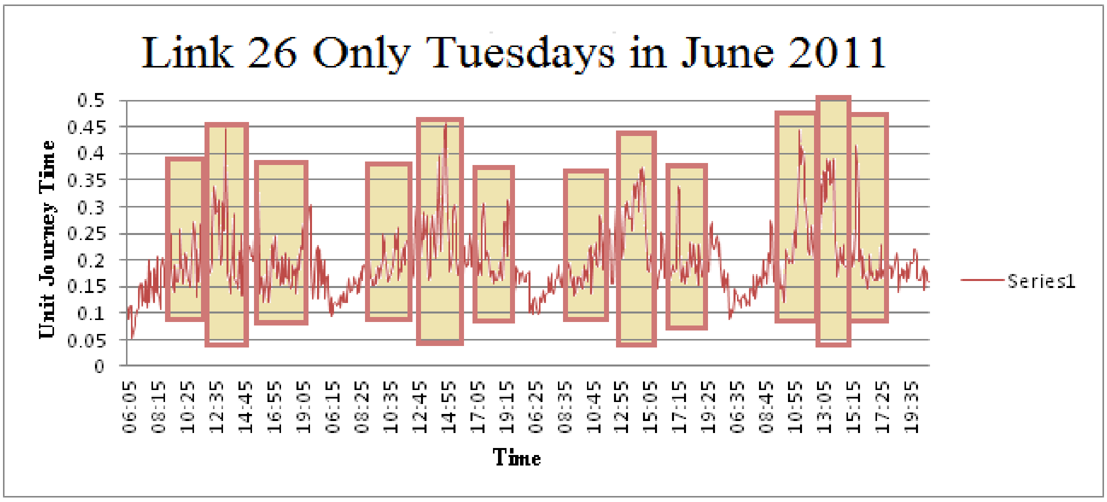


Figure 6: Days of the week

Although both Tuesday and Monday have consistently good patterns, and are good candidates for use in the forecast models. AM, PM and INTER peak separation is better in Tuesday hence it has been selected for use in the model.

So far in this chapter, the rationale behind the selection of the links and Tuesday data has been explained. Figure 7 is meant to highlight the further separation of the total day's data into various peak time periods i.e. AM, PM and INTER

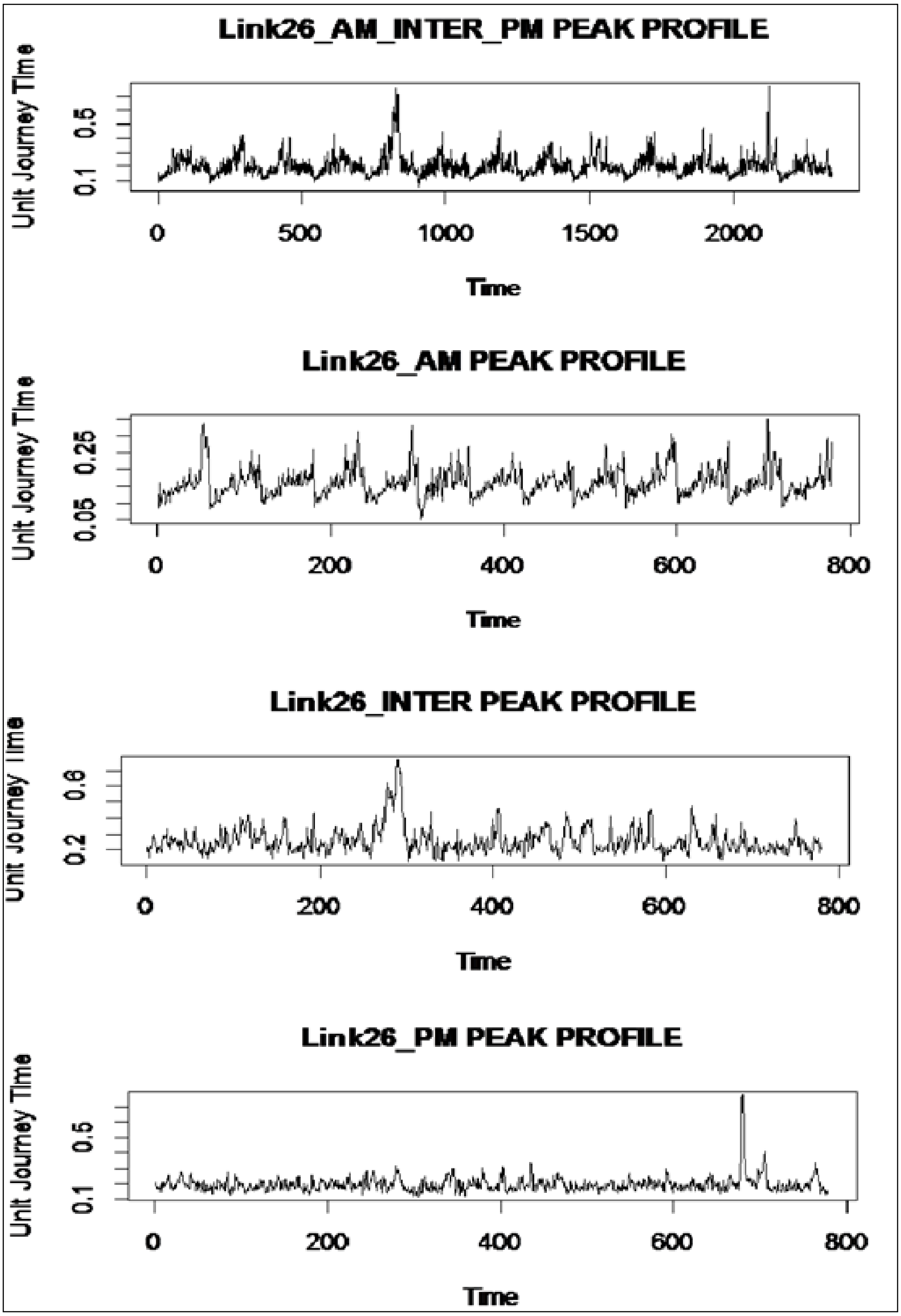


Figure 7: Various peak periods in a day

Experiment Plan Design

Experiment 1: Comparison between Online SVR forecast and Offline SVR forecast

The experiment is divided into multiple parts based on the AM, INTER and PM peak divisions of the data. All the tests are carried out for the 10 links. The tests include a combination of grid search on the parameter range as well as the cross validation of the test data.

Through changing different combinations of parameters (C, Sigma, and Epsilon) while keeping the embedding value at constant at m=3 and kernel function at RBF Gaussian, prediction accuracy of the three peak time periods are evaluated. Error term is the determining factor to gauge the performance of one set of parameter over the other. The combination with the minimum absolute mean error value is the best result. A series of broader values were first checked against each parameter and following range of parameters was narrowed down for the grid search:

Table 8: Parameter Range for cross validation and grid search

Epsilon	C	Kernel Parameter
0.0050	1	0.100
0.0075	21	0.400
0.0100	41	0.800
0.0250	61	1.200
0.0500	81	1.600

Error indices of RMSE, MAPE, NRMSE and ME are also calculated and compared in this experiment. K fold cross validation at subset size of 12 was used.

Experiment 2: Multi-step ahead forecast

Multi-step test was carried out on a selected link i.e. 1798 for one step a head forecast. It was built on the same dataset that was used for experiment 1. In multi-step ahead forecast the previous predicted values are used to predict future values. The results for this test include comparison with the test data. All the error indices calculated were with reference to the test data.

Two experiments have been designed to evaluate the accuracy of online SVR and its ability to forecast future values. The detail results including accuracy tables and comparison plots. These are presented in next chapter

CHAPTER 5: RESULTS

Introduction

This chapter details the results of the experiments that are carried out in this project. The main experiment was to compare the accuracy of the forecast between offline and online support vector regression. The tests were carried out on a total of 10 links for AM, INTER and PM peak data. The prediction of online and offline SVR were based on the best results for each link and peak time dataset. Accuracy comparisons between online and offline SVR predictions were done using various error indices and charts.

Search for optimum parameters

The detailed results of each of the combination tested for each link are attached in the appendix of this report. Some of the links were sample tested to identify the broad range of parameters to be used, which is then applied to all the links. The results presented in this section give a summary of each link and peak time after cross validation and grid search. Mean Absolute Error (MAE) was the determining factor for each result. A Parameter set with the lowest value of MAE were selected for each link

Table 9: Best Results - AM Peak – All 10 links

Best Parameters (AM Peak)				
Link Name	Epsilon	C	Kernel P. (Sigma)	Error
24	0.01	1	0.1	0.084909
26	0.01	21	1.6	0.021639
442	0.025	1	0.4	0.033345
453	0.01	41	0.1	0.029716
454	0.0075	41	1.6	0.037972
881	0.0075	81	1.6	0.011956
1798	0.0075	81	0.1	0.006469
1799	0.005	1	1.6	0.012101
1815	0.005	81	1.6	0.00174
2448	0.0075	21	0.8	0.022199

Table 9 presents the best results for all 10 links for AM peak data. The error term vary significantly from one link to another. This is not a measure of how good or bad the results for a link are in comparison with other links, as the absolute mean error is not a scaled error index. Further down in this chapter scaled error indices have been computed for each link and peak time as well as for offline and online SVR predictions. Scaled indices are good for comparison with other links as well as with other forecast methods.

Table 10 is a summary of best results for inter-peak data for Tuesday. As can be seen from the results all the parameters vary for almost all the links, which just goes to show that the grid search method has been effective in identifying the best results across a range of parameter combinations.

Table 10: Best Results - Inter-peak – All 10 links

Best Parameters (INTER Peak)				
Link Name	**Epsilon**	**C**	**Kernel P. (Sigma)**	**Error**
24	0.0075	1	0.4	0.065332
26	0.0075	21	0.8	0.038447
442	0.01	21	0.1	0.031862
453	0.0075	1	1.6	0.02285
454	0.025	61	0.1	0.031548
881	0.005	41	0.8	0.011191
1798	0.005	21	1.6	0.005822
1799	0.0075	61	0.4	0.006465
1815	0.005	21	0.1	0.00653
2448	0.025	21	0.1	0.049533

Table 11: Best Results - PM Peak – All 10 links

Best Parameters (PM Peak)				
Link Name	Epsilon	C	Kernel P. (Sigma)	Error
24	0.0075	1	0.4	0.030298
26	0.005	81	1.2	0.022141
442	0.01	41	1.2	0.028448
453	0.005	21	0.4	0.018169
454	0.005	61	0.4	0.030865
881	0.005	41	0.4	0.008692
1798	0.005	21	0.4	0.005073
1799	0.005	41	0.1	0.009118
1815	0.005	21	0.1	0.005033
2448	0.0075	21	0.1	0.043233

Table 11 presents the results of PM peak data for all the links

Comparative Accuracy of Online and Offline SVR

First part of this section presents the results of various accuracy measures for both online and offline predictions across all links and time periods. There is no one verdict on these tests. In some cases offline prediction worked slightly better and in other cases online. The differences in error for the two methodologies were very small in almost all cases.

These results confirms the initial expectation for applying online SVR i.e. with online SVR there is no significant deterioration in the accuracy but we have the added benefit of training the systems in real time.

Table 12,13,14 present a summary of the entire comparison test that were conducted for the 10 links across three peak time periods. The results summarize the ME/ RMSE/ NRMSE/ MAPE indices against the best parameters for each link.

Table 12: Error Indices - AM Peak Profile

AM PEAK		ME	RMSE	NRMSE	MAPE	BETTER RESULT
24	Offline_SVR	0.0265956	0.1319304	57.9	20.39117	OFFLINE
	OL_SVR	0.0258126	0.1372714	60.3	21.41138	
26	Offline_SVR	0.0045385	0.0362291	80.5	14.58972	OFFLINE
	OL_SVR	0.0031414	0.0365437	81.2	15.38996	
442	Offline_SVR	-0.001638	0.03811	52.5	12.40597	OL_SVR
	OL_SVR	-0.001831	0.037999	52.3	12.26753	
453	Offline_SVR	-0.001088	0.0329616	60.2	14.21056	OL_SVR
	OL_SVR	-0.001086	0.0337217	61.6	14.75782	
454	Offline_SVR	-0.001287	0.0326951	88.1	13.03072	OFFLINE
	OL_SVR	-0.000736	0.0331764	89.4	13.7374	
881	Offline_SVR	0.004327	0.0201397	39	11.85828	OL_SVR
	OL_SVR R	0.0037286	0.0188767	36.6	11.60446	
1798	Offline_SVR	-0.001135	0.0079608	18.8	6.403002	OL_SVR
	OL_SVR	-0.000593	0.007973	18.8	6.239834	
1799	Offline_SVR	-0.000401	0.0134769	61.5	8.44403	OL_SVR
	OL_SVR	-0.000351	0.0134498	61.4	8.342709	
1815	Offline_SVR	-0.001152	0.0031857	47	3.601482	OFFLINE
	OL_SVR	-0.001233	0.0032106	47.4	3.971001	
2448	Offline_SVR	-0.000713	0.0297911	62.3	11.06359	OFFLINE
	OL_SVR	-0.000975	0.0297868	62.3	11.08628	

As can be seen from the AM peak results the error indices for all the links across all time periods are almost similar for online and offline SVR. Link 1815 is the only exception.

Table 13: Error Indices - INTER Peak Profile

INTER	PEAK	ME	RMSE	NRMSE	MAPE	BETTER RESULT
24	Offline_SVR	0.01563512	0.08630439	74.2	19.13992	OL_SVR
	OL_SVR	0.01549016	0.08463621	72.7	18.44065	
26	Offline_SVR	-0.000413624	0.04353323	73.1	13.91845	OFFLINE
	OL_SVR	-0.000504048	0.04355276	73.3	13.93669	
442	Offline_SVR	-0.003141808	0.02810852	83.1	12.39824	OL_SVR
	OL_SVR	-0.003299976	0.02811653	83.1	11.94065	
453	Offline_SVR	-0.00032291	0.01946383	84.1	9.7486	OFFLINE
	OL_SVR	-0.000601494	0.01964955	84.9	9.874105	
454	Offline_SVR	-5.96E-05	0.02325055	103.7	9.810482	OFFLINE
	OL_SVR	0.001231983	0.02248366	100.3	8.992344	
881	Offline_SVR	-8.12E-05	0.01047599	92.6	9.725187	OFFLINE
	OL_SVR	-0.000235516	0.01047941	92.6	9.762155	
1798	Offline_SVR	-0.001323973	0.00659126	31	6.164866	OFFLINE
	OL_SVR	-0.001378495	0.00671199	31.5	6.303222	
1799	Offline_SVR	0.002021051	0.00772112	92.1	6.03294	OL_SVR
	OL_SVR	0.001965301	0.00771144	92	6.004025	
1815	Offline_SVR	-0.000353338	0.00118715	132.1	2.009841	OFFLINE
	OL_SVR	-0.003029068	0.0031655	352.3	6.852764	
2448	Offline_SVR	-0.00594787	0.04322159	48.4	11.88035	OFFLINE
	OL_SVR	-0.001041483	0.04545366	50.9	12.07464	

The same applies to inter peak and PM data; the results are almost similar for online and offline SVR with the exception of link 1815.

PM PEAK		ME	RMSE	NRMSE	MAPE	BETTER RESULT
24	Offline_SVR	0.006759082	0.04694567	81.8	12.73593	OFFLINE
	OL_SVR	0.006424882	0.04854702	84.6	13.0264	
26	Offline_SVR	0.01865886	0.07683489	87.8	14.30736	OL_SVR
	OL_SVR	0.01398975	0.05515882	63.1	12.65318	
442	Offline_SVR	0.1235539	0.5753017	108.4	15.46392	OFFLINE
	OL_SVR	0.1192501	0.5724632	107.9	22.9422	
453	Offline_SVR	0.0022307	0.02471502	54.9	11.15665	OL_SVR
	OL_SVR	0.001540767	0.02448259	54.3	10.9184	
454	Offline_SVR	-0.002640196	0.02165469	90.4	9.06828	OL_SVR
	OL_SVR	-0.002332727	0.02089937	87.2	8.66549	
881	Offline_SVR	0.001282811	0.01255821	26.5	8.451466	OL_SVR
	OL_SVR	0.000816348	0.01078681	22.8	8.104014	
1798	Offline_SVR	0.000404394	0.00897436	19.4	5.789909	OL_SVR
	OL_SVR	-0.000312747	0.00903548	19.6	5.728319	
1799	Offline_SVR	0.001496165	0.0111016	67.3	7.155857	OL_SVR
	OL_SVR	0.001306553	0.01048884	63.6	6.789785	
1815	Offline_SVR	-0.001242527	0.00194826	153.9	3.492584	OFFLINE
	OL_SVR	-0.003140493	0.00339342	268	7.399589	
2448	Offline_SVR	0.002897472	0.03437658	81.2	11.73705	OFFLINE
	OL_SVR	0.00585508	0.03801774	89.8	12.31497	

Table 14: Error Indices - PM Peak Profile

Table 15 is for AM, Inter-peak and PM data comparison, the error measure MAPE is used to compare the accuracy of the forecast for various time periods as well as links. The last column gives the order of best result for each time period. It highlights that out of the three segments of peak time that have been tested, we can gauge which time period has been most suitable for forecast based on the data that was trained and model used

For example, link 24 error value is 20.39117, 19.13992 and 12.73593 for AM-peak, inter-peak and PM peak data, respectively . This just goes to show the model adapted best for PM data, compared to inter-peak and then AM data. This could be due the nature of the traffic for that link which may predictable (based on past data) in the evening than other times or could be that model adapted best to the underlying characteristics of this link

Similarly link 1798 and 1799 has the least error among the links, which suggest that it suited best to the model that was applied for forecast. There may be a need to tailor each period and each link independently so that it better reflect the underlying nature of the traffic. This is something that can be taken up as future work in the area.

Table 15: Intra-day results

Links Online/Offline SVR		AM MAPE	INTER MAPE	PM MAPE	Order of best results
24	Offline_SVR	20.39117	19.13992	12.73593	PM, INTER,AM
	OL_SVR	21.41138	18.44065	13.0264	PM, INTER,AM
	Offline_SVR	14.58972	13.91845	14.30736	INTER, PM, AM
26	OL_SVR	15.38996	13.93669	12.65318	PM, INTER,AM
	Offline_SVR	12.40597	12.39824	15.46392	INTER, AM, PM
442	OL_SVR	12.26753	11.94065	22.9422	INTER, AM, PM
	Offline_SVR	14.21056	9.7486	11.15665	INTER, PM, AM
453	OL_SVR	14.75782	9.874105	10.9184	INTER, PM, AM
	Offline_SVR	13.03072	9.810482	9.06828	PM, INTER,AM
454	OL_SVR	13.7374	8.992344	8.66549	PM, INTER,AM
	Offline_SVR	11.85828	9.725187	8.451466	PM, INTER,AM
881	OL_SVR	11.60446	9.762155	8.104014	PM, INTER,AM
	Offline_SVR	6.403002	6.164866	5.789909	PM, INTER,AM
1798	OL_SVR	6.239834	6.303222	5.728319	PM, INTER,AM
	Offline_SVR	8.44403	6.03294	7.155857	INTER, PM, AM
1799	OL_SVR	8.342709	6.004025	6.789785	INTER, PM, AM
	Offline_SVR	3.601482	2.009841	3.492584	INTER, PM, AM
1815	OL_SVR	3.971001	6.852764	7.399589	AM, INTER, PM
	Offline_SVR	11.06359	11.88035	11.73705	AM, PM, INTER
2448	OL_SVR	11.08628	12.07464	12.31497	AM, INTER, PM

The Results of Plots

Plot results for 10 links (am/ inter/ pm) are also available along with this report. In total: 30 different results showed that AM/PM peak results are better in accuracy than inter-peak. The results of online and offline predictions plots are very similar. Along with the comparative performance of the two methodology offline and online, the SVR regression results as a whole very closely follow the test data, which is a good results for support vector regression.

The results of three links can be seen in this chapter, remaining results are appended in the appendix of this report. Link 24 is randomly selected, Link 1798 is the best accuracy, link1 815 has the worst accuracy.

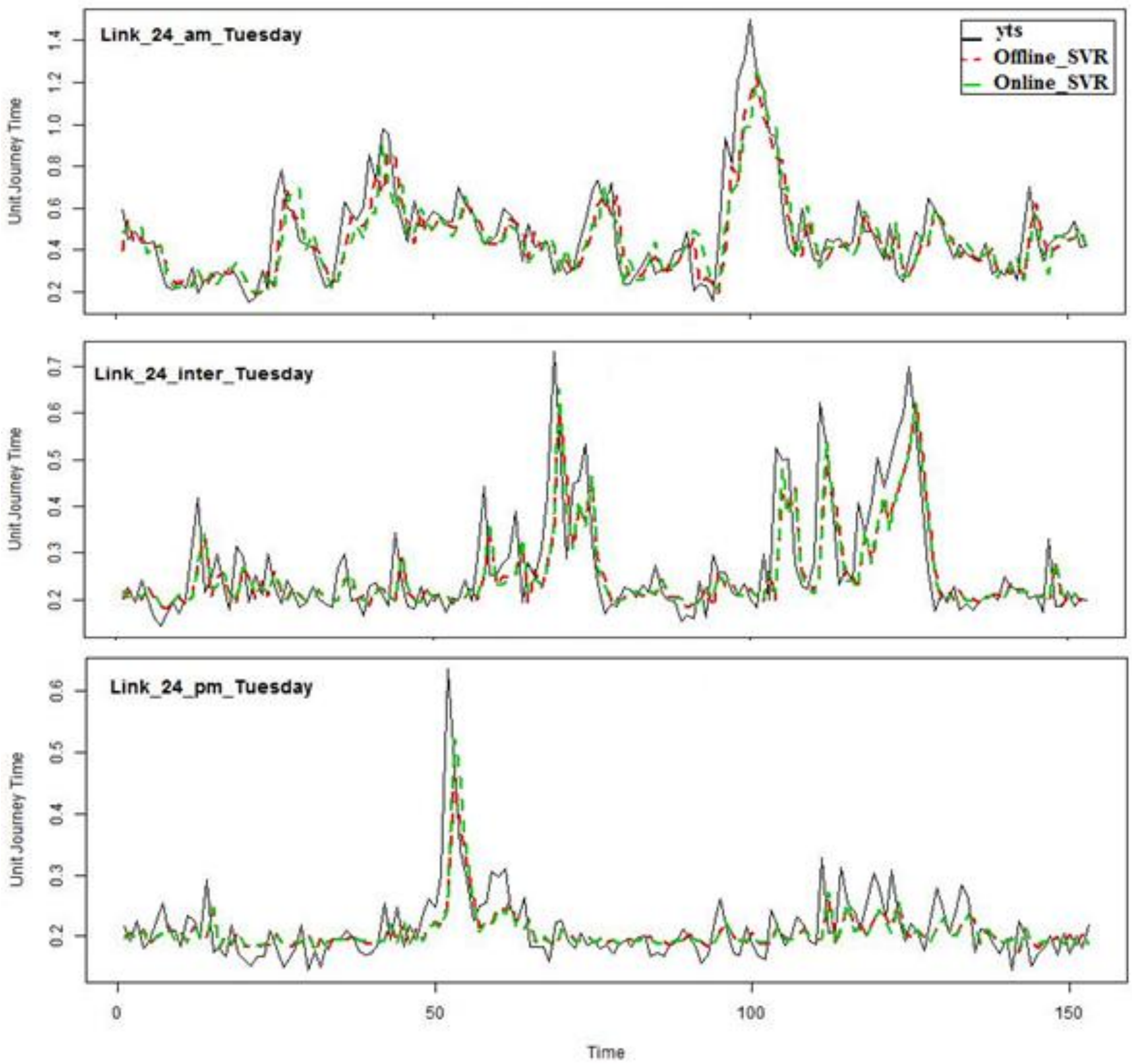


Figure 8: Link 24 AM, INTER, PM Peak forecasting

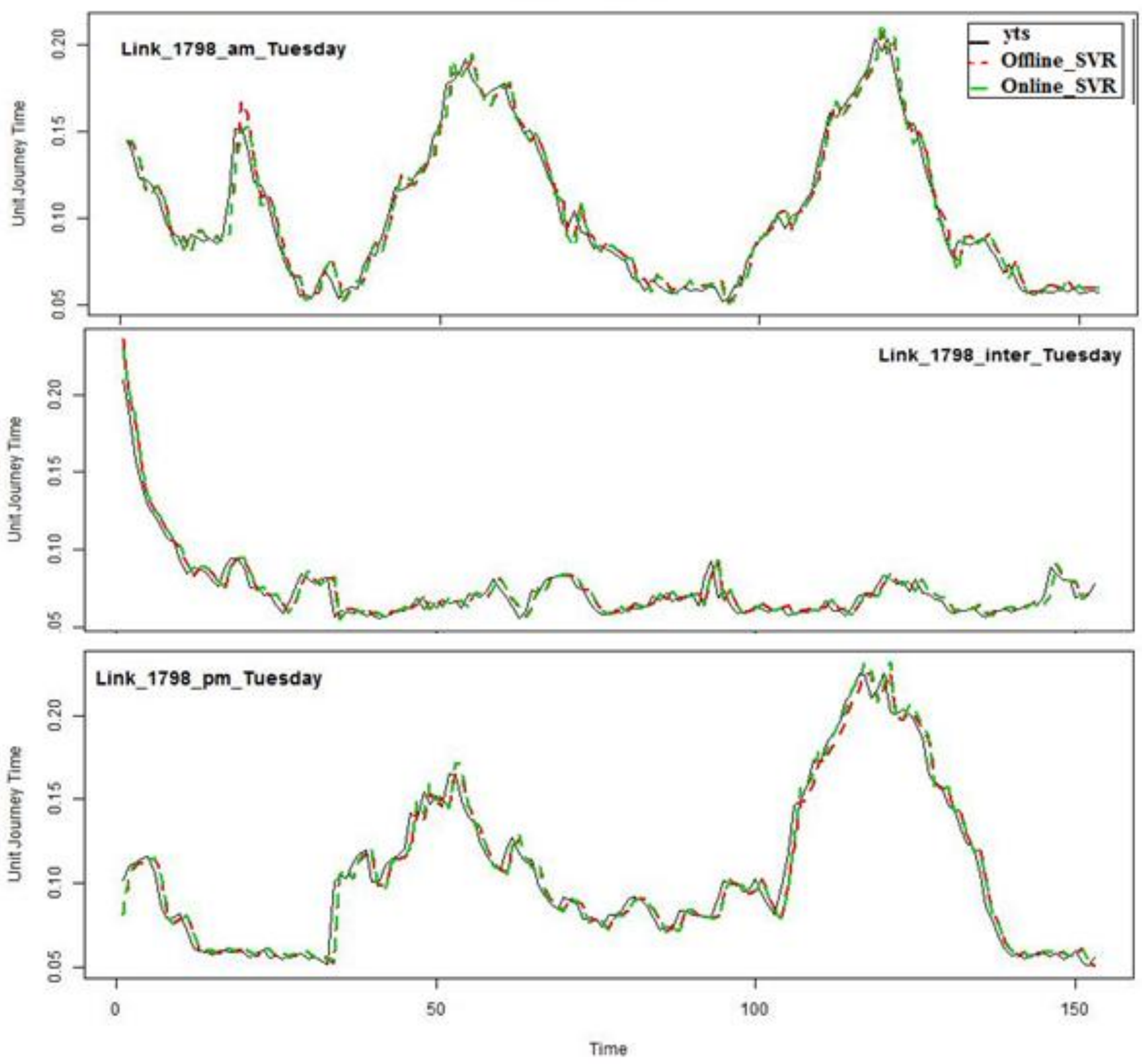


Figure 9: Link 1798 AM, INTER, PM Peak Forecasting

There were few unexpected results e.g. Inter peak and PM peak for link 1815. This can be better visualized from figure 10. This odd result could have been caused by the unusually high peaks in the data for this link. This seems to have affected the online based prediction more than offline.

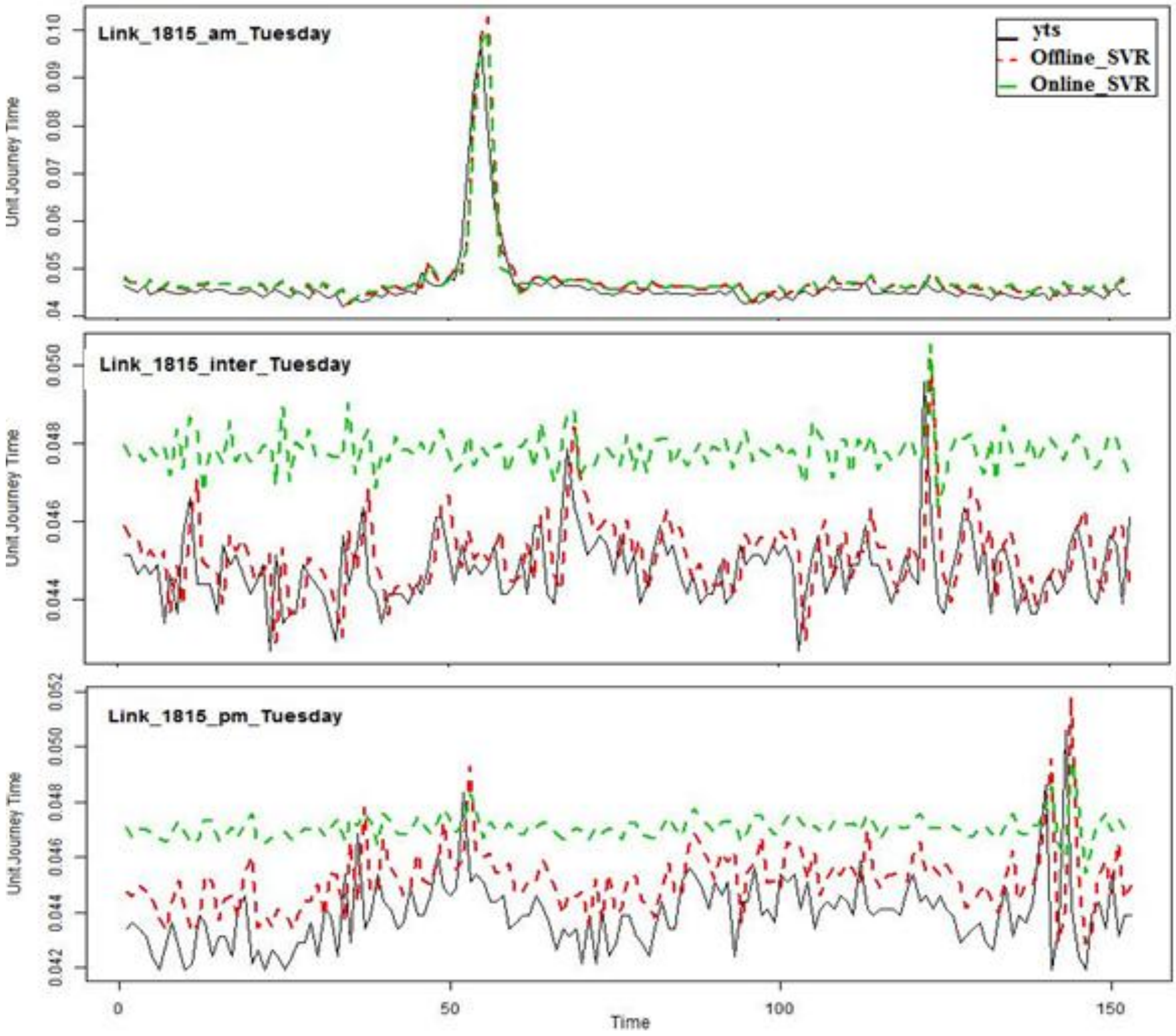


Figure 10: Link 1815 AM, INTER, PM peak Forecasting

Multi-step forecast result:

This section summarizes the results of multi-step ahead test. As mentioned in previous chapter, this is a limited test only focusing on one link and one time period. The comparison plot below shows predicted values in red and original test data in black colour. This chart is only meant for approximation rather than strict comparison. As the methodology only meant to predict future values that are not used in the validation process with test data.

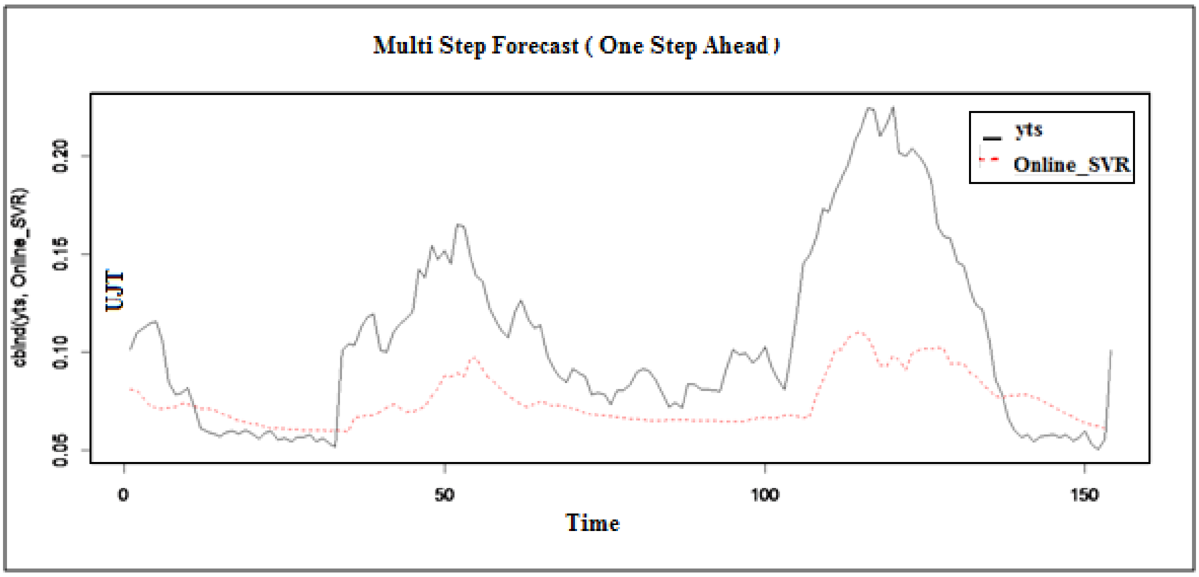


Figure 11: Multi-Step Forecast

Table 16: Multi-Step Forecast Accuracy

ME	RMSE	MAE	MPE	MAPE
0.03106408	0.04751828	0.03576638	20.2157	28.4665

Table 16 summarize the results of multi-step ahead forecast technique

CHAPTER 6: CONCLUSION & DISCUSSIONS

Conclusion

Travel time data is an important factor in understanding the behaviour of traffic flow on the road networks. It provides useful information about rapidly changing characteristics of the traffic environment and helps build a temporal model for forecast. This project was aimed to utilize the historical data to build a real time model for forecast.

A machine learning technique known as online support vector regression was employed in this project. Accuracy of Online SVR was compared with more established technique Offline SVR to determine if the performance of online SVR is comparable with offline SVR. The tests were conducted on the historical travel time data The experiment for Online SVR were carried out by incrementally training the system, which is to show that this technique can be very easily adapted to real-time data. In addition to the comparison with the offline SVR, an extensive cross validation and grid search based experiment was carried out for online SVR. This experiment identified the best SVR parameters of kernel, Epsilon and C.

In almost all the experiments the accuracy of online SVR was comparable with batch SVR. In some cases the results were even better than offline SVR. With the advantage of incremental training, there is a good justification for applying online SVR to real-time traffic management systems. The results were quite promising and highlighted the fact that online SVR is a viable option to consider in the field of real-time traffic flow management. This study also paved the way for further research in this field where spatial-temporal model can be developed to more accurately capture the changing trends of traffic flow.

Although the bulk of the emphasis of this project was towards the comparison between the accuracy of online and offline SVR by means of validation and testing using historical data, actual forecast techniques were also applied in one of the experiment to predict future values. This was conducted by employing multi-step ahead forecast. To demonstrate that it can be achieved, one-step ahead was done, by means of using the predicted values as input to predict future values. This part of the test only focused on one small subset of the test data set (one link and time period). The results were not as good when compared with historical test data, as by feeding in predicted values in the system, the effect of earlier training gradually seems to fade away over time.

Discussion

Number of things came out in the course of the analysis and experimentation of this project. Not all of these could have been investigated in more detail due to the time restrictions and scope of this project. Below is a summary of areas where more work can be carried out.

- The experiments that were carried out in this project were all based on one Autoregressive (AR) temporal model i.e. the forecast value was dependent on the previous 3 historical values i.e. m=3. It was observed that the AR model for the forecast performed better for some links and time periods compared to others. There may be a need to adapt this in a more flexible manner so that each link and time period can be modelled individually. This could be achieved as demonstrated by (Li, 2010). We need to include the embedding parameter m in grid search. This would increase the overall time required for grid search.

- Actual predictions values were computed using multi-step ahead technique in one of the experiment. The method applied was one of the few techniques used for this purpose. This aspect of the experiment can be further worked by applying 2 and more steps ahead forecast as well as attempting other techniques.

- The project was focused completely on the temporal aspect of the data by looking at one link at a time. In a complex road network traffic situation, a link on the network is often spatial correlated with each other links. This effect can be captured by a more sophisticated model that can incorporate both temporal and spatial aspect of the road network. The online SVR component of the system can still be applied to such a model as it is.

- If the data for atypical road network condition is available it can also be modelled using this online SVR approach. This should give better results as demonstrated by CASTO-NETO et al (2009).

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LIST OF ABBREVIATION

AI	artificial intelligence
ANN	Artificial Neural Network
ARIMA	Auto-Regressive Integrated Moving Average
ATIS	Advance Traveller Information System
ATMS	Advance Traffic Management System
AVI	Automatic Vehicle Identification
GARCH	Generalized Autoregressive Conditional Heteroskedasticity
GML	Gaussian Maximum Likelihood
GMM	Gaussian mixture model
KKTC	Karush-Kuhn-Tucker Conditions
LTCC	London Transport Control Centre
LQE	Linear Quadratic Estimation
NRMSE	Normalized Root Mean Square Error
ME	Mean Error
MAPE	Mean Absolute Percentage Error
OL_SVR	Online Support Vector Machine
RBF	Radial Basis Function
RMSE	Root Mean Square Error
STARIMA	Space-Time ARIMA
SVM	Support Vector Machine
SVR	Support Vector Regression

List of Terminology

Time Series	Series of points collected at time interval
Time Series Prediction	To predict future values based on past data
Support Vector Machine (SVM)	SVM is a classification and pattern recognition technique.
Support Vector Regression	Regression based on SVM
Online Support Vector Regression (OL_SVR)	Incremental learning for SVR
Kernel Function	It maps the data from lower dimensions to higher
Kernel regression	an example of a statistics based non parametric forecast method. It has been applied to short-term traffic flow forecasting by (Sun and Chen, 2008)
Karush-Kuhn-Tucker (KKT) Conditions	Incremental learning techniques to help find support vectors over large datasets, have found extensive use in the SVM literature (Osuna et al, 1997), Platt et al, 1998, Friess et al, 1998, Joachims et al, 1999).
K-fold cross validation	Type f Cross validation
Radial Basis Function Kernel (RBF)	RBF kernel shows that the similarity of two examples can be measured by distance between them (Ruping, 2001)

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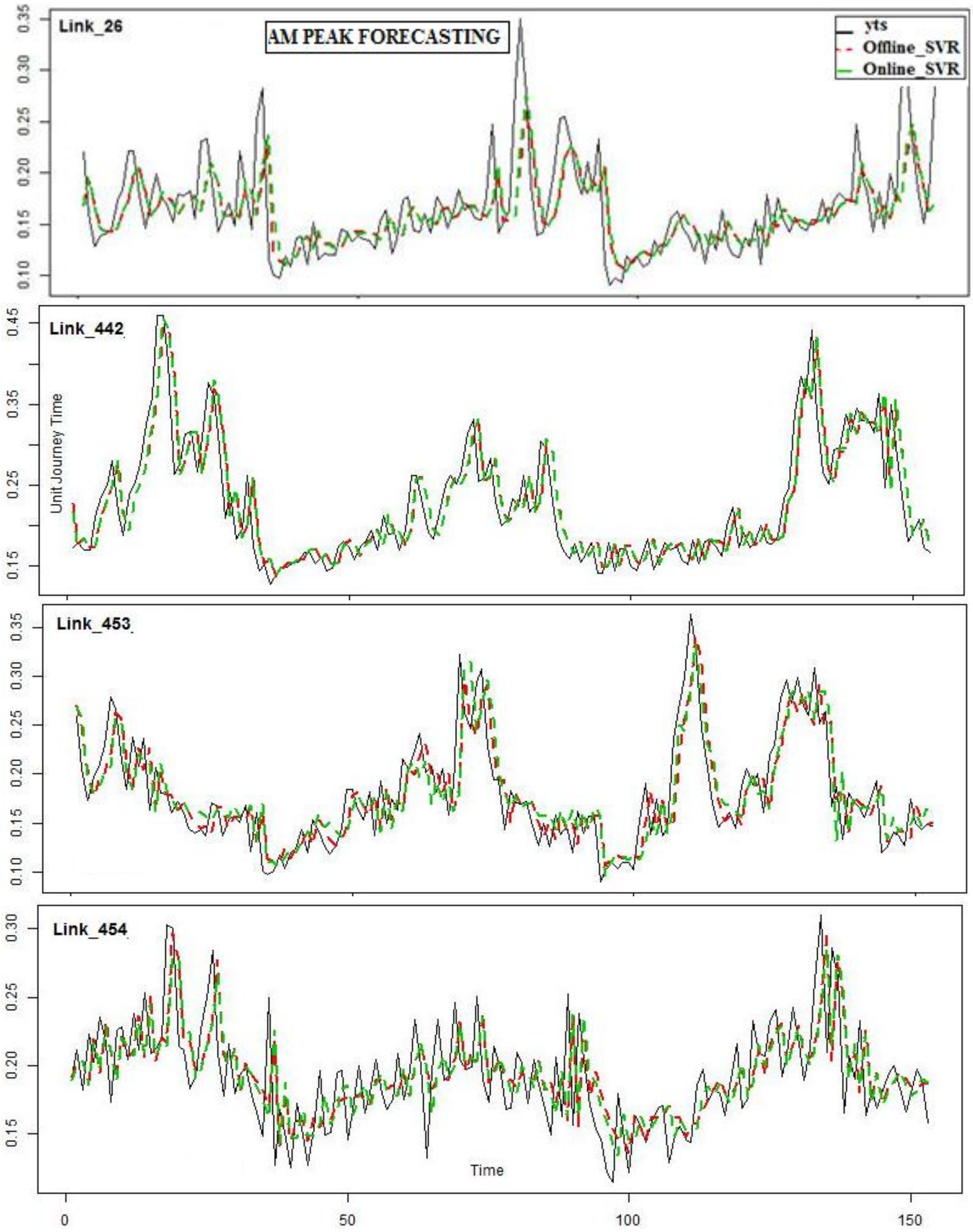
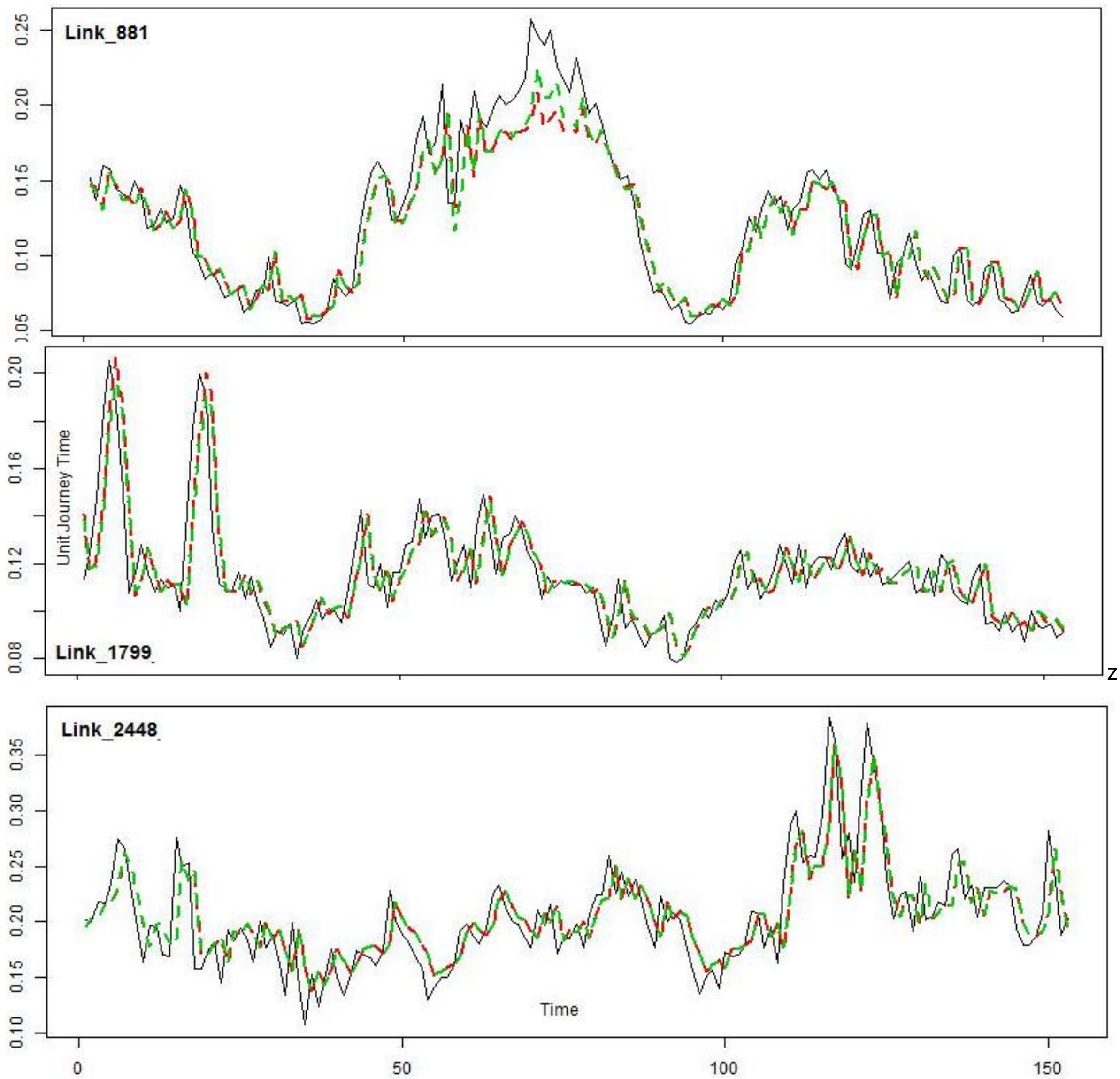
APPENDIX

Appendix A - Results

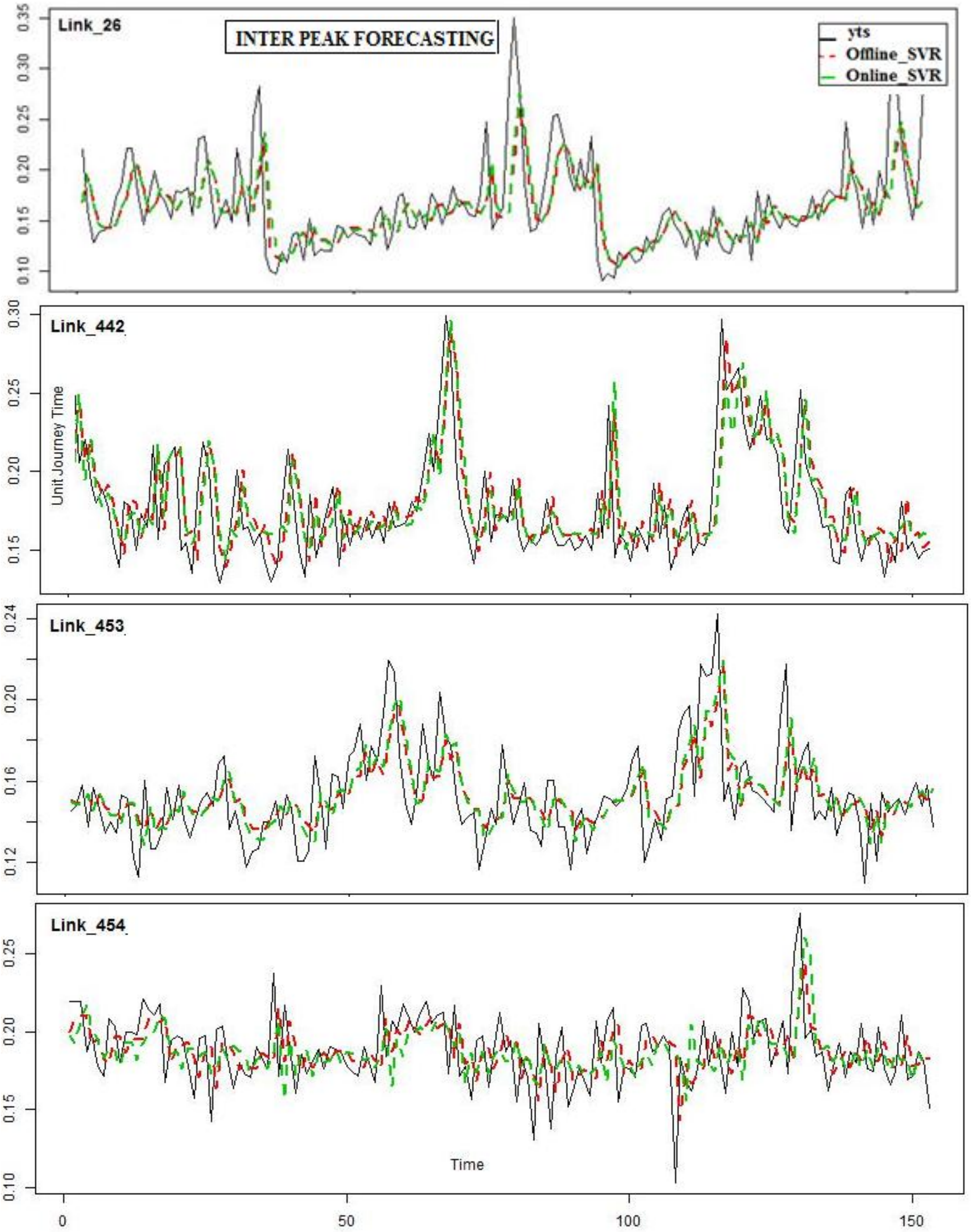
Details results of the grid search for each of the link and period

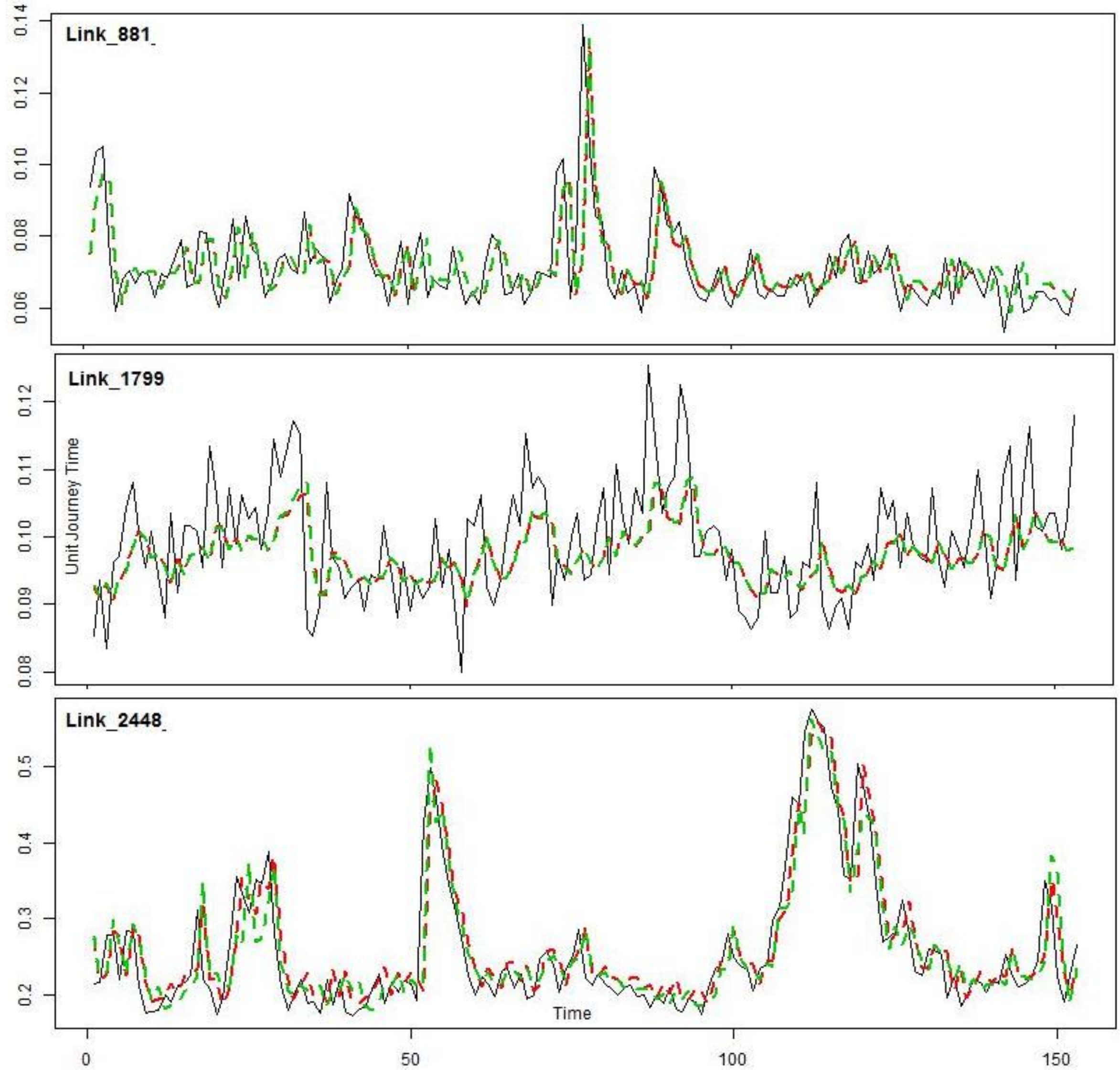
AM PEAK FORECASTING PLOTS



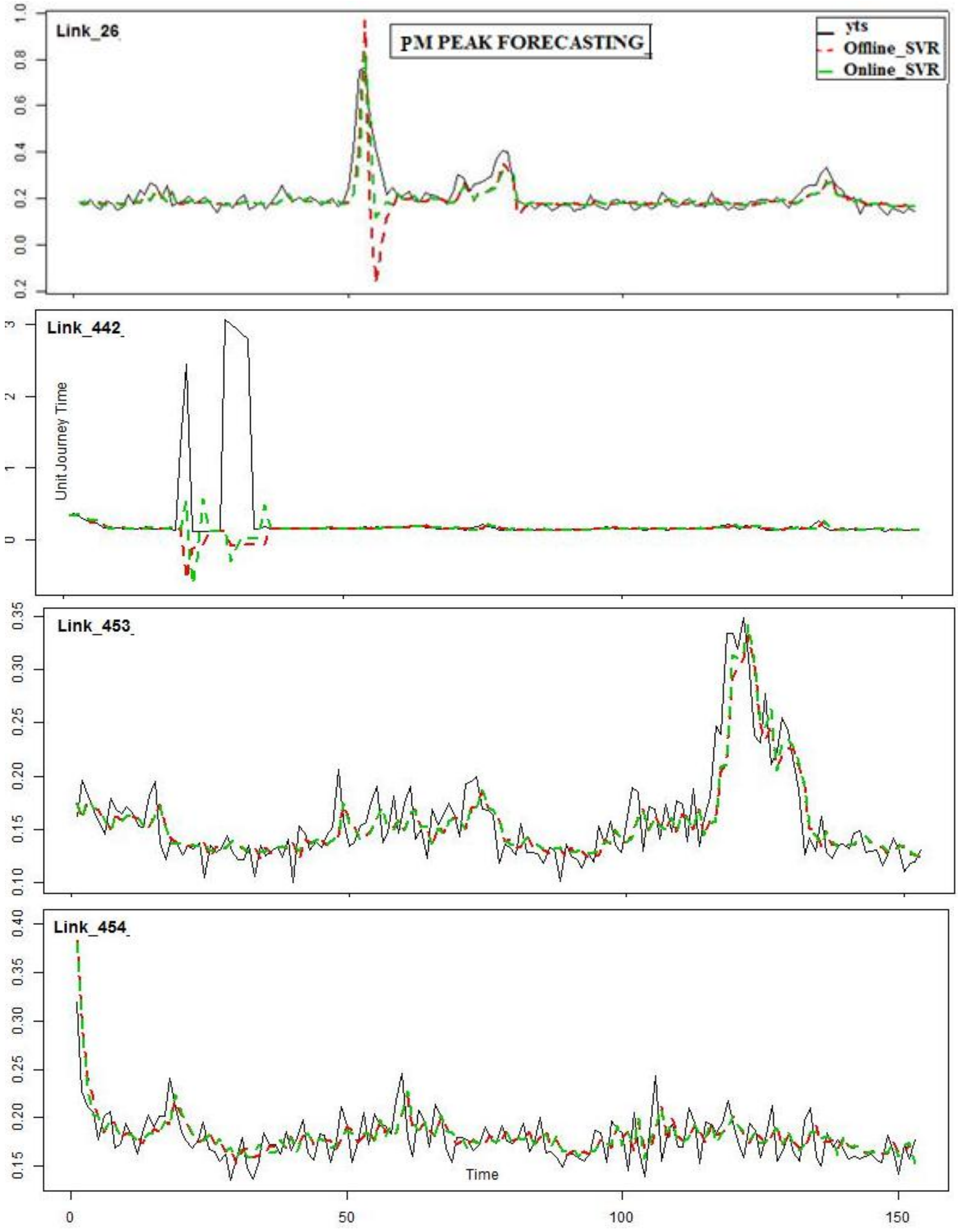

Link_881
Link_1799
Link_2448
Unit Journey Time
Time
z
0.05
0.10
0.15
0.20
0.25
0.08
0.12
0.16
0.20
0.10
0.15
0.20
0.25
0.30
0.35
0
50
100
150

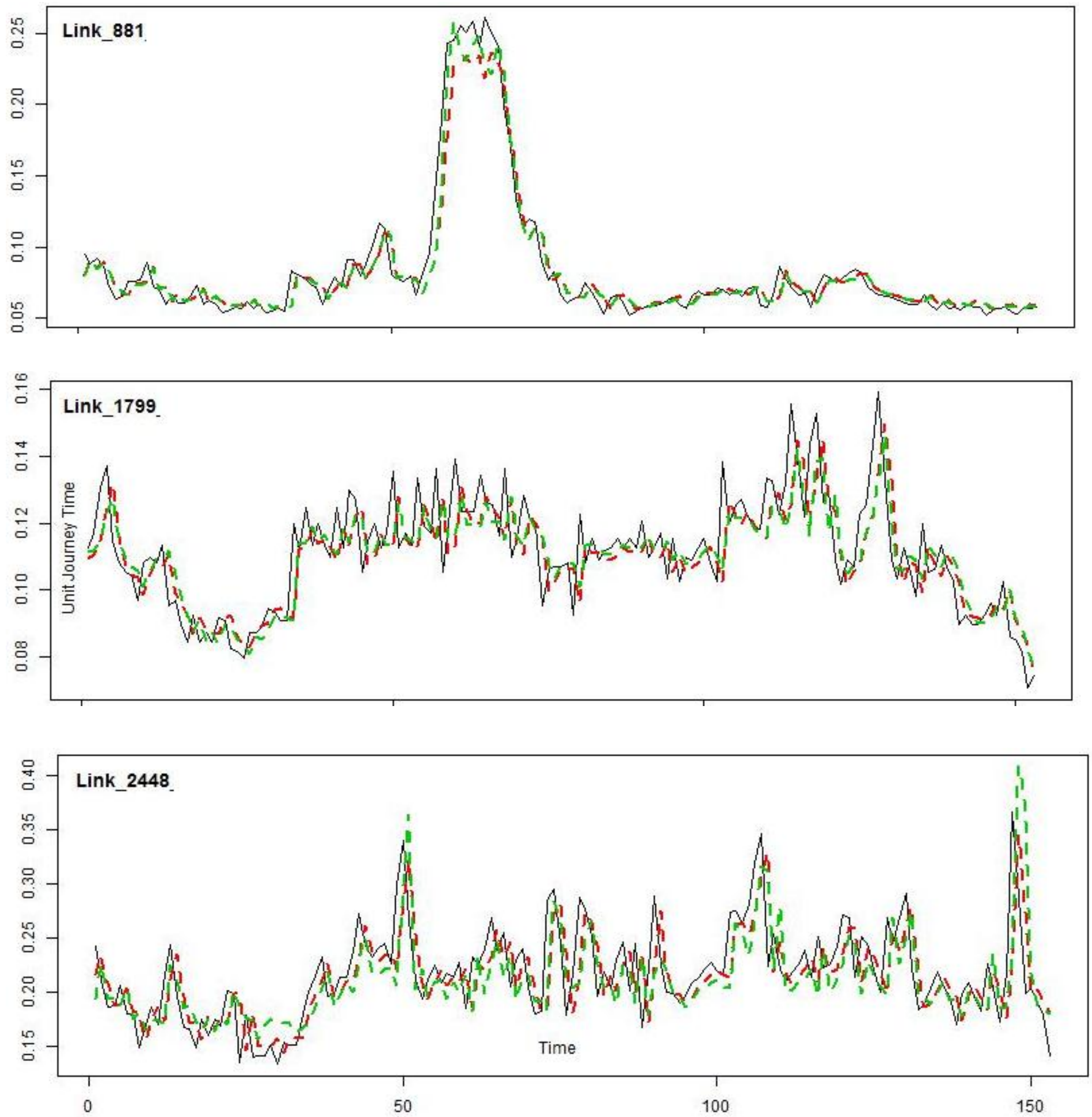
INTER PEAK FORECASTING PLOTS




Link_881
Link_1799
Link_2448
Unit Journey Time
Time
0.06
0.08
0.10
0.12
0.14
0.08
0.09
0.10
0.11
0.12
0.2
0.3
0.4
0.5
0
50
100
150

PM PEAK FORECASTING PLOTS




Link_881
0.05
0.10
0.15
0.20
0.25
Link_1799
0.08
0.10
0.12
0.14
0.16
Unit Journey Time
Link_2448
0.15
0.20
0.25
0.30
0.35
0.40
Time
0
50
100
150

Appendix B - Code (R)

```
############## Accuracy offline and online SVR, plots#######################

library(kernlab)
library(hydroGOF)
library(forecast)

#############____TEMPORAL MODEL____Support Vector Regression____#######################
embed <- function(data, m)
{
ts <- matrix(0, nrow(data)-m, m+1)
for (i in 1:(m+1))
{
ts[,i] <- as.matrix(data[i:(nrow(data)-(m-(i-1))),])
}
y <- as.matrix(ts[,m+1])
x <- as.matrix(ts[,1:m])
return(list(x=x, y=y))
}

am_svm<-NULL
am_svm<-read.table("C:\\aMS-Project\\Code\\CB_OSVR\\cross_valid_test\\forecast\\am\\26_am.csv",sep=",",header=TRUE)
tseries <- embed(as.matrix(am_svm[,1]), m=3)

#tseries$x
#tseries$y

Xtr <- tseries$x[1:624,]
ytr <- tseries$y[1:624,]
Xts <- tseries$x[624:nrow(tseries$y),]
yts <- tseries$y[624:nrow(tseries$y),]

############Training the SVM model#################
am_svmmodel <- ksvm(x=Xtr,y=ytr,type="eps-svr",kernel ="rbfdot", epsilon=0.01, C=21,kpar=list(sigma=1.6), scaled=FALSE)

###########Forecasting with the SVR model###########

Offline_SVR <- predict(am_svmmodel, Xts)
matplot(cbind(yts, Offline_SVR), type="l")

##########Evaluating the model performance##########
accuracy(Offline_SVR,yts)


# nrmse for offline SVR
nrmse(Offline_SVR[,],yts, na.rm=TRUE, norm="sd")


###################Link26############################
osvr_predict<- NULL
osvr_predict_mat <- NULL
Online_SVR <- NULL

osvr_predict<-read.table("C:\\aMS-Project\\Code\\CB_OSVR\\cross_valid_test\\forecast\\am\\26am_predict.txt",sep="
",header=FALSE)
#osvr_predict<-read.table("C:\\aMS-Project\\Code\\CB_OSVR\\cross_valid_test\\links\\26\\AM\\26AM_predict.txt",sep="
",header=FALSE)
osvr_predict_mat <- t(as.matrix(osvr_predict))
Online_SVR <-  osvr_predict_mat

#matplot(cbind(yts, Online_SVR), type="l")



accuracy(Online_SVR,yts)
# nrmse for online SVR
nrmse(osvr_predict,yts, na.rm=TRUE, norm="sd")

legend_txt <- c('yts', 'Offline_SVR', 'Online_SVR')
#jpeg(file="link26_1.jpeg", width = 850, height = 370,pointsize = 12, quality = 75, bg = "white")
matplot(cbind(yts, Offline_SVR, osvr_predict), main='Link_26_am_Tuesday',xlab='Time',ylab="Unit Journey Time",
type="l", lty=cbind(1,2,2),lwd=cbind(1,2,2), col=cbind(1:3))
```

```
#legend(x=120, y=.70, legend=legend_txt, lty=5, col=1:3, title="Legend")
#dev.off()

########################## code to export input data in text files to be used by online SVR C++ code################
########################## separate training and testing input files ############################################
library(data.table)

embed <- function(data, m)
{
ts <- matrix(0, nrow(data)-m, m+1)
for (i in 1:(m+1))
{
ts[,i] <- as.matrix(data[i:(nrow(data)-(m-(i-1))),])
}
y <- as.matrix(ts[,m+1])
x <- as.matrix(ts[,1:m])
return(list(x=x, y=y))
}

am_svm<-NULL
am_svm<-read.table("C:\\aMS-Project\\Code\\CB_OSVR\\cross_valid_test\\24AM.csv",sep=",",header=TRUE)
tseries <- embed(as.matrix(am_svm[,1]), m=3)
outtable <- cbind(tseries$y,tseries$x)
write.table(outtable[1:624,],file("C:\\aMS-Project\\Code\\CB_OSVR\\cross_valid_test\\24AM_train.txt"),sep="	",row.names = FALSE,col.names = FALSE)
write.table(tseries$x[624:nrow(tseries$x),],file="C:\\aMS-Project\\Code\\CB_OSVR\\cross_valid_test\\24AM_test.txt",sep="	",row.names = FALSE,col.names = FALSE)
```

Appendix C- Code (C++)

Cross Validation and Grid Search

```
#include "OnlineSVR.h"
#include <math.h>
#include <sstream>
#include <string>

using namespace onlinesvr;

int _main (int argc, char* argv[])
{
   // the code is written so that that link and team time can be passed as arguments
   cout <<"LinkID:"<< argv[1] << "\tPeakTime:" << argv[2]<<"\n" ;

   //Type link number
   char* LinkName = argv[1];
   //Type in peak time as PM, AM, INTER
   char* PeakTime = argv[2];

   // location of input and output files
   std::stringstream trainFilename;
   trainFilename << "C:\\aMS-Project\\Code\\CB_OSVR\\cross_valid_test\\links\\"<<LinkName<<"\\"<<PeakTime<<"\\"<<LinkName<< PeakTime<< "_train.txt";

   std::stringstream testFilename;
   testFilename << "C:\\aMS-Project\\Code\\CB_OSVR\\cross_valid_test\\links\\"<<LinkName<<"\\"<<PeakTime<<"\\"<<LinkName<< PeakTime<< "_test.txt";

   std::stringstream resultsFilename;
   resultsFilename << "C:\\aMS-Project\\Code\\CB_OSVR\\cross_valid_test\\links\\"<<LinkName<<"\\"<<PeakTime<<"\\"<<LinkName<< PeakTime<< "_results.txt";

   std::stringstream predictFilename;
   predictFilename << "C:\\aMS-Project\\Code\\CB_OSVR\\cross_valid_test\\links\\"<<LinkName<<"\\"<<PeakTime<<"\\"<<LinkName<< PeakTime<< "_predict.txt";

   std::stringstream modelFilename;
   modelFilename << "C:\\aMS-Project\\Code\\CB_OSVR\\cross_valid_test\\links\\"<<LinkName<<"\\"<<PeakTime<<"\\"<<LinkName<< PeakTime<< "_model.svr";


   const std::string& tmptrainFilename = trainFilename.str();
   const std::string& tmptestFilename = testFilename.str();
   const std::string& tmpresultsFilename = resultsFilename.str();
   const std::string& tmppredictFilename = predictFilename.str();
   const std::string& tmpmodelFilename = modelFilename.str();


   char* TrainFileName = (char*)tmptrainFilename.c_str();
   char* TestFileName = (char*)tmptestFilename.c_str();
   char* ResultsFileName = (char*)tmpresultsFilename.c_str();
   char* PredictFileName = (char*)tmppredictFilename.c_str();
   char* ModelFileName = (char*)tmpmodelFilename.c_str();


         // Make a new OnlineSVR
         OnlineSVR* SVR = new OnlineSVR();

         // Build training set
         Matrix<double>* TrainingSetX ;
         Vector<double>* TrainingSetY ;

         SVR->Import(TrainFileName, &TrainingSetX, &TrainingSetY);

   Vector<double>* EpsilonList = new Vector<double>();
```

```
    Vector<double>* CList = new Vector<double>();
    Vector<double>* KernelParamList = new Vector<double>();

    // k fold cross validation, at size 10
    int SetNumber = 10;

    // range of grid search paramters
    EpsilonList->Add(.0050);
    EpsilonList->Add(.0075);
    EpsilonList->Add(.0100);
    EpsilonList->Add(.0250);
    EpsilonList->Add(.0500);

    (CList)->Add(1);
    (CList)->Add(21);
    (CList)->Add(41);
    (CList)->Add(61);
    (CList)->Add(81);

    (KernelParamList)->Add(0.1);
    (KernelParamList)->Add(0.4);
    (KernelParamList)->Add(0.8);
    (KernelParamList)->Add(1.2);
    (KernelParamList)->Add(1.6);

    double MinEpsilon = 0;
    double MinC = 0;
    double MinKernelParam = 0;

    // this function does cross validation and grid search on the parameter range
    SVR->CrossValidation(TrainingSetX,TrainingSetY, EpsilonList, CList, KernelParamList, SetNumber, ResultsFileName,
MinEpsilon, MinC, MinKernelParam);
            // Set parameters based on the best parameters

            SVR->SetEpsilon(MinEpsilon);
            SVR->SetC(MinC);
            SVR->SetKernelParam(MinKernelParam);
            SVR->SetKernelType(OnlineSVR::KERNEL_RBF_GAUSSIAN);
            SVR->SetVerbosity(OnlineSVR::VERBOSITY_NORMAL);

    // Partition of the training set
    int SamplesPerSet = static_cast<int>(TrainingSetX->GetLengthRows()/SetNumber);

    // Build the Sets
    Vector<Matrix<double>*>* SetX = new Vector<Matrix<double>*>();
    Vector<Vector<double>*>* SetY = new Vector<Vector<double>*>();
    for (int i=0; i<SetNumber; i++) {
        SetX->Add(new Matrix<double>());
        SetY->Add(new Vector<double>());
        for (int j=0; j<SamplesPerSet; j++) {
            SetX->GetValue(i)->AddRowCopy(TrainingSetX->GetRowRef(j*SetNumber+i));
            SetY->GetValue(i)->Add(TrainingSetY->GetValue(j*SetNumber+i));
        }
    }

    for (int k =0; k<SetX->GetLength(); k++)
    {
                    SVR->Train(SetX->GetValue(k), SetY->GetValue(k));
            }

            // Train OnlineSVR
            //SVR->Train(TrainingSetX,TrainingSetY);

            // Show OnlineSVR info
            SVR->ShowInfo();

            // Save OnlineSVR
            SVR->SaveOnlineSVR(ModelFileName);

            // Predict some new values
            Matrix<double>* TestingSetX = TestingSetX->Load(TestFileName);
    Vector<double>* PredictedY = SVR->Predict(TestingSetX);
            PredictedY->Save(PredictFileName);

    delete TestingSetX;
```

```
    delete PredictedY;

    delete EpsilonList;
    delete CList;
    delete KernelParamList;
    delete ResultsFileName;

            // Delete
            delete SVR;
            delete TrainingSetX;
            delete TrainingSetY;

            return 0;
}
```

Multi-step forecast

```
#include "OnlineSVR.h"
#include <math.h>
#include <sstream>
#include <string>

using namespace onlinesvr;

int main (int argc, char* argv[])
{
   // the code is written so that that link and team time can be passed as arguments

   cout <<"LinkID:"<< argv[1] << "\tPeakTime:" << argv[2]<<"\n" ;

   //Type link number
   char* LinkName = argv[1];
   //Type in peak time as PM, AM, INTER
   char* PeakTime = argv[2];

   //location of input and output files
   std::stringstream trainFilename;
   trainFilename << "C:\\aMS-
Project\\Code\\CB_OSVR\\cross_valid_test\\links\\"<<LinkName<<"\\"<<PeakTime<<"\\"<<LinkName<< PeakTime<<
"_train.txt";

   std::stringstream testFilename;
   testFilename << "C:\\aMS-
Project\\Code\\CB_OSVR\\cross_valid_test\\links\\"<<LinkName<<"\\"<<PeakTime<<"\\"<<LinkName<< PeakTime<< "_test.txt";

   std::stringstream resultsFilename;
   resultsFilename << "C:\\aMS-
Project\\Code\\CB_OSVR\\cross_valid_test\\links\\"<<LinkName<<"\\"<<PeakTime<<"\\"<<LinkName<< PeakTime<<
"_results.txt";

   std::stringstream predictFilename;
   predictFilename << "C:\\aMS-
Project\\Code\\CB_OSVR\\cross_valid_test\\links\\"<<LinkName<<"\\"<<PeakTime<<"\\"<<LinkName<< PeakTime<<
"_predict.txt";

   std::stringstream modelFilename;
   modelFilename << "C:\\aMS-
Project\\Code\\CB_OSVR\\cross_valid_test\\links\\"<<LinkName<<"\\"<<PeakTime<<"\\"<<LinkName<< PeakTime<<
"_model.svr";


   const std::string& tmptrainFilename = trainFilename.str();
   const std::string& tmptestFilename = testFilename.str();
   const std::string& tmpresultsFilename = resultsFilename.str();
   const std::string& tmppredictFilename = predictFilename.str();
   const std::string& tmpmodelFilename = modelFilename.str();


   char* TrainFileName = (char*)tmptrainFilename.c_str();
   char* TestFileName = (char*)tmptestFilename.c_str();
   char* ResultsFileName = (char*)tmpresultsFilename.c_str();
   char* PredictFileName = (char*)tmppredictFilename.c_str();
   char* ModelFileName = (char*)tmpmodelFilename.c_str();


         // Make a new OnlineSVR
         OnlineSVR* SVR = new OnlineSVR();

         // Build training set
         Matrix<double>* TrainingSetX ;
         Vector<double>* TrainingSetY ;

         SVR->Import(TrainFileName, &TrainingSetX, &TrainingSetY);

   Vector<double>* EpsilonList = new Vector<double>();
   Vector<double>* CList = new Vector<double>();
```

```
    Vector<double>* KernelParamList = new Vector<double>();
    int SetNumber = 10;

    // the best values were manual input for the link that was tested
    double MinEpsilon = 0.0075;
    double MinC = 81;
    double MinKernelParam = 0.1;


            SVR->SetEpsilon(MinEpsilon);
            SVR->SetC(MinC);
            SVR->SetKernelParam(MinKernelParam);
            SVR->SetKernelType(OnlineSVR::KERNEL_RBF_GAUSSIAN);
            SVR->SetVerbosity(OnlineSVR::VERBOSITY_NORMAL);

            SVR->Train(TrainingSetX,TrainingSetY);
            Matrix<double>* TestingSetX = TestingSetX->Load(TestFileName);

            // Show OnlineSVR info
            SVR->ShowInfo();

            // Save OnlineSVR
            SVR->SaveOnlineSVR(ModelFileName);

            Vector<double>* PredictedMyY = new Vector<double>();
    Vector<double>* PredictedYList = new Vector<double>();
    Matrix<double>* TestingSetMyX;
    Vector<double>* PredictedY;
    // 153 is the size of test data
    for (int ii= 0; ii < 153; ii++){
       PredictedMyY = new Vector<double>();

       TestingSetMyX = new Matrix<double>();
       //TestingSetMyX->AddRowRefAt(PredictedMyY,0);

       TestingSetMyX->AddRowRefAt(TestingSetX->GetRowCopy(ii),0);
       PredictedY = SVR->Predict(TestingSetMyX);
       PredictedYList->Add(PredictedY->GetValue(0));
       if (ii<152)
       {
          // updating column 3 (index 2) , is dependent variable X3
          TestingSetX->SetValue(ii+1,2,PredictedY->GetValue(0));
       }
    }

            PredictedYList->Save(PredictFileName);

    delete TestingSetX;
    delete TestingSetMyX;
    delete PredictedYList;
    delete PredictedMyY;

    delete PredictedY;

    delete EpsilonList;
    delete CList;
    delete KernelParamList;
    delete ResultsFileName;

            // Delete
            delete SVR;
            delete TrainingSetX;
            delete TrainingSetY;

            return 0;
}
```

Appendix D : Data

Detail results of grid search and cross validation, Link:24, Period: AM

Epsilon	C	Kernel Param	Error	Epsilon	C	Kernel Param	Error	Epsilon	C	Kernel Param	Error
0.005	1	0.1	0.0851862	0.0075	61	0.8	0.0874691	0.025	21	1.6	0.0868752
0.005	1	0.4	0.0868443	0.0075	61	1.2	0.0864635	0.025	41	0.1	0.0877052
0.005	1	0.8	0.0877543	0.0075	61	1.6	0.0870161	0.025	41	0.4	0.0916176
0.005	1	1.2	0.0884506	0.0075	81	0.1	0.0901579	0.025	41	0.8	0.0871492
0.005	1	1.6	0.0885088	0.0075	81	0.4	0.0935813	0.025	41	1.2	0.0861278
0.005	21	0.1	0.0868527	0.0075	81	0.8	0.0876136	0.025	41	1.6	0.0867374
0.005	21	0.4	0.0917108	0.0075	81	1.2	0.0866986	0.025	61	0.1	0.088916
0.005	21	0.8	0.0870589	0.0075	81	1.6	0.0879467	0.025	61	0.4	0.092573
0.005	21	1.2	0.086385	0.01	1	0.1	0.0849089	0.025	61	0.8	0.0871122
0.005	21	1.6	0.0867185	0.01	1	0.4	0.0865653	0.025	61	1.2	0.0858768
0.005	41	0.1	0.0881336	0.01	1	0.8	0.087692	0.025	61	1.6	0.0868147
0.005	41	0.4	0.0925909	0.01	1	1.2	0.0883422	0.025	81	0.1	0.0898954
0.005	41	0.8	0.0872738	0.01	1	1.6	0.0882804	0.025	81	0.4	0.0928348
0.005	41	1.2	0.0863812	0.01	21	0.1	0.0865636	0.025	81	0.8	0.0869977
0.005	41	1.6	0.0868906	0.01	21	0.4	0.0916908	0.025	81	1.2	0.0858528
0.005	61	0.1	0.0894018	0.01	21	0.8	0.0867253	0.025	81	1.6	0.087245
0.005	61	0.4	0.092996	0.01	21	1.2	0.0863382	0.05	1	0.1	0.0861282
0.005	61	0.8	0.0874731	0.01	21	1.6	0.086898	0.05	1	0.4	0.0869738
0.005	61	1.2	0.0863311	0.01	41	0.1	0.087959	0.05	1	0.8	0.0879103
0.005	61	1.6	0.087009	0.01	41	0.4	0.0924504	0.05	1	1.2	0.0884858
0.005	81	0.1	0.0904334	0.01	41	0.8	0.0869719	0.05	1	1.6	0.088969
0.005	81	0.4	0.0936863	0.01	41	1.2	0.0862658	0.05	21	0.1	0.0864549
0.005	81	0.8	0.0875856	0.01	41	1.6	0.0867548	0.05	21	0.4	0.0903054
0.005	81	1.2	0.0865907	0.01	61	0.1	0.0891506	0.05	21	0.8	0.0871463
0.005	81	1.6	0.0879161	0.01	61	0.4	0.0929465	0.05	21	1.2	0.087
0.0075	1	0.1	0.0850257	0.01	61	0.8	0.0873492	0.05	21	1.6	0.0873083
0.0075	1	0.4	0.086673	0.01	61	1.2	0.0863471	0.05	41	0.1	0.0878341
0.0075	1	0.8	0.0877565	0.01	61	1.6	0.0869391	0.05	41	0.4	0.0918188
0.0075	1	1.2	0.0884597	0.01	81	0.1	0.090102	0.05	41	0.8	0.0869419
0.0075	1	1.6	0.088478	0.01	81	0.4	0.0936159	0.05	41	1.2	0.0866201
0.0075	21	0.1	0.0866569	0.01	81	0.8	0.087247	0.05	41	1.6	0.0868664
0.0075	21	0.4	0.0915531	0.01	81	1.2	0.0865905	0.05	61	0.1	0.0889777
0.0075	21	0.8	0.086792	0.01	81	1.6	0.0879763	0.05	61	0.4	0.0923364
0.0075	21	1.2	0.0864664	0.025	1	0.1	0.0853405	0.05	61	0.8	0.0871191
0.0075	21	1.6	0.0867743	0.025	1	0.4	0.0866993	0.05	61	1.2	0.0863417
0.0075	41	0.1	0.0880979	0.025	1	0.8	0.0876258	0.05	61	1.6	0.0870469
0.0075	41	0.4	0.0923636	0.025	1	1.2	0.0883483	0.05	81	0.1	0.0898572
0.0075	41	0.8	0.0871649	0.025	1	1.6	0.0882298	0.05	81	0.4	0.0921522
0.0075	41	1.2	0.0862983	0.025	21	0.1	0.0861878	0.05	81	0.8	0.0871986
0.0075	41	1.6	0.0868944	0.025	21	0.4	0.0906158	0.05	81	1.2	0.0860914
0.0075	61	0.1	0.0891736	0.025	21	0.8	0.0866847	0.05	81	1.6	0.0874936
0.0075	61	0.4	0.0929198	0.025	21	1.2	0.0863162	Best Solution:			
								0.01	1	0.1	0.0849089

Link:26, Period: AM

Epsilon	C	Kernel Param	Error	Epsilon	C	Kernel Param	Error	Epsilon	C	Kernel Param	Error
0.005	1	0.1	0.0219474	0.0075	61	0.8	0.0216882	0.025	21	1.6	0.02185
0.005	1	0.4	0.0217892	0.0075	61	1.2	0.0216655	0.025	41	0.1	0.0220073
0.005	1	0.8	0.0217487	0.0075	61	1.6	0.0216838	0.025	41	0.4	0.0218612
0.005	1	1.2	0.0217409	0.0075	81	0.1	0.0217461	0.025	41	0.8	0.0218352
0.005	1	1.6	0.0217448	0.0075	81	0.4	0.0217193	0.025	41	1.2	0.0218577
0.005	21	0.1	0.0218003	0.0075	81	0.8	0.0216832	0.025	41	1.6	0.0219114
0.005	21	0.4	0.0217328	0.0075	81	1.2	0.0216818	0.025	61	0.1	0.0219959
0.005	21	0.8	0.0217376	0.0075	81	1.6	0.0216752	0.025	61	0.4	0.0218654
0.005	21	1.2	0.021747	0.01	1	0.1	0.021911	0.025	61	0.8	0.0218097
0.005	21	1.6	0.0217915	0.01	1	0.4	0.0217714	0.025	61	1.2	0.0218746
0.005	41	0.1	0.0218021	0.01	1	0.8	0.0217655	0.025	61	1.6	0.0219509
0.005	41	0.4	0.0217445	0.01	1	1.2	0.0217768	0.025	81	0.1	0.0219768
0.005	41	0.8	0.0217399	0.01	1	1.6	0.021764	0.025	81	0.4	0.0218504
0.005	41	1.2	0.0217992	0.01	21	0.1	0.0218275	0.025	81	0.8	0.0218226
0.005	41	1.6	0.0218466	0.01	21	0.4	0.0217601	0.025	81	1.2	0.0219093
0.005	61	0.1	0.0217897	0.01	21	0.8	0.0216621	0.025	81	1.6	0.0219569
0.005	61	0.4	0.0217301	0.01	21	1.2	0.0216615	0.05	1	0.1	0.0257768
0.005	61	0.8	0.0217528	0.01	21	1.6	0.0216392	0.05	1	0.4	0.0245003
0.005	61	1.2	0.0218273	0.01	41	0.1	0.0218277	0.05	1	0.8	0.0243352
0.005	61	1.6	0.0218031	0.01	41	0.4	0.021757	0.05	1	1.2	0.0242636
0.005	81	0.1	0.0217825	0.01	41	0.8	0.0216665	0.05	1	1.6	0.024278
0.005	81	0.4	0.0217406	0.01	41	1.2	0.021645	0.05	21	0.1	0.0242204
0.005	81	0.8	0.0217786	0.01	41	1.6	0.0216848	0.05	21	0.4	0.0242099
0.005	81	1.2	0.0218546	0.01	61	0.1	0.0217989	0.05	21	0.8	0.0239489
0.005	81	1.6	0.0217981	0.01	61	0.4	0.0217024	0.05	21	1.2	0.0238545
0.0075	1	0.1	0.0219325	0.01	61	0.8	0.0216399	0.05	21	1.6	0.0240049
0.0075	1	0.4	0.0217597	0.01	61	1.2	0.0216652	0.05	41	0.1	0.0242532
0.0075	1	0.8	0.0217276	0.01	61	1.6	0.0217057	0.05	41	0.4	0.0240593
0.0075	1	1.2	0.0217278	0.01	81	0.1	0.0218011	0.05	41	0.8	0.0238662
0.0075	1	1.6	0.0217492	0.01	81	0.4	0.0216638	0.05	41	1.2	0.0240544
0.0075	21	0.1	0.0217857	0.01	81	0.8	0.0216435	0.05	41	1.6	0.0241561
0.0075	21	0.4	0.0217548	0.01	81	1.2	0.0216966	0.05	61	0.1	0.024252
0.0075	21	0.8	0.0217131	0.01	81	1.6	0.0217315	0.05	61	0.4	0.0239804
0.0075	21	1.2	0.0216827	0.025	1	0.1	0.0223592	0.05	61	0.8	0.0238827
0.0075	21	1.6	0.0216434	0.025	1	0.4	0.0220029	0.05	61	1.2	0.024031
0.0075	41	0.1	0.0217751	0.025	1	0.8	0.021991	0.05	61	1.6	0.0243039
0.0075	41	0.4	0.0217235	0.025	1	1.2	0.0219781	0.05	81	0.1	0.0242207
0.0075	41	0.8	0.0216799	0.025	1	1.6	0.0219781	0.05	81	0.4	0.0239575
0.0075	41	1.2	0.0216491	0.025	21	0.1	0.0219794	0.05	81	0.8	0.0240392
0.0075	41	1.6	0.0216676	0.025	21	0.4	0.0219046	0.05	81	1.2	0.0242458
0.0075	61	0.1	0.0217543	0.025	21	0.8	0.0218576	0.05	81	1.6	0.0242722
0.0075	61	0.4	0.0217259	0.025	21	1.2	0.0218225	Best Solution:			
								0.01	21	1.6	0.0216392

Link:442, Period: AM

Epsilon	C	Kernel Param	Error	Epsilon	C	Kernel Param	Error	Epsilon	C	Kernel Param	Error
0.005	1	0.1	0.033932	0.0075	61	0.8	0.0334896	0.025	21	1.6	0.0337536
0.005	1	0.4	0.0334456	0.0075	61	1.2	0.0335465	0.025	41	0.1	0.0335305
0.005	1	0.8	0.0335401	0.0075	61	1.6	0.0335661	0.025	41	0.4	0.0337321
0.005	1	1.2	0.0336034	0.0075	81	0.1	0.0335768	0.025	41	0.8	0.0337483
0.005	1	1.6	0.033669	0.0075	81	0.4	0.0336892	0.025	41	1.2	0.0337555
0.005	21	0.1	0.033488	0.0075	81	0.8	0.0334917	0.025	41	1.6	0.0337235
0.005	21	0.4	0.0335995	0.0075	81	1.2	0.0335782	0.025	61	0.1	0.0335899
0.005	21	0.8	0.033619	0.0075	81	1.6	0.0335788	0.025	61	0.4	0.0337681
0.005	21	1.2	0.0335117	0.01	1	0.1	0.0338046	0.025	61	0.8	0.0337515
0.005	21	1.6	0.0334838	0.01	1	0.4	0.0334703	0.025	61	1.2	0.0337286
0.005	41	0.1	0.0335092	0.01	1	0.8	0.0335656	0.025	61	1.6	0.0337107
0.005	41	0.4	0.0336367	0.01	1	1.2	0.0336588	0.025	81	0.1	0.03362
0.005	41	0.8	0.0336162	0.01	1	1.6	0.033691	0.025	81	0.4	0.0337623
0.005	41	1.2	0.0335368	0.01	21	0.1	0.0335116	0.025	81	0.8	0.0337566
0.005	41	1.6	0.0335799	0.01	21	0.4	0.0335995	0.025	81	1.2	0.0336996
0.005	61	0.1	0.0335518	0.01	21	0.8	0.0335865	0.025	81	1.6	0.0336872
0.005	61	0.4	0.0336589	0.01	21	1.2	0.0334997	0.05	1	0.1	0.0367461
0.005	61	0.8	0.0335551	0.01	21	1.6	0.0334776	0.05	1	0.4	0.0349408
0.005	61	1.2	0.0336174	0.01	41	0.1	0.0335391	0.05	1	0.8	0.0348803
0.005	61	1.6	0.0335684	0.01	41	0.4	0.0336191	0.05	1	1.2	0.0347068
0.005	81	0.1	0.0335737	0.01	41	0.8	0.0335505	0.05	1	1.6	0.0346848
0.005	81	0.4	0.0337281	0.01	41	1.2	0.0335879	0.05	21	0.1	0.0343054
0.005	81	0.8	0.033534	0.01	41	1.6	0.0334894	0.05	21	0.4	0.0343832
0.005	81	1.2	0.0336477	0.01	61	0.1	0.0335554	0.05	21	0.8	0.0345244
0.005	81	1.6	0.0335536	0.01	61	0.4	0.0336341	0.05	21	1.2	0.0345601
0.0075	1	0.1	0.0339076	0.01	61	0.8	0.0335733	0.05	21	1.6	0.0347848
0.0075	1	0.4	0.033451	0.01	61	1.2	0.0335504	0.05	41	0.1	0.0341019
0.0075	1	0.8	0.0335559	0.01	61	1.6	0.033563	0.05	41	0.4	0.0344077
0.0075	1	1.2	0.0336569	0.01	81	0.1	0.0335747	0.05	41	0.8	0.0345752
0.0075	1	1.6	0.0336751	0.01	81	0.4	0.0336198	0.05	41	1.2	0.0346743
0.0075	21	0.1	0.0334731	0.01	81	0.8	0.0335783	0.05	41	1.6	0.0348702
0.0075	21	0.4	0.0336344	0.01	81	1.2	0.0335626	0.05	61	0.1	0.034099
0.0075	21	0.8	0.0335733	0.01	81	1.6	0.03362	0.05	61	0.4	0.0344881
0.0075	21	1.2	0.0334194	0.025	1	0.1	0.0339116	0.05	61	0.8	0.0345989
0.0075	21	1.6	0.0334524	0.025	1	0.4	0.0333449	0.05	61	1.2	0.0347845
0.0075	41	0.1	0.0335411	0.025	1	0.8	0.0334229	0.05	61	1.6	0.0350093
0.0075	41	0.4	0.0336632	0.025	1	1.2	0.0335064	0.05	81	0.1	0.0341421
0.0075	41	0.8	0.0335044	0.025	1	1.6	0.0336042	0.05	81	0.4	0.034525
0.0075	41	1.2	0.0334755	0.025	21	0.1	0.0334204	0.05	81	0.8	0.0345725
0.0075	41	1.6	0.0335212	0.025	21	0.4	0.0336751	0.05	81	1.2	0.034842
0.0075	61	0.1	0.0335781	0.025	21	0.8	0.0337763	0.05	81	1.6	0.0350697
0.0075	61	0.4	0.0337151	0.025	21	1.2	0.0337364	Best Solution:			
								0.025	1	0.4	0.0333449

Link: 453, Period: AM

Epsilon	C	Kernel Param	Error	Epsilon	C	Kernel Param	Error	Epsilon	C	Kernel Param	Error
0.005	1	0.1	0.0302349	0.0075	61	0.8	0.0302665	0.025	21	1.6	0.0304157
0.005	1	0.4	0.029808	0.0075	61	1.2	0.0302492	0.025	41	0.1	0.0298242
0.005	1	0.8	0.0298444	0.0075	61	1.6	0.0302707	0.025	41	0.4	0.0301259
0.005	1	1.2	0.0299818	0.0075	81	0.1	0.0299238	0.025	41	0.8	0.0302869
0.005	1	1.6	0.0300566	0.0075	81	0.4	0.0302602	0.025	41	1.2	0.0304286
0.005	21	0.1	0.0297458	0.0075	81	0.8	0.0302985	0.025	41	1.6	0.0304256
0.005	21	0.4	0.0302066	0.0075	81	1.2	0.0302267	0.025	61	0.1	0.0298384
0.005	21	0.8	0.0301986	0.0075	81	1.6	0.0302424	0.025	61	0.4	0.0301609
0.005	21	1.2	0.0302315	0.01	1	0.1	0.0302367	0.025	61	0.8	0.0303694
0.005	21	1.6	0.0302643	0.01	1	0.4	0.0298965	0.025	61	1.2	0.0304629
0.005	41	0.1	0.0297867	0.01	1	0.8	0.0298466	0.025	61	1.6	0.0304027
0.005	41	0.4	0.0302051	0.01	1	1.2	0.0298688	0.025	81	0.1	0.029847
0.005	41	0.8	0.0302699	0.01	1	1.6	0.02993	0.025	81	0.4	0.0302032
0.005	41	1.2	0.0302843	0.01	21	0.1	0.0297451	0.025	81	0.8	0.0304283
0.005	41	1.6	0.030272	0.01	21	0.4	0.0300916	0.025	81	1.2	0.0304421
0.005	61	0.1	0.0298221	0.01	21	0.8	0.0302165	0.025	81	1.6	0.0304486
0.005	61	0.4	0.0302345	0.01	21	1.2	0.0301772	0.05	1	0.1	0.0321938
0.005	61	0.8	0.0302923	0.01	21	1.6	0.0302511	0.05	1	0.4	0.0308672
0.005	61	1.2	0.0302441	0.01	41	0.1	0.0297159	0.05	1	0.8	0.030701
0.005	61	1.6	0.030305	0.01	41	0.4	0.0301437	0.05	1	1.2	0.0307601
0.005	81	0.1	0.0298751	0.01	41	0.8	0.0301938	0.05	1	1.6	0.0307044
0.005	81	0.4	0.030241	0.01	41	1.2	0.030282	0.05	21	0.1	0.0304356
0.005	81	0.8	0.0303033	0.01	41	1.6	0.0302682	0.05	21	0.4	0.0307871
0.005	81	1.2	0.0302576	0.01	61	0.1	0.0298349	0.05	21	0.8	0.0308134
0.005	81	1.6	0.0303066	0.01	61	0.4	0.03015	0.05	21	1.2	0.0309434
0.0075	1	0.1	0.0302656	0.01	61	0.8	0.0302081	0.05	21	1.6	0.0311394
0.0075	1	0.4	0.0298984	0.01	61	1.2	0.0302599	0.05	41	0.1	0.030457
0.0075	1	0.8	0.0298388	0.01	61	1.6	0.0302179	0.05	41	0.4	0.0308291
0.0075	1	1.2	0.0299371	0.01	81	0.1	0.0298551	0.05	41	0.8	0.0308866
0.0075	1	1.6	0.0300184	0.01	81	0.4	0.0301643	0.05	41	1.2	0.0311548
0.0075	21	0.1	0.0297744	0.01	81	0.8	0.0302373	0.05	41	1.6	0.0314499
0.0075	21	0.4	0.0301965	0.01	81	1.2	0.030284	0.05	61	0.1	0.0304787
0.0075	21	0.8	0.0302661	0.01	81	1.6	0.0301782	0.05	61	0.4	0.030883
0.0075	21	1.2	0.0302299	0.025	1	0.1	0.0305474	0.05	61	0.8	0.0310673
0.0075	21	1.6	0.0302464	0.025	1	0.4	0.0300598	0.05	61	1.2	0.031383
0.0075	41	0.1	0.029785	0.025	1	0.8	0.0300257	0.05	61	1.6	0.0313719
0.0075	41	0.4	0.0302407	0.025	1	1.2	0.0300105	0.05	81	0.1	0.0305212
0.0075	41	0.8	0.0302654	0.025	1	1.6	0.0299823	0.05	81	0.4	0.0308828
0.0075	41	1.2	0.0302529	0.025	21	0.1	0.0298536	0.05	81	0.8	0.0310538
0.0075	41	1.6	0.0302355	0.025	21	0.4	0.0299812	0.05	81	1.2	0.0314831
0.0075	61	0.1	0.0298475	0.025	21	0.8	0.0302311	0.05	81	1.6	0.0312934
0.0075	61	0.4	0.0302418	0.025	21	1.2	0.0303507	Best Solution:			
								0.01	41	0.1	0.0297159

Link: 454, Period: AM

Epsilon	C	Kernel Param	Error	Epsilon	C	Kernel Param	Error	Epsilon	C	Kernel Param	Error
0.005	1	0.1	0.0415234	0.0075	61	0.8	0.0386713	0.025	21	1.6	0.0389089
0.005	1	0.4	0.0404459	0.0075	61	1.2	0.0387062	0.025	41	0.1	0.0397461
0.005	1	0.8	0.039907	0.0075	61	1.6	0.0381865	0.025	41	0.4	0.039674
0.005	1	1.2	0.0400627	0.0075	81	0.1	0.0395557	0.025	41	0.8	0.0395443
0.005	1	1.6	0.0401526	0.0075	81	0.4	0.0397383	0.025	41	1.2	0.0390587
0.005	21	0.1	0.0398158	0.0075	81	0.8	0.0388497	0.025	41	1.6	0.0386633
0.005	21	0.4	0.0401228	0.0075	81	1.2	0.0385492	0.025	61	0.1	0.0398615
0.005	21	0.8	0.0392623	0.0075	81	1.6	0.0381007	0.025	61	0.4	0.0394978
0.005	21	1.2	0.0385954	0.01	1	0.1	0.0414541	0.025	61	0.8	0.0394322
0.005	21	1.6	0.0383841	0.01	1	0.4	0.0403233	0.025	61	1.2	0.0389557
0.005	41	0.1	0.0395087	0.01	1	0.8	0.0400824	0.025	61	1.6	0.0387617
0.005	41	0.4	0.0402657	0.01	1	1.2	0.0402348	0.025	81	0.1	0.0399799
0.005	41	0.8	0.0386659	0.01	1	1.6	0.0401014	0.025	81	0.4	0.039285
0.005	41	1.2	0.0387464	0.01	21	0.1	0.0398191	0.025	81	0.8	0.0393633
0.005	41	1.6	0.0379908	0.01	21	0.4	0.0403189	0.025	81	1.2	0.0386717
0.005	61	0.1	0.0394799	0.01	21	0.8	0.0390783	0.025	81	1.6	0.0387416
0.005	61	0.4	0.039916	0.01	21	1.2	0.0387394	0.05	1	0.1	0.04224
0.005	61	0.8	0.0388681	0.01	21	1.6	0.038409	0.05	1	0.4	0.0408325
0.005	61	1.2	0.0385973	0.01	41	0.1	0.0395969	0.05	1	0.8	0.0408674
0.005	61	1.6	0.0380461	0.01	41	0.4	0.0402444	0.05	1	1.2	0.0411165
0.005	81	0.1	0.0396317	0.01	41	0.8	0.0387289	0.05	1	1.6	0.0412953
0.005	81	0.4	0.0395979	0.01	41	1.2	0.038816	0.05	21	0.1	0.0406481
0.005	81	0.8	0.0389303	0.01	41	1.6	0.0381368	0.05	21	0.4	0.0407137
0.005	81	1.2	0.0385006	0.01	61	0.1	0.0395817	0.05	21	0.8	0.041405
0.005	81	1.6	0.0379823	0.01	61	0.4	0.0400059	0.05	21	1.2	0.0412481
0.0075	1	0.1	0.0414839	0.01	61	0.8	0.0386683	0.05	21	1.6	0.0408738
0.0075	1	0.4	0.040325	0.01	61	1.2	0.0386498	0.05	41	0.1	0.0404582
0.0075	1	0.8	0.0399068	0.01	61	1.6	0.0381569	0.05	41	0.4	0.0411473
0.0075	1	1.2	0.0400472	0.01	81	0.1	0.039625	0.05	41	0.8	0.0414075
0.0075	1	1.6	0.0401035	0.01	81	0.4	0.0398076	0.05	41	1.2	0.0410906
0.0075	21	0.1	0.0398286	0.01	81	0.8	0.0390184	0.05	41	1.6	0.0405634
0.0075	21	0.4	0.0401119	0.01	81	1.2	0.038616	0.05	61	0.1	0.040654
0.0075	21	0.8	0.0390913	0.01	81	1.6	0.0381411	0.05	61	0.4	0.0411414
0.0075	21	1.2	0.0385457	0.025	1	0.1	0.0415103	0.05	61	0.8	0.0414779
0.0075	21	1.6	0.0384542	0.025	1	0.4	0.0402345	0.05	61	1.2	0.041019
0.0075	41	0.1	0.0395801	0.025	1	0.8	0.0402754	0.05	61	1.6	0.0406778
0.0075	41	0.4	0.0402079	0.025	1	1.2	0.0403566	0.05	81	0.1	0.040672
0.0075	41	0.8	0.0386667	0.025	1	1.6	0.0402966	0.05	81	0.4	0.0411242
0.0075	41	1.2	0.0387583	0.025	21	0.1	0.0398618	0.05	81	0.8	0.0417023
0.0075	41	1.6	0.0379717	0.025	21	0.4	0.0401351	0.05	81	1.2	0.0409065
0.0075	61	0.1	0.0394884	0.025	21	0.8	0.0393224	0.05	81	1.6	0.0406417
0.0075	61	0.4	0.0398348	0.025	21	1.2	0.039116	Best Solution:			
								0.0075	41	1.6	0.0379717

Link:881, Period: AM

Epsilon	C	Kernel Param	Error	Epsilon	C	Kernel Param	Error	Epsilon	C	Kernel Param	Error
0.005	1	0.1	0.0133324	0.0075	61	0.8	0.0120401	0.025	21	1.6	0.0128309
0.005	1	0.4	0.0124224	0.0075	61	1.2	0.0119921	0.025	41	0.1	0.0133284
0.005	1	0.8	0.0122295	0.0075	61	1.6	0.011957	0.025	41	0.4	0.0129119
0.005	1	1.2	0.0121347	0.0075	81	0.1	0.0122028	0.025	41	0.8	0.0128129
0.005	1	1.6	0.0120968	0.0075	81	0.4	0.0120983	0.025	41	1.2	0.0127996
0.005	21	0.1	0.0122491	0.0075	81	0.8	0.0120289	0.025	41	1.6	0.0128383
0.005	21	0.4	0.0121054	0.0075	81	1.2	0.0119887	0.025	61	0.1	0.0132337
0.005	21	0.8	0.0120963	0.0075	81	1.6	0.0119564	0.025	61	0.4	0.0128708
0.005	21	1.2	0.0120558	0.01	1	0.1	0.0136263	0.025	61	0.8	0.0127752
0.005	21	1.6	0.0120322	0.01	1	0.4	0.0126303	0.025	61	1.2	0.0128167
0.005	41	0.1	0.0122174	0.01	1	0.8	0.0123755	0.025	61	1.6	0.0128186
0.005	41	0.4	0.0121045	0.01	1	1.2	0.0122582	0.025	81	0.1	0.013202
0.005	41	0.8	0.0120727	0.01	1	1.6	0.0121841	0.025	81	0.4	0.0128254
0.005	41	1.2	0.0120478	0.01	21	0.1	0.0123604	0.025	81	0.8	0.0127613
0.005	41	1.6	0.012018	0.01	21	0.4	0.0121396	0.025	81	1.2	0.0128143
0.005	61	0.1	0.0121848	0.01	21	0.8	0.0121054	0.025	81	1.6	0.0128264
0.005	61	0.4	0.0121043	0.01	21	1.2	0.0120612	0.05	1	0.1	0.0239791
0.005	61	0.8	0.0120751	0.01	21	1.6	0.0120148	0.05	1	0.4	0.0223246
0.005	61	1.2	0.0120261	0.01	41	0.1	0.0122816	0.05	1	0.8	0.0217145
0.005	61	1.6	0.0120248	0.01	41	0.4	0.0121294	0.05	1	1.2	0.021156
0.005	81	0.1	0.0121686	0.01	41	0.8	0.0120742	0.05	1	1.6	0.0206542
0.005	81	0.4	0.0121113	0.01	41	1.2	0.01202	0.05	21	0.1	0.020428
0.005	81	0.8	0.0120709	0.01	41	1.6	0.0119984	0.05	21	0.4	0.0189066
0.005	81	1.2	0.0120253	0.01	61	0.1	0.012243	0.05	21	0.8	0.0189081
0.005	81	1.6	0.0120184	0.01	61	0.4	0.0121205	0.05	21	1.2	0.0188698
0.0075	1	0.1	0.0134704	0.01	61	0.8	0.0120606	0.05	21	1.6	0.0186903
0.0075	1	0.4	0.012522	0.01	61	1.2	0.0120194	0.05	41	0.1	0.0201337
0.0075	1	0.8	0.0123024	0.01	61	1.6	0.0119823	0.05	41	0.4	0.0188496
0.0075	1	1.2	0.0122005	0.01	81	0.1	0.0122186	0.05	41	0.8	0.0189152
0.0075	1	1.6	0.0121495	0.01	81	0.4	0.0121217	0.05	41	1.2	0.0186538
0.0075	21	0.1	0.012306	0.01	81	0.8	0.0120583	0.05	41	1.6	0.0187775
0.0075	21	0.4	0.0121284	0.01	81	1.2	0.0120131	0.05	61	0.1	0.0194444
0.0075	21	0.8	0.0120881	0.01	81	1.6	0.0119652	0.05	61	0.4	0.0188559
0.0075	21	1.2	0.0120329	0.025	1	0.1	0.0157892	0.05	61	0.8	0.0186769
0.0075	21	1.6	0.0120061	0.025	1	0.4	0.0141403	0.05	61	1.2	0.0187357
0.0075	41	0.1	0.0122379	0.025	1	0.8	0.0137921	0.05	61	1.6	0.0188832
0.0075	41	0.4	0.0121158	0.025	1	1.2	0.0136271	0.05	81	0.1	0.0191661
0.0075	41	0.8	0.0120623	0.025	1	1.6	0.0135094	0.05	81	0.4	0.0188459
0.0075	41	1.2	0.0120131	0.025	21	0.1	0.0135516	0.05	81	0.8	0.0186115
0.0075	41	1.6	0.0119858	0.025	21	0.4	0.0130418	0.05	81	1.2	0.0187953
0.0075	61	0.1	0.0122147	0.025	21	0.8	0.0128695	0.05	81	1.6	0.0189078
0.0075	61	0.4	0.0121045	0.025	21	1.2	0.0128644	Best Solution:			
								0.0075	81	1.6	0.0119564

Link: 1798, Period: AM

Epsilon	C	Kernel Param	Error	Epsilon	C	Kernel Param	Error	Epsilon	C	Kernel Param	Error
0.005	1	0.1	0.00832391	0.0075	61	0.8	0.00649891	0.025	21	1.6	0.00840647
0.005	1	0.4	0.00690747	0.0075	61	1.2	0.00650575	0.025	41	0.1	0.00760635
0.005	1	0.8	0.00663533	0.0075	61	1.6	0.00652316	0.025	41	0.4	0.00813918
0.005	1	1.2	0.00653814	0.0075	81	0.1	0.0064688	0.025	41	0.8	0.0089328
0.005	1	1.6	0.00648928	0.0075	81	0.4	0.00650055	0.025	41	1.2	0.00880895
0.005	21	0.1	0.00650477	0.0075	81	0.8	0.00649322	0.025	41	1.6	0.00851426
0.005	21	0.4	0.0065163	0.0075	81	1.2	0.00651975	0.025	61	0.1	0.00767132
0.005	21	0.8	0.00651773	0.0075	81	1.6	0.00653491	0.025	61	0.4	0.00832923
0.005	21	1.2	0.00650997	0.01	1	0.1	0.00928343	0.025	61	0.8	0.00894061
0.005	21	1.6	0.00651067	0.01	1	0.4	0.0073509	0.025	61	1.2	0.00862996
0.005	41	0.1	0.00649285	0.01	1	0.8	0.00695424	0.025	61	1.6	0.00860895
0.005	41	0.4	0.0065177	0.01	1	1.2	0.00682382	0.025	81	0.1	0.00764588
0.005	41	0.8	0.00651811	0.01	1	1.6	0.00678274	0.025	81	0.4	0.00844741
0.005	41	1.2	0.00651824	0.01	21	0.1	0.00661885	0.025	81	0.8	0.00900152
0.005	41	1.6	0.00652516	0.01	21	0.4	0.00653179	0.025	81	1.2	0.0086275
0.005	61	0.1	0.00649577	0.01	21	0.8	0.00650169	0.025	81	1.6	0.00866761
0.005	61	0.4	0.00652129	0.01	21	1.2	0.00652336	0.05	1	0.1	0.0223972
0.005	61	0.8	0.00653312	0.01	21	1.6	0.00653085	0.05	1	0.4	0.0141874
0.005	61	1.2	0.00652516	0.01	41	0.1	0.00655839	0.05	1	0.8	0.012758
0.005	61	1.6	0.00653944	0.01	41	0.4	0.00649655	0.05	1	1.2	0.0128203
0.005	81	0.1	0.00649882	0.01	41	0.8	0.00651033	0.05	1	1.6	0.0132697
0.005	81	0.4	0.00652703	0.01	41	1.2	0.00651875	0.05	21	0.1	0.0210626
0.005	81	0.8	0.00652582	0.01	41	1.6	0.00652197	0.05	21	0.4	0.0216157
0.005	81	1.2	0.00653306	0.01	61	0.1	0.00652421	0.05	21	0.8	0.0231119
0.005	81	1.6	0.00652663	0.01	61	0.4	0.00648455	0.05	21	1.2	0.0230523
0.0075	1	0.1	0.00877933	0.01	61	0.8	0.00651421	0.05	21	1.6	0.0231208
0.0075	1	0.4	0.00701461	0.01	61	1.2	0.00651834	0.05	41	0.1	0.0214428
0.0075	1	0.8	0.00664756	0.01	61	1.6	0.00653125	0.05	41	0.4	0.0235411
0.0075	1	1.2	0.00659908	0.01	81	0.1	0.00650179	0.05	41	0.8	0.0223535
0.0075	1	1.6	0.00657531	0.01	81	0.4	0.00648998	0.05	41	1.2	0.0235157
0.0075	21	0.1	0.00652316	0.01	81	0.8	0.00651515	0.05	41	1.6	0.023262
0.0075	21	0.4	0.00649609	0.01	81	1.2	0.00651949	0.05	61	0.1	0.0216928
0.0075	21	0.8	0.0064951	0.01	81	1.6	0.00654424	0.05	61	0.4	0.0208924
0.0075	21	1.2	0.00649443	0.025	1	0.1	0.0122924	0.05	61	0.8	0.0233644
0.0075	21	1.6	0.00650982	0.025	1	0.4	0.0100717	0.05	61	1.2	0.0235355
0.0075	41	0.1	0.00649121	0.025	1	0.8	0.0089304	0.05	61	1.6	0.0233089
0.0075	41	0.4	0.00649483	0.025	1	1.2	0.00881286	0.05	81	0.1	0.0219187
0.0075	41	0.8	0.00650184	0.025	1	1.6	0.00854504	0.05	81	0.4	0.0204844
0.0075	41	1.2	0.00649877	0.025	21	0.1	0.00771698	0.05	81	0.8	0.0236703
0.0075	41	1.6	0.00652092	0.025	21	0.4	0.00803869	0.05	81	1.2	0.0236158
0.0075	61	0.1	0.00647678	0.025	21	0.8	0.00848335	0.05	81	1.6	0.0233075
0.0075	61	0.4	0.00649462	0.025	21	1.2	0.0088821	Best Solution:			
								0.0075	81	0.1	0.0064688

Link: 1799, Period: AM

Epsilon	C	Kernel Param	Error	Epsilon	C	Kernel Param	Error	Epsilon	C	Kernel Param	Error
0.005	1	0.1	0.0134054	0.0075	61	0.8	0.0125019	0.025	21	1.6	0.0130936
0.005	1	0.4	0.0124771	0.0075	61	1.2	0.0124861	0.025	41	0.1	0.013077
0.005	1	0.8	0.0122579	0.0075	61	1.6	0.012676	0.025	41	0.4	0.013009
0.005	1	1.2	0.0121628	0.0075	81	0.1	0.0123588	0.025	41	0.8	0.013083
0.005	1	1.6	0.0121014	0.0075	81	0.4	0.0124646	0.025	41	1.2	0.0131017
0.005	21	0.1	0.0123779	0.0075	81	0.8	0.0124639	0.025	41	1.6	0.0131602
0.005	21	0.4	0.0122785	0.0075	81	1.2	0.0125683	0.025	61	0.1	0.01306
0.005	21	0.8	0.0123219	0.0075	81	1.6	0.0127778	0.025	61	0.4	0.0130418
0.005	21	1.2	0.0123556	0.01	1	0.1	0.013444	0.025	61	0.8	0.0131475
0.005	21	1.6	0.0123152	0.01	1	0.4	0.0125605	0.025	61	1.2	0.0131599
0.005	41	0.1	0.0123864	0.01	1	0.8	0.0123604	0.025	61	1.6	0.013231
0.005	41	0.4	0.0123158	0.01	1	1.2	0.0122854	0.025	81	0.1	0.0130089
0.005	41	0.8	0.0124144	0.01	1	1.6	0.0122577	0.025	81	0.4	0.0130649
0.005	41	1.2	0.0123833	0.01	21	0.1	0.0124392	0.025	81	0.8	0.0131495
0.005	41	1.6	0.0125623	0.01	21	0.4	0.0123866	0.025	81	1.2	0.0132166
0.005	61	0.1	0.0123647	0.01	21	0.8	0.0124909	0.025	81	1.6	0.0133409
0.005	61	0.4	0.012352	0.01	21	1.2	0.0124024	0.05	1	0.1	0.0303573
0.005	61	0.8	0.0124339	0.01	21	1.6	0.0124104	0.05	1	0.4	0.0259698
0.005	61	1.2	0.0124891	0.01	41	0.1	0.0124229	0.05	1	0.8	0.0241109
0.005	61	1.6	0.0126533	0.01	41	0.4	0.0124734	0.05	1	1.2	0.0220984
0.005	81	0.1	0.0123301	0.01	41	0.8	0.0124959	0.05	1	1.6	0.021511
0.005	81	0.4	0.0123828	0.01	41	1.2	0.0124325	0.05	21	0.1	0.0177084
0.005	81	0.8	0.0124286	0.01	41	1.6	0.0125713	0.05	21	0.4	0.013869
0.005	81	1.2	0.0125804	0.01	61	0.1	0.0124229	0.05	21	0.8	0.0137424
0.005	81	1.6	0.0127725	0.01	61	0.4	0.0125251	0.05	21	1.2	0.0146589
0.0075	1	0.1	0.0133785	0.01	61	0.8	0.0124782	0.05	21	1.6	0.0159275
0.0075	1	0.4	0.0125349	0.01	61	1.2	0.0125115	0.05	41	0.1	0.0158767
0.0075	1	0.8	0.0123332	0.01	61	1.6	0.0126439	0.05	41	0.4	0.0135928
0.0075	1	1.2	0.012243	0.01	81	0.1	0.0124203	0.05	41	0.8	0.0143258
0.0075	1	1.6	0.0121872	0.01	81	0.4	0.0125591	0.05	41	1.2	0.015505
0.0075	21	0.1	0.0124123	0.01	81	0.8	0.0124517	0.05	41	1.6	0.0161332
0.0075	21	0.4	0.0123037	0.01	81	1.2	0.0125775	0.05	61	0.1	0.0149712
0.0075	21	0.8	0.0124242	0.01	81	1.6	0.0127217	0.05	61	0.4	0.0136985
0.0075	21	1.2	0.0124112	0.025	1	0.1	0.015936	0.05	61	0.8	0.0147204
0.0075	21	1.6	0.0123764	0.025	1	0.4	0.0138553	0.05	61	1.2	0.0158611
0.0075	41	0.1	0.0123883	0.025	1	0.8	0.0133024	0.05	61	1.6	0.0162523
0.0075	41	0.4	0.0123886	0.025	1	1.2	0.0131349	0.05	81	0.1	0.0144542
0.0075	41	0.8	0.0125084	0.025	1	1.6	0.0131602	0.05	81	0.4	0.0138433
0.0075	41	1.2	0.0124	0.025	21	0.1	0.013078	0.05	81	0.8	0.0149985
0.0075	41	1.6	0.0125592	0.025	21	0.4	0.0130285	0.05	81	1.2	0.0159699
0.0075	61	0.1	0.0123603	0.025	21	0.8	0.0130388	0.05	81	1.6	0.0162553
0.0075	61	0.4	0.0124419	0.025	21	1.2	0.0131205	Best Solution:			
								0.005	1	1.6	0.0121014

Link: 1815, Period:AM

Epsilon	C	Kernel Param	Error	Epsilon	C	Kernel Param	Error	Epsilon	C	Kernel Param	Error
0.005	1	0.1	0.0038318	0.0075	61	0.8	0.00210346	0.025	21	1.6	0.0133368
0.005	1	0.4	0.00307691	0.0075	61	1.2	0.00197357	0.025	41	0.1	0.0158514
0.005	1	0.8	0.00272411	0.0075	61	1.6	0.00197125	0.025	41	0.4	0.0132199
0.005	1	1.2	0.00259406	0.0075	81	0.1	0.00282989	0.025	41	0.8	0.013259
0.005	1	1.6	0.00261305	0.0075	81	0.4	0.00237807	0.025	41	1.2	0.0132979
0.005	21	0.1	0.00241904	0.0075	81	0.8	0.00204508	0.025	41	1.6	0.0133368
0.005	21	0.4	0.00200206	0.0075	81	1.2	0.00194452	0.025	61	0.1	0.0149758
0.005	21	0.8	0.00188786	0.0075	81	1.6	0.00202654	0.025	61	0.4	0.0132199
0.005	21	1.2	0.00186156	0.01	1	0.1	0.007665	0.025	61	0.8	0.013259
0.005	21	1.6	0.00185666	0.01	1	0.4	0.00680941	0.025	61	1.2	0.0132979
0.005	41	0.1	0.00225572	0.01	1	0.8	0.00645702	0.025	61	1.6	0.0133368
0.005	41	0.4	0.00191851	0.01	1	1.2	0.00651013	0.025	81	0.1	0.0147438
0.005	41	0.8	0.00184552	0.01	1	1.6	0.00641003	0.025	81	0.4	0.0132199
0.005	41	1.2	0.00181449	0.01	21	0.1	0.00567206	0.025	81	0.8	0.013259
0.005	41	1.6	0.00177053	0.01	21	0.4	0.00368119	0.025	81	1.2	0.0132979
0.005	61	0.1	0.00209997	0.01	21	0.8	0.00289628	0.025	81	1.6	0.0133368
0.005	61	0.4	0.00187397	0.01	21	1.2	0.00223173	0.05	1	0.1	0.0442438
0.005	61	0.8	0.00182031	0.01	21	1.6	0.00201274	0.05	1	0.4	0.0440008
0.005	61	1.2	0.00176696	0.01	41	0.1	0.00474193	0.05	1	0.8	0.0440001
0.005	61	1.6	0.00176043	0.01	41	0.4	0.00309838	0.05	1	1.2	0.0439995
0.005	81	0.1	0.00202846	0.01	41	0.8	0.002326	0.05	1	1.6	0.0439988
0.005	81	0.4	0.00186457	0.01	41	1.2	0.00197047	0.05	21	0.1	0.0440013
0.005	81	0.8	0.00180953	0.01	41	1.6	0.00181572	0.05	21	0.4	0.0440008
0.005	81	1.2	0.00175727	0.01	61	0.1	0.00440915	0.05	21	0.8	0.0440001
0.005	81	1.6	0.00173991	0.01	61	0.4	0.00266162	0.05	21	1.2	0.0439995
0.0075	1	0.1	0.00562036	0.01	61	0.8	0.0021427	0.05	21	1.6	0.0439988
0.0075	1	0.4	0.00465366	0.01	61	1.2	0.00185599	0.05	41	0.1	0.0440013
0.0075	1	0.8	0.00428235	0.01	61	1.6	0.00186712	0.05	41	0.4	0.0440008
0.0075	1	1.2	0.00430743	0.01	81	0.1	0.00383116	0.05	41	0.8	0.0440001
0.0075	1	1.6	0.00420027	0.01	81	0.4	0.00257058	0.05	41	1.2	0.0439995
0.0075	21	0.1	0.00341245	0.01	81	0.8	0.00204538	0.05	41	1.6	0.0439988
0.0075	21	0.4	0.00277567	0.01	81	1.2	0.00182614	0.05	61	0.1	0.0440013
0.0075	21	0.8	0.00242162	0.01	81	1.6	0.00197851	0.05	61	0.4	0.0440008
0.0075	21	1.2	0.00232238	0.025	1	0.1	0.0215485	0.05	61	0.8	0.0440001
0.0075	21	1.6	0.00212482	0.025	1	0.4	0.0212227	0.05	61	1.2	0.0439995
0.0075	41	0.1	0.00333492	0.025	1	0.8	0.0206895	0.05	61	1.6	0.0439988
0.0075	41	0.4	0.00248725	0.025	1	1.2	0.0188746	0.05	81	0.1	0.0440013
0.0075	41	0.8	0.00230405	0.025	1	1.6	0.0182764	0.05	81	0.4	0.0440008
0.0075	41	1.2	0.00204231	0.025	21	0.1	0.0174436	0.05	81	0.8	0.0440001
0.0075	41	1.6	0.00196572	0.025	21	0.4	0.0147452	0.05	81	1.2	0.0439995
0.0075	61	0.1	0.00301129	0.025	21	0.8	0.013259	0.05	81	1.6	0.0439988
0.0075	61	0.4	0.00244087	0.025	21	1.2	0.0132979	Best Solution:			
								0.005	81	1.6	0.00173991

Link: 2448, Period: AM

Epsilon	C	Kernel Param	Error	Epsilon	C	Kernel Param	Error	Epsilon	C	Kernel Param	Error
0.005	1	0.1	0.022747	0.0075	61	0.8	0.02223	0.025	21	1.6	0.022343
0.005	1	0.4	0.022323	0.0075	61	1.2	0.022299	0.025	41	0.1	0.022335
0.005	1	0.8	0.022292	0.0075	61	1.6	0.022382	0.025	41	0.4	0.022324
0.005	1	1.2	0.022284	0.0075	81	0.1	0.022275	0.025	41	0.8	0.022271
0.005	1	1.6	0.022236	0.0075	81	0.4	0.022214	0.025	41	1.2	0.022336
0.005	21	0.1	0.022233	0.0075	81	0.8	0.02225	0.025	41	1.6	0.022411
0.005	21	0.4	0.022209	0.0075	81	1.2	0.022327	0.025	61	0.1	0.022366
0.005	21	0.8	0.022203	0.0075	81	1.6	0.022398	0.025	61	0.4	0.022261
0.005	21	1.2	0.022238	0.01	1	0.1	0.022831	0.025	61	0.8	0.022282
0.005	21	1.6	0.022325	0.01	1	0.4	0.022331	0.025	61	1.2	0.022362
0.005	41	0.1	0.022244	0.01	1	0.8	0.022344	0.025	61	1.6	0.022482
0.005	41	0.4	0.022215	0.01	1	1.2	0.022289	0.025	81	0.1	0.022379
0.005	41	0.8	0.022234	0.01	1	1.6	0.022252	0.025	81	0.4	0.022288
0.005	41	1.2	0.022316	0.01	21	0.1	0.0223	0.025	81	0.8	0.022295
0.005	41	1.6	0.022387	0.01	21	0.4	0.022199	0.025	81	1.2	0.0224
0.005	61	0.1	0.022244	0.01	21	0.8	0.022285	0.025	81	1.6	0.022565
0.005	61	0.4	0.022214	0.01	21	1.2	0.022307	0.05	1	0.1	0.025584
0.005	61	0.8	0.022248	0.01	21	1.6	0.022351	0.05	1	0.4	0.024014
0.005	61	1.2	0.022358	0.01	41	0.1	0.022265	0.05	1	0.8	0.023761
0.005	61	1.6	0.022404	0.01	41	0.4	0.022226	0.05	1	1.2	0.023506
0.005	81	0.1	0.022243	0.01	41	0.8	0.022316	0.05	1	1.6	0.023345
0.005	81	0.4	0.022206	0.01	41	1.2	0.022339	0.05	21	0.1	0.023083
0.005	81	0.8	0.022264	0.01	41	1.6	0.0224	0.05	21	0.4	0.023045
0.005	81	1.2	0.02239	0.01	61	0.1	0.022249	0.05	21	0.8	0.023149
0.005	81	1.6	0.022441	0.01	61	0.4	0.02225	0.05	21	1.2	0.023201
0.0075	1	0.1	0.022706	0.01	61	0.8	0.022312	0.05	21	1.6	0.023444
0.0075	1	0.4	0.022319	0.01	61	1.2	0.02236	0.05	41	0.1	0.02305
0.0075	1	0.8	0.022305	0.01	61	1.6	0.022433	0.05	41	0.4	0.023097
0.0075	1	1.2	0.022288	0.01	81	0.1	0.022233	0.05	41	0.8	0.023192
0.0075	1	1.6	0.022247	0.01	81	0.4	0.022263	0.05	41	1.2	0.023443
0.0075	21	0.1	0.022278	0.01	81	0.8	0.022326	0.05	41	1.6	0.023829
0.0075	21	0.4	0.022202	0.01	81	1.2	0.022392	0.05	61	0.1	0.022954
0.0075	21	0.8	0.022199	0.01	81	1.6	0.022463	0.05	61	0.4	0.023132
0.0075	21	1.2	0.022225	0.025	1	0.1	0.023261	0.05	61	0.8	0.023298
0.0075	21	1.6	0.02228	0.025	1	0.4	0.022419	0.05	61	1.2	0.02372
0.0075	41	0.1	0.022286	0.025	1	0.8	0.022389	0.05	61	1.6	0.024308
0.0075	41	0.4	0.022239	0.025	1	1.2	0.022409	0.05	81	0.1	0.022974
0.0075	41	0.8	0.022219	0.025	1	1.6	0.022403	0.05	81	0.4	0.023136
0.0075	41	1.2	0.022276	0.025	21	0.1	0.02233	0.05	81	0.8	0.023368
0.0075	41	1.6	0.022339	0.025	21	0.4	0.022387	0.05	81	1.2	0.023831
0.0075	61	0.1	0.022274	0.025	21	0.8	0.022308	0.05	81	1.6	0.024665
0.0075	61	0.4	0.02222	0.025	21	1.2	0.022293	Best Solution:			
								0.0075	21	0.8	0.022199

Link: 24, Period: INTER

Epsilon	C	Kernel Param	Error	Epsilon	C	Kernel Param	Error	Epsilon	C	Kernel Param	Error
0.005	1	0.1	0.066053	0.008	61	0.8	0.0684	0.025	21	1.6	0.070617
0.005	1	0.4	0.065392	0.008	61	1.2	0.0703	0.025	41	0.1	0.065974
0.005	1	0.8	0.065489	0.008	61	1.6	0.0719	0.025	41	0.4	0.066339
0.005	1	1.2	0.066258	0.008	81	0.1	0.0657	0.025	41	0.8	0.068153
0.005	1	1.6	0.067085	0.008	81	0.4	0.0666	0.025	41	1.2	0.070013
0.005	21	0.1	0.065957	0.008	81	0.8	0.0687	0.025	41	1.6	0.071758
0.005	21	0.4	0.06571	0.008	81	1.2	0.0704	0.025	61	0.1	0.065899
0.005	21	0.8	0.06755	0.008	81	1.6	0.0724	0.025	61	0.4	0.066614
0.005	21	1.2	0.068938	0.01	1	0.1	0.066	0.025	61	0.8	0.068399
0.005	21	1.6	0.070249	0.01	1	0.4	0.0655	0.025	61	1.2	0.070463
0.005	41	0.1	0.065909	0.01	1	0.8	0.0656	0.025	61	1.6	0.072447
0.005	41	0.4	0.066044	0.01	1	1.2	0.0662	0.025	81	0.1	0.066169
0.005	41	0.8	0.067998	0.01	1	1.6	0.0671	0.025	81	0.4	0.066956
0.005	41	1.2	0.06974	0.01	21	0.1	0.0659	0.025	81	0.8	0.068791
0.005	41	1.6	0.071099	0.01	21	0.4	0.0658	0.025	81	1.2	0.070966
0.005	61	0.1	0.065836	0.01	21	0.8	0.0676	0.025	81	1.6	0.073121
0.005	61	0.4	0.066236	0.01	21	1.2	0.0689	0.05	1	0.1	0.067784
0.005	61	0.8	0.068306	0.01	21	1.6	0.0705	0.05	1	0.4	0.067398
0.005	61	1.2	0.070301	0.01	41	0.1	0.0659	0.05	1	0.8	0.067719
0.005	61	1.6	0.071712	0.01	41	0.4	0.0662	0.05	1	1.2	0.068163
0.005	81	0.1	0.065779	0.01	41	0.8	0.068	0.05	1	1.6	0.068911
0.005	81	0.4	0.066462	0.01	41	1.2	0.0698	0.05	21	0.1	0.067558
0.005	81	0.8	0.068539	0.01	41	1.6	0.0713	0.05	21	0.4	0.067906
0.005	81	1.2	0.070457	0.01	61	0.1	0.0659	0.05	21	0.8	0.069187
0.005	81	1.6	0.072309	0.01	61	0.4	0.0665	0.05	21	1.2	0.070439
0.008	1	0.1	0.06593	0.01	61	0.8	0.0684	0.05	21	1.6	0.071766
0.008	1	0.4	0.065332	0.01	61	1.2	0.0703	0.05	41	0.1	0.067645
0.008	1	0.8	0.065543	0.01	61	1.6	0.0721	0.05	41	0.4	0.068285
0.008	1	1.2	0.066289	0.01	81	0.1	0.0658	0.05	41	0.8	0.069484
0.008	1	1.6	0.067109	0.01	81	0.4	0.0668	0.05	41	1.2	0.071182
0.008	21	0.1	0.065938	0.01	81	0.8	0.0686	0.05	41	1.6	0.072776
0.008	21	0.4	0.065831	0.01	81	1.2	0.0705	0.05	61	0.1	0.067662
0.008	21	0.8	0.067615	0.01	81	1.6	0.0727	0.05	61	0.4	0.068703
0.008	21	1.2	0.068964	0.025	1	0.1	0.0664	0.05	61	0.8	0.069638
0.008	21	1.6	0.070366	0.025	1	0.4	0.0659	0.05	61	1.2	0.071659
0.008	41	0.1	0.065877	0.025	1	0.8	0.0661	0.05	61	1.6	0.073718
0.008	41	0.4	0.066248	0.025	1	1.2	0.0665	0.05	81	0.1	0.06784
0.008	41	0.8	0.068011	0.025	1	1.6	0.0672	0.05	81	0.4	0.068951
0.008	41	1.2	0.06975	0.025	21	0.1	0.0661	0.05	81	0.8	0.069927
0.008	41	1.6	0.071148	0.025	21	0.4	0.0663	0.05	81	1.2	0.072107
0.008	61	0.1	0.065824	0.025	21	0.8	0.0677	0.05	81	1.6	0.074453
0.008	61	0.4	0.066398	0.025	21	1.2	0.0689	Best Solution:			
								0.008	1	0.4	0.065332

Link: 26, Period: INTER

Epsilon	C	Kernel Param	Error	Epsilon	C	Kernel Param	Error	Epsilon	C	Kernel Param	Error
0.005	1	0.1	0.0396	0.008	61	0.8	0.03861	0.025	21	1.6	0.03913
0.005	1	0.4	0.0389	0.008	61	1.2	0.03912	0.025	41	0.1	0.03854
0.005	1	0.8	0.0389	0.008	61	1.6	0.03953	0.025	41	0.4	0.03861
0.005	1	1.2	0.0389	0.008	81	0.1	0.03867	0.025	41	0.8	0.03882
0.005	1	1.6	0.0388	0.008	81	0.4	0.03847	0.025	41	1.2	0.03909
0.005	21	0.1	0.0389	0.008	81	0.8	0.03872	0.025	41	1.6	0.03924
0.005	21	0.4	0.0386	0.008	81	1.2	0.03924	0.025	61	0.1	0.03856
0.005	21	0.8	0.0385	0.008	81	1.6	0.0397	0.025	61	0.4	0.03861
0.005	21	1.2	0.0387	0.01	1	0.1	0.03952	0.025	61	0.8	0.0389
0.005	21	1.6	0.039	0.01	1	0.4	0.03881	0.025	61	1.2	0.03914
0.005	41	0.1	0.0388	0.01	1	0.8	0.03881	0.025	61	1.6	0.03938
0.005	41	0.4	0.0386	0.01	1	1.2	0.03872	0.025	81	0.1	0.03857
0.005	41	0.8	0.0385	0.01	1	1.6	0.03863	0.025	81	0.4	0.03862
0.005	41	1.2	0.0389	0.01	21	0.1	0.03874	0.025	81	0.8	0.03899
0.005	41	1.6	0.0393	0.01	21	0.4	0.03846	0.025	81	1.2	0.03917
0.005	61	0.1	0.0387	0.01	21	0.8	0.03847	0.025	81	1.6	0.03956
0.005	61	0.4	0.0385	0.01	21	1.2	0.03873	0.05	1	0.1	0.04048
0.005	61	0.8	0.0386	0.01	21	1.6	0.03902	0.05	1	0.4	0.03907
0.005	61	1.2	0.0391	0.01	41	0.1	0.03874	0.05	1	0.8	0.03903
0.005	61	1.6	0.0395	0.01	41	0.4	0.03851	0.05	1	1.2	0.03905
0.005	81	0.1	0.0387	0.01	41	0.8	0.03856	0.05	1	1.6	0.03904
0.005	81	0.4	0.0385	0.01	41	1.2	0.03896	0.05	21	0.1	0.03899
0.005	81	0.8	0.0387	0.01	41	1.6	0.03933	0.05	21	0.4	0.03893
0.005	81	1.2	0.0393	0.01	61	0.1	0.03878	0.05	21	0.8	0.03929
0.005	81	1.6	0.0396	0.01	61	0.4	0.03851	0.05	21	1.2	0.03952
0.008	1	0.1	0.0396	0.01	61	0.8	0.03869	0.05	21	1.6	0.03982
0.008	1	0.4	0.0388	0.01	61	1.2	0.03911	0.05	41	0.1	0.03896
0.008	1	0.8	0.0389	0.01	61	1.6	0.03957	0.05	41	0.4	0.03907
0.008	1	1.2	0.0387	0.01	81	0.1	0.03876	0.05	41	0.8	0.03936
0.008	1	1.6	0.0387	0.01	81	0.4	0.0385	0.05	41	1.2	0.03972
0.008	21	0.1	0.0388	0.01	81	0.8	0.03878	0.05	41	1.6	0.04006
0.008	21	0.4	0.0385	0.01	81	1.2	0.03923	0.05	61	0.1	0.03894
0.008	21	0.8	0.0384	0.01	81	1.6	0.03972	0.05	61	0.4	0.03913
0.008	21	1.2	0.0387	0.025	1	0.1	0.03955	0.05	61	0.8	0.03956
0.008	21	1.6	0.039	0.025	1	0.4	0.03869	0.05	61	1.2	0.03993
0.008	41	0.1	0.0387	0.025	1	0.8	0.03871	0.05	61	1.6	0.04021
0.008	41	0.4	0.0385	0.025	1	1.2	0.0387	0.05	81	0.1	0.03902
0.008	41	0.8	0.0385	0.025	1	1.6	0.03869	0.05	81	0.4	0.03927
0.008	41	1.2	0.039	0.025	21	0.1	0.03859	0.05	81	0.8	0.03963
0.008	41	1.6	0.0393	0.025	21	0.4	0.03861	0.05	81	1.2	0.04002
0.008	61	0.1	0.0387	0.025	21	0.8	0.03867	0.05	81	1.6	0.04034
0.008	61	0.4	0.0385	0.025	21	1.2	0.03892	Best Solution:			
								0.008	21	0.8	0.03845

Link: 442, Period: INTER

Epsilon	C	Kernel Param	Error	Epsilon	C	Kernel Param	Error	Epsilon	C	Kernel Param	Error
0.005	1	0.1	0.03236	0.0075	61	0.8	0.0323	0.025	21	1.6	0.032598
0.005	1	0.4	0.03191	0.0075	61	1.2	0.03256	0.025	41	0.1	0.032113
0.005	1	0.8	0.03196	0.0075	61	1.6	0.03273	0.025	41	0.4	0.032237
0.005	1	1.2	0.03204	0.0075	81	0.1	0.03198	0.025	41	0.8	0.032415
0.005	1	1.6	0.03215	0.0075	81	0.4	0.03211	0.025	41	1.2	0.032551
0.005	21	0.1	0.03201	0.0075	81	0.8	0.03236	0.025	41	1.6	0.032752
0.005	21	0.4	0.032	0.0075	81	1.2	0.03268	0.025	61	0.1	0.032166
0.005	21	0.8	0.03223	0.0075	81	1.6	0.03276	0.025	61	0.4	0.032272
0.005	21	1.2	0.03244	0.01	1	0.1	0.0324	0.025	61	0.8	0.032515
0.005	21	1.6	0.03256	0.01	1	0.4	0.03187	0.025	61	1.2	0.032635
0.005	41	0.1	0.03194	0.01	1	0.8	0.03191	0.025	61	1.6	0.032869
0.005	41	0.4	0.03208	0.01	1	1.2	0.032	0.025	81	0.1	0.032207
0.005	41	0.8	0.03236	0.01	1	1.6	0.03212	0.025	81	0.4	0.032295
0.005	41	1.2	0.03255	0.01	21	0.1	0.03186	0.025	81	0.8	0.032516
0.005	41	1.6	0.03274	0.01	21	0.4	0.03197	0.025	81	1.2	0.032701
0.005	61	0.1	0.03191	0.01	21	0.8	0.03217	0.025	81	1.6	0.033003
0.005	61	0.4	0.03216	0.01	21	1.2	0.03236	0.05	1	0.1	0.035588
0.005	61	0.8	0.03244	0.01	21	1.6	0.0325	0.05	1	0.4	0.03442
0.005	61	1.2	0.03261	0.01	41	0.1	0.03187	0.05	1	0.8	0.03402
0.005	61	1.6	0.03278	0.01	41	0.4	0.03204	0.05	1	1.2	0.033988
0.005	81	0.1	0.0319	0.01	41	0.8	0.03224	0.05	1	1.6	0.034134
0.005	81	0.4	0.03219	0.01	41	1.2	0.03248	0.05	21	0.1	0.033786
0.005	81	0.8	0.03251	0.01	41	1.6	0.0327	0.05	21	0.4	0.034063
0.005	81	1.2	0.0327	0.01	61	0.1	0.0319	0.05	21	0.8	0.03427
0.005	81	1.6	0.03283	0.01	61	0.4	0.0321	0.05	21	1.2	0.034344
0.008	1	0.1	0.03237	0.01	61	0.8	0.03235	0.05	21	1.6	0.034427
0.008	1	0.4	0.03197	0.01	61	1.2	0.03261	0.05	41	0.1	0.033737
0.008	1	0.8	0.03189	0.01	61	1.6	0.03272	0.05	41	0.4	0.034185
0.008	1	1.2	0.03196	0.01	81	0.1	0.03193	0.05	41	0.8	0.034273
0.008	1	1.6	0.03211	0.01	81	0.4	0.03213	0.05	41	1.2	0.034458
0.008	21	0.1	0.03198	0.01	81	0.8	0.03241	0.05	41	1.6	0.034578
0.008	21	0.4	0.03195	0.01	81	1.2	0.03268	0.05	61	0.1	0.033574
0.008	21	0.8	0.03216	0.01	81	1.6	0.03279	0.05	61	0.4	0.034294
0.008	21	1.2	0.03231	0.025	1	0.1	0.03261	0.05	61	0.8	0.034322
0.008	21	1.6	0.03249	0.025	1	0.4	0.0321	0.05	61	1.2	0.034509
0.008	41	0.1	0.03196	0.025	1	0.8	0.03222	0.05	61	1.6	0.034735
0.008	41	0.4	0.03204	0.025	1	1.2	0.03213	0.05	81	0.1	0.033455
0.008	41	0.8	0.03223	0.025	1	1.6	0.03218	0.05	81	0.4	0.034329
0.008	41	1.2	0.03245	0.025	21	0.1	0.03211	0.05	81	0.8	0.034384
0.008	41	1.6	0.0327	0.025	21	0.4	0.0322	0.05	81	1.2	0.034568
0.008	61	0.1	0.03196	0.025	21	0.8	0.03231	0.05	81	1.6	0.034886
0.008	61	0.4	0.03207	0.025	21	1.2	0.03252	Best Solution:			
								0.01	21	0.1	0.031862

Link:453, Period: INTER

Epsilon	C	Kernel Param	Error	Epsilon	C	Kernel Param	Error	Epsilon	C	Kernel Param	Error
0.005	1	0.1	0.0243	0.0075	61	0.8	0.02326	0.025	21	1.6	0.02343
0.005	1	0.4	0.0236	0.0075	61	1.2	0.02301	0.025	41	0.1	0.02407
0.005	1	0.8	0.0232	0.0075	61	1.6	0.02308	0.025	41	0.4	0.02368
0.005	1	1.2	0.023	0.0075	81	0.1	0.02379	0.025	41	0.8	0.02348
0.005	1	1.6	0.0229	0.0075	81	0.4	0.02333	0.025	41	1.2	0.02357
0.005	21	0.1	0.0238	0.0075	81	0.8	0.02331	0.025	41	1.6	0.02348
0.005	21	0.4	0.0235	0.0075	81	1.2	0.02302	0.025	61	0.1	0.02402
0.005	21	0.8	0.0231	0.0075	81	1.6	0.02308	0.025	61	0.4	0.02367
0.005	21	1.2	0.0232	0.01	1	0.1	0.02415	0.025	61	0.8	0.02361
0.005	21	1.6	0.0231	0.01	1	0.4	0.02355	0.025	61	1.2	0.02347
0.005	41	0.1	0.0236	0.01	1	0.8	0.02312	0.025	61	1.6	0.02352
0.005	41	0.4	0.0235	0.01	1	1.2	0.02287	0.025	81	0.1	0.02406
0.005	41	0.8	0.0232	0.01	1	1.6	0.02287	0.025	81	0.4	0.02363
0.005	41	1.2	0.0231	0.01	21	0.1	0.02368	0.025	81	0.8	0.02361
0.005	41	1.6	0.023	0.01	21	0.4	0.02336	0.025	81	1.2	0.02349
0.005	61	0.1	0.0237	0.01	21	0.8	0.02319	0.025	81	1.6	0.02358
0.005	61	0.4	0.0233	0.01	21	1.2	0.0232	0.05	1	0.1	0.02528
0.005	61	0.8	0.0232	0.01	21	1.6	0.02312	0.05	1	0.4	0.02422
0.005	61	1.2	0.023	0.01	41	0.1	0.02367	0.05	1	0.8	0.02366
0.005	61	1.6	0.0231	0.01	41	0.4	0.02334	0.05	1	1.2	0.02368
0.005	81	0.1	0.0237	0.01	41	0.8	0.02327	0.05	1	1.6	0.02352
0.005	81	0.4	0.0233	0.01	41	1.2	0.02322	0.05	21	0.1	0.02474
0.005	81	0.8	0.0232	0.01	41	1.6	0.02314	0.05	21	0.4	0.02371
0.005	81	1.2	0.0229	0.01	61	0.1	0.0237	0.05	21	0.8	0.024
0.005	81	1.6	0.0231	0.01	61	0.4	0.02334	0.05	21	1.2	0.02438
0.0075	1	0.1	0.0242	0.01	61	0.8	0.02334	0.05	21	1.6	0.02438
0.0075	1	0.4	0.0236	0.01	61	1.2	0.02309	0.05	41	0.1	0.02454
0.0075	1	0.8	0.0232	0.01	61	1.6	0.02315	0.05	41	0.4	0.02378
0.0075	1	1.2	0.0229	0.01	81	0.1	0.02372	0.05	41	0.8	0.02426
0.0075	1	1.6	0.0228	0.01	81	0.4	0.02328	0.05	41	1.2	0.02438
0.0075	21	0.1	0.0238	0.01	81	0.8	0.02334	0.05	41	1.6	0.02448
0.0075	21	0.4	0.0234	0.01	81	1.2	0.02311	0.05	61	0.1	0.02448
0.0075	21	0.8	0.0231	0.01	81	1.6	0.02321	0.05	61	0.4	0.02386
0.0075	21	1.2	0.0232	0.025	1	0.1	0.02429	0.05	61	0.8	0.02448
0.0075	21	1.6	0.0231	0.025	1	0.4	0.02364	0.05	61	1.2	0.0244
0.0075	41	0.1	0.0237	0.025	1	0.8	0.02334	0.05	61	1.6	0.02448
0.0075	41	0.4	0.0234	0.025	1	1.2	0.02314	0.05	81	0.1	0.02443
0.0075	41	0.8	0.0232	0.025	1	1.6	0.0231	0.05	81	0.4	0.02388
0.0075	41	1.2	0.0232	0.025	21	0.1	0.02411	0.05	81	0.8	0.0245
0.0075	41	1.6	0.0231	0.025	21	0.4	0.02374	0.05	81	1.2	0.02445
0.0075	61	0.1	0.0238	0.025	21	0.8	0.02346	0.05	81	1.6	0.0246
0.0075	61	0.4	0.0233	0.025	21	1.2	0.02346	Best Solution:			
								0.008	1	1.6	0.02285

Link: 454, Period: INTER

Epsilon	C	Kernel Param	Error	Epsilon	C	Kernel Param	Error	Epsilon	C	Kernel Param	Error
0.005	1	0.1	0.03282	0.008	61	0.8	0.03229	0.025	21	1.6	0.0333
0.005	1	0.4	0.03179	0.008	61	1.2	0.03315	0.025	41	0.1	0.0316
0.005	1	0.8	0.0316	0.008	61	1.6	0.03401	0.025	41	0.4	0.032
0.005	1	1.2	0.03182	0.008	81	0.1	0.03184	0.025	41	0.8	0.0323
0.005	1	1.6	0.03208	0.008	81	0.4	0.03216	0.025	41	1.2	0.0334
0.005	21	0.1	0.03175	0.008	81	0.8	0.03247	0.025	41	1.6	0.0339
0.005	21	0.4	0.03171	0.008	81	1.2	0.03377	0.025	61	0.1	0.0315
0.005	21	0.8	0.03226	0.008	81	1.6	0.03463	0.025	61	0.4	0.032
0.005	21	1.2	0.03221	0.01	1	0.1	0.03289	0.025	61	0.8	0.0326
0.005	21	1.6	0.03256	0.01	1	0.4	0.03166	0.025	61	1.2	0.0337
0.005	41	0.1	0.03182	0.01	1	0.8	0.03163	0.025	61	1.6	0.0346
0.005	41	0.4	0.03207	0.01	1	1.2	0.03176	0.025	81	0.1	0.0316
0.005	41	0.8	0.03232	0.01	1	1.6	0.0321	0.025	81	0.4	0.0321
0.005	41	1.2	0.03273	0.01	21	0.1	0.03162	0.025	81	0.8	0.033
0.005	41	1.6	0.03324	0.01	21	0.4	0.03163	0.025	81	1.2	0.034
0.005	61	0.1	0.03181	0.01	21	0.8	0.03199	0.025	81	1.6	0.0351
0.005	61	0.4	0.03221	0.01	21	1.2	0.03187	0.05	1	0.1	0.0334
0.005	61	0.8	0.03247	0.01	21	1.6	0.03225	0.05	1	0.4	0.033
0.005	61	1.2	0.03306	0.01	41	0.1	0.03155	0.05	1	0.8	0.0333
0.005	61	1.6	0.03394	0.01	41	0.4	0.0317	0.05	1	1.2	0.0337
0.005	81	0.1	0.03189	0.01	41	0.8	0.03204	0.05	1	1.6	0.034
0.005	81	0.4	0.03241	0.01	41	1.2	0.03241	0.05	21	0.1	0.0329
0.005	81	0.8	0.03271	0.01	41	1.6	0.03318	0.05	21	0.4	0.0328
0.005	81	1.2	0.03373	0.01	61	0.1	0.03161	0.05	21	0.8	0.0339
0.005	81	1.6	0.03458	0.01	61	0.4	0.03186	0.05	21	1.2	0.0341
0.008	1	0.1	0.03288	0.01	61	0.8	0.03209	0.05	21	1.6	0.0348
0.008	1	0.4	0.03177	0.01	61	1.2	0.03311	0.05	41	0.1	0.0326
0.008	1	0.8	0.0316	0.01	61	1.6	0.03372	0.05	41	0.4	0.0332
0.008	1	1.2	0.03179	0.01	81	0.1	0.03169	0.05	41	0.8	0.0341
0.008	1	1.6	0.03212	0.01	81	0.4	0.03203	0.05	41	1.2	0.0349
0.008	21	0.1	0.03176	0.01	81	0.8	0.03224	0.05	41	1.6	0.0358
0.008	21	0.4	0.0316	0.01	81	1.2	0.03368	0.05	61	0.1	0.0324
0.008	21	0.8	0.03209	0.01	81	1.6	0.03428	0.05	61	0.4	0.0335
0.008	21	1.2	0.03204	0.025	1	0.1	0.03293	0.05	61	0.8	0.0343
0.008	21	1.6	0.03248	0.025	1	0.4	0.03192	0.05	61	1.2	0.0357
0.008	41	0.1	0.03173	0.025	1	0.8	0.03183	0.05	61	1.6	0.0361
0.008	41	0.4	0.03182	0.025	1	1.2	0.03215	0.05	81	0.1	0.0325
0.008	41	0.8	0.0322	0.025	1	1.6	0.03249	0.05	81	0.4	0.0338
0.008	41	1.2	0.03259	0.025	21	0.1	0.03174	0.05	81	0.8	0.0346
0.008	41	1.6	0.03328	0.025	21	0.4	0.03185	0.05	81	1.2	0.036
0.008	61	0.1	0.0318	0.025	21	0.8	0.03248	0.05	81	1.6	0.036
0.008	61	0.4	0.03193	0.025	21	1.2	0.03246	Best Solution:			
								0.025	61	0.1	0.0315

Link: 881, Period: INTER

Epsilon	C	Kernel Param	Error	Epsilon	C	Kernel Param	Error	Epsilon	C	Kernel Param	Error
0.005	1	0.1	0.01287	0.0075	61	0.8	0.0116	0.025	21	1.6	0.013
0.005	1	0.4	0.01176	0.0075	61	1.2	0.0128	0.025	41	0.1	0.0131
0.005	1	0.8	0.01164	0.0075	61	1.6	0.0125	0.025	41	0.4	0.0131
0.005	1	1.2	0.01147	0.0075	81	0.1	0.0117	0.025	41	0.8	0.0124
0.005	1	1.6	0.01144	0.0075	81	0.4	0.0117	0.025	41	1.2	0.0131
0.005	21	0.1	0.01179	0.0075	81	0.8	0.0118	0.025	41	1.6	0.0132
0.005	21	0.4	0.01163	0.0075	81	1.2	0.0131	0.025	61	0.1	0.013
0.005	21	0.8	0.0114	0.0075	81	1.6	0.0122	0.025	61	0.4	0.013
0.005	21	1.2	0.01137	0.01	1	0.1	0.013	0.025	61	0.8	0.0126
0.005	21	1.6	0.01213	0.01	1	0.4	0.0118	0.025	61	1.2	0.0134
0.005	41	0.1	0.0118	0.01	1	0.8	0.0116	0.025	61	1.6	0.0131
0.005	41	0.4	0.01166	0.01	1	1.2	0.0116	0.025	81	0.1	0.0131
0.005	41	0.8	0.01119	0.01	1	1.6	0.0116	0.025	81	0.4	0.0128
0.005	41	1.2	0.01223	0.01	21	0.1	0.0118	0.025	81	0.8	0.0129
0.005	41	1.6	0.0127	0.01	21	0.4	0.0117	0.025	81	1.2	0.0136
0.005	61	0.1	0.01181	0.01	21	0.8	0.0115	0.025	81	1.6	0.0131
0.005	61	0.4	0.01169	0.01	21	1.2	0.0117	0.05	1	0.1	0.033
0.005	61	0.8	0.0114	0.01	21	1.6	0.0123	0.05	1	0.4	0.0303
0.005	61	1.2	0.01279	0.01	41	0.1	0.0118	0.05	1	0.8	0.0288
0.005	61	1.6	0.01236	0.01	41	0.4	0.0118	0.05	1	1.2	0.0274
0.005	81	0.1	0.01177	0.01	41	0.8	0.0114	0.05	1	1.6	0.0264
0.005	81	0.4	0.01168	0.01	41	1.2	0.0124	0.05	21	0.1	0.0242
0.005	81	0.8	0.01174	0.01	41	1.6	0.0128	0.05	21	0.4	0.0205
0.005	81	1.2	0.01308	0.01	61	0.1	0.0118	0.05	21	0.8	0.0184
0.005	81	1.6	0.01214	0.01	61	0.4	0.0118	0.05	21	1.2	0.018
0.008	1	0.1	0.01296	0.01	61	0.8	0.0117	0.05	21	1.6	0.0186
0.008	1	0.4	0.01176	0.01	61	1.2	0.0129	0.05	41	0.1	0.0227
0.008	1	0.8	0.01162	0.01	61	1.6	0.0127	0.05	41	0.4	0.0187
0.008	1	1.2	0.01149	0.01	81	0.1	0.0118	0.05	41	0.8	0.0179
0.008	1	1.6	0.01149	0.01	81	0.4	0.0118	0.05	41	1.2	0.0183
0.008	21	0.1	0.01176	0.01	81	0.8	0.012	0.05	41	1.6	0.0202
0.008	21	0.4	0.01165	0.01	81	1.2	0.0132	0.05	61	0.1	0.0219
0.008	21	0.8	0.01133	0.01	81	1.6	0.0127	0.05	61	0.4	0.0183
0.008	21	1.2	0.0115	0.025	1	0.1	0.015	0.05	61	0.8	0.0177
0.008	21	1.6	0.01214	0.025	1	0.4	0.0134	0.05	61	1.2	0.0193
0.008	41	0.1	0.01176	0.025	1	0.8	0.0132	0.05	61	1.6	0.0223
0.008	41	0.4	0.01166	0.025	1	1.2	0.0128	0.05	81	0.1	0.0217
0.008	41	0.8	0.0112	0.025	1	1.6	0.0127	0.05	81	0.4	0.0181
0.008	41	1.2	0.01221	0.025	21	0.1	0.0132	0.05	81	0.8	0.018
0.008	41	1.6	0.01266	0.025	21	0.4	0.0129	0.05	81	1.2	0.0203
0.008	61	0.1	0.01175	0.025	21	0.8	0.0126	0.05	81	1.6	0.0239
0.008	61	0.4	0.01172	0.025	21	1.2	0.0126	Best Solution:			
								0.005	41	0.8	0.0112

Link: 1798, Period: INTER

Epsilon	C	Kernel Param	Error	Epsilon	C	Kernel Param	Error	Epsilon	C	Kernel Param	Error
0.005	1	0.1	0.00705118	0.0075	61	0.8	0.00587369	0.025	21	1.6	0.00833018
0.005	1	0.4	0.0061586	0.0075	61	1.2	0.00585345	0.025	41	0.1	0.00731399
0.005	1	0.8	0.00591677	0.0075	61	1.6	0.00585256	0.025	41	0.4	0.0071719
0.005	1	1.2	0.00584593	0.0075	81	0.1	0.00588615	0.025	41	0.8	0.00787958
0.005	1	1.6	0.00582302	0.0075	81	0.4	0.0058851	0.025	41	1.2	0.00819138
0.005	21	0.1	0.00583995	0.0075	81	0.8	0.00587114	0.025	41	1.6	0.00875593
0.005	21	0.4	0.00584069	0.0075	81	1.2	0.00585135	0.025	61	0.1	0.00699206
0.005	21	0.8	0.0058378	0.0075	81	1.6	0.00585455	0.025	61	0.4	0.00728125
0.005	21	1.2	0.00582936	0.01	1	0.1	0.00775093	0.025	61	0.8	0.00786273
0.005	21	1.6	0.00582246	0.01	1	0.4	0.0064997	0.025	61	1.2	0.00853384
0.005	41	0.1	0.00583983	0.01	1	0.8	0.0062351	0.025	61	1.6	0.00874312
0.005	41	0.4	0.00584795	0.01	1	1.2	0.00614245	0.025	81	0.1	0.00650932
0.005	41	0.8	0.00584224	0.01	1	1.6	0.00611309	0.025	81	0.4	0.00742083
0.005	41	1.2	0.00582863	0.01	21	0.1	0.00598166	0.025	81	0.8	0.00807268
0.005	41	1.6	0.00582507	0.01	21	0.4	0.00597152	0.025	81	1.2	0.00852194
0.005	61	0.1	0.00584038	0.01	21	0.8	0.00598006	0.025	81	1.6	0.00869919
0.005	61	0.4	0.00585289	0.01	21	1.2	0.00600242	0.05	1	0.1	0.0281949
0.005	61	0.8	0.00584645	0.01	21	1.6	0.00602282	0.05	1	0.4	0.0213817
0.005	61	1.2	0.00582565	0.01	41	0.1	0.00598123	0.05	1	0.8	0.0179889
0.005	61	1.6	0.00583165	0.01	41	0.4	0.00597632	0.05	1	1.2	0.0168354
0.005	81	0.1	0.00584365	0.01	41	0.8	0.00600008	0.05	1	1.6	0.0169625
0.005	81	0.4	0.00585448	0.01	41	1.2	0.00602144	0.05	21	0.1	0.0169665
0.005	81	0.8	0.00584261	0.01	41	1.6	0.0060097	0.05	21	0.4	0.0152983
0.005	81	1.2	0.00583247	0.01	61	0.1	0.00595624	0.05	21	0.8	0.0144583
0.005	81	1.6	0.00583455	0.01	61	0.4	0.00598588	0.05	21	1.2	0.0145545
0.0075	1	0.1	0.00731067	0.01	61	0.8	0.00601717	0.05	21	1.6	0.014611
0.0075	1	0.4	0.00628735	0.01	61	1.2	0.00601206	0.05	41	0.1	0.0160868
0.0075	1	0.8	0.0059924	0.01	61	1.6	0.00600005	0.05	41	0.4	0.0145866
0.0075	1	1.2	0.00592622	0.01	81	0.1	0.00595365	0.05	41	0.8	0.0144444
0.0075	1	1.6	0.00588448	0.01	81	0.4	0.0059859	0.05	41	1.2	0.0145545
0.0075	21	0.1	0.00586897	0.01	81	0.8	0.00601856	0.05	41	1.6	0.014611
0.0075	21	0.4	0.00588159	0.01	81	1.2	0.0060074	0.05	61	0.1	0.0157706
0.0075	21	0.8	0.00587193	0.01	81	1.6	0.00600208	0.05	61	0.4	0.0141556
0.0075	21	1.2	0.00586216	0.025	1	0.1	0.0134663	0.05	61	0.8	0.0144444
0.0075	21	1.6	0.00585553	0.025	1	0.4	0.0110401	0.05	61	1.2	0.0145545
0.0075	41	0.1	0.00586259	0.025	1	0.8	0.00991818	0.05	61	1.6	0.014611
0.0075	41	0.4	0.00587724	0.025	1	1.2	0.00974111	0.05	81	0.1	0.0156519
0.0075	41	0.8	0.00587317	0.025	1	1.6	0.0100025	0.05	81	0.4	0.0140468
0.0075	41	1.2	0.00585947	0.025	21	0.1	0.00862863	0.05	81	0.8	0.0144444
0.0075	41	1.6	0.0058557	0.025	21	0.4	0.00698322	0.05	81	1.2	0.0145545
0.0075	61	0.1	0.00587861	0.025	21	0.8	0.00754205	0.05	81	1.6	0.014611
0.0075	61	0.4	0.00588226	0.025	21	1.2	0.00810409	Best Solution:			
								0.005	21	1.6	0.00582246

Link: 1799, Period: INTER

Epsilon	C	Kernel Param	Error	Epsilon	C	Kernel Param	Error	Epsilon	C	Kernel Param	Error
0.005	1	0.1	0.00662066	0.0075	61	0.8	0.00647548	0.025	21	1.6	0.0117576
0.005	1	0.4	0.00649447	0.0075	61	1.2	0.00649828	0.025	41	0.1	0.0118954
0.005	1	0.8	0.00649479	0.0075	61	1.6	0.00650538	0.025	41	0.4	0.0118734
0.005	1	1.2	0.00649295	0.0075	81	0.1	0.00647733	0.025	41	0.8	0.0117737
0.005	1	1.6	0.0064937	0.0075	81	0.4	0.00646706	0.025	41	1.2	0.0117079
0.005	21	0.1	0.00650646	0.0075	81	0.8	0.00648059	0.025	41	1.6	0.0117858
0.005	21	0.4	0.0065178	0.0075	81	1.2	0.00650516	0.025	61	0.1	0.0118891
0.005	21	0.8	0.00649857	0.0075	81	1.6	0.00650575	0.025	61	0.4	0.0117774
0.005	21	1.2	0.00649386	0.01	1	0.1	0.00705413	0.025	61	0.8	0.0117168
0.005	21	1.6	0.00649183	0.01	1	0.4	0.0067375	0.025	61	1.2	0.0117939
0.005	41	0.1	0.00652149	0.01	1	0.8	0.00669251	0.025	61	1.6	0.0117739
0.005	41	0.4	0.00650893	0.01	1	1.2	0.0066787	0.025	81	0.1	0.0118909
0.005	41	0.8	0.00649522	0.01	1	1.6	0.0066723	0.025	81	0.4	0.0117816
0.005	41	1.2	0.0064911	0.01	21	0.1	0.00666597	0.025	81	0.8	0.0118022
0.005	41	1.6	0.00648266	0.01	21	0.4	0.00666292	0.025	81	1.2	0.0117841
0.005	61	0.1	0.00652603	0.01	21	0.8	0.00667011	0.025	81	1.6	0.0117683
0.005	61	0.4	0.00650239	0.01	21	1.2	0.00667241	0.05	1	0.1	0.0252453
0.005	61	0.8	0.00649757	0.01	21	1.6	0.0066803	0.05	1	0.4	0.0253799
0.005	61	1.2	0.00648654	0.01	41	0.1	0.00666053	0.05	1	0.8	0.0255592
0.005	61	1.6	0.00647133	0.01	41	0.4	0.00666751	0.05	1	1.2	0.0257384
0.005	81	0.1	0.00652876	0.01	41	0.8	0.00667143	0.05	1	1.6	0.0259176
0.005	81	0.4	0.00649989	0.01	41	1.2	0.00668118	0.05	21	0.1	0.0261424
0.005	81	0.8	0.00649656	0.01	41	1.6	0.00668198	0.05	21	0.4	0.0277338
0.005	81	1.2	0.00648231	0.01	61	0.1	0.00666346	0.05	21	0.8	0.0279349
0.005	81	1.6	0.00647402	0.01	61	0.4	0.00666922	0.05	21	1.2	0.0281377
0.0075	1	0.1	0.00675745	0.01	61	0.8	0.00667743	0.05	21	1.6	0.028226
0.0075	1	0.4	0.00652929	0.01	61	1.2	0.00668282	0.05	41	0.1	0.0270409
0.0075	1	0.8	0.006491	0.01	61	1.6	0.00668824	0.05	41	0.4	0.0279251
0.0075	1	1.2	0.00648346	0.01	81	0.1	0.00666319	0.05	41	0.8	0.02822
0.0075	1	1.6	0.00647617	0.01	81	0.4	0.0066702	0.05	41	1.2	0.0283302
0.0075	21	0.1	0.00648094	0.01	81	0.8	0.00667976	0.05	41	1.6	0.0284328
0.0075	21	0.4	0.00647246	0.01	81	1.2	0.00668039	0.05	61	0.1	0.02768
0.0075	21	0.8	0.00646663	0.01	81	1.6	0.00669472	0.05	61	0.4	0.0281179
0.0075	21	1.2	0.0064727	0.025	1	0.1	0.0122085	0.05	61	0.8	0.0283269
0.0075	21	1.6	0.0064799	0.025	1	0.4	0.012046	0.05	61	1.2	0.028472
0.0075	41	0.1	0.00648084	0.025	1	0.8	0.0119327	0.05	61	1.6	0.0285437
0.0075	41	0.4	0.00646838	0.025	1	1.2	0.0119075	0.05	81	0.1	0.0277267
0.0075	41	0.8	0.0064714	0.025	1	1.6	0.0118872	0.05	81	0.4	0.028217
0.0075	41	1.2	0.00648286	0.025	21	0.1	0.0118466	0.05	81	0.8	0.0284265
0.0075	41	1.6	0.00650141	0.025	21	0.4	0.0118895	0.05	81	1.2	0.0285412
0.0075	61	0.1	0.00647862	0.025	21	0.8	0.0118672	0.05	81	1.6	0.0285685
0.0075	61	0.4	0.00646546	0.025	21	1.2	0.0117701	Best Solution:			
								0.0075	61	0.4	0.0064655

Link: 1815, Period: INTER

Epsilon	C	Kernel Param	Error	Epsilon	C	Kernel Param	Error	Epsilon	C	Kernel Param	Error
0.005	1	0.1	0.00891336	0.0075	61	0.8	0.0113346	0.025	21	1.6	0.0237105
0.005	1	0.4	0.0071875	0.0075	61	1.2	0.0108084	0.025	41	0.1	0.0165569
0.005	1	0.8	0.00741415	0.0075	61	1.6	0.0113308	0.025	41	0.4	0.0233172
0.005	1	1.2	0.00780182	0.0075	81	0.1	0.00788799	0.025	41	0.8	0.0240536
0.005	1	1.6	0.00795088	0.0075	81	0.4	0.0106727	0.025	41	1.2	0.0238937
0.005	21	0.1	0.00652987	0.0075	81	0.8	0.0113362	0.025	41	1.6	0.0246
0.005	21	0.4	0.0081195	0.0075	81	1.2	0.0113151	0.025	61	0.1	0.016462
0.005	21	0.8	0.0085659	0.0075	81	1.6	0.012132	0.025	61	0.4	0.0237423
0.005	21	1.2	0.00902884	0.01	1	0.1	0.01324	0.025	61	0.8	0.0241425
0.005	21	1.6	0.00921304	0.01	1	0.4	0.0105637	0.025	61	1.2	0.0244868
0.005	41	0.1	0.00690008	0.01	1	0.8	0.0111022	0.025	61	1.6	0.0253495
0.005	41	0.4	0.00896233	0.01	1	1.2	0.0116216	0.025	81	0.1	0.0164208
0.005	41	0.8	0.00989601	0.01	1	1.6	0.0116565	0.025	81	0.4	0.0241042
0.005	41	1.2	0.0101685	0.01	21	0.1	0.00796407	0.025	81	0.8	0.0244294
0.005	41	1.6	0.0102693	0.01	21	0.4	0.0107364	0.025	81	1.2	0.0252711
0.005	61	0.1	0.00713121	0.01	21	0.8	0.0113077	0.025	81	1.6	0.0260943
0.005	61	0.4	0.00932356	0.01	21	1.2	0.010812	0.05	1	0.1	0.0495407
0.005	61	0.8	0.0107589	0.01	21	1.6	0.0105176	0.05	1	0.4	0.0449952
0.005	61	1.2	0.0107125	0.01	41	0.1	0.00780623	0.05	1	0.8	0.0425414
0.005	61	1.6	0.0110679	0.01	41	0.4	0.0114195	0.05	1	1.2	0.0442373
0.005	81	0.1	0.00740363	0.01	41	0.8	0.0120996	0.05	1	1.6	0.0463156
0.005	81	0.4	0.00957372	0.01	41	1.2	0.0112848	0.05	21	0.1	0.0367294
0.005	81	0.8	0.0110123	0.01	41	1.6	0.0111128	0.05	21	0.4	0.0396747
0.005	81	1.2	0.0111946	0.01	61	0.1	0.00821534	0.05	21	0.8	0.0450821
0.005	81	1.6	0.0119978	0.01	61	0.4	0.0118732	0.05	21	1.2	0.0448553
0.0075	1	0.1	0.0110499	0.01	61	0.8	0.0125227	0.05	21	1.6	0.0453257
0.0075	1	0.4	0.00887861	0.01	61	1.2	0.0114105	0.05	41	0.1	0.0370107
0.0075	1	0.8	0.00935253	0.01	61	1.6	0.0120614	0.05	41	0.4	0.0399225
0.0075	1	1.2	0.00974687	0.01	81	0.1	0.00847075	0.05	41	0.8	0.0453755
0.0075	1	1.6	0.00978822	0.01	81	0.4	0.0121532	0.05	41	1.2	0.0453844
0.0075	21	0.1	0.00702866	0.01	81	0.8	0.0124365	0.05	41	1.6	0.0461871
0.0075	21	0.4	0.00954994	0.01	81	1.2	0.0118233	0.05	61	0.1	0.0352235
0.0075	21	0.8	0.00970353	0.01	81	1.6	0.0129411	0.05	61	0.4	0.0409458
0.0075	21	1.2	0.00958438	0.025	1	0.1	0.0257661	0.05	61	0.8	0.0454736
0.0075	21	1.6	0.00955408	0.025	1	0.4	0.0217413	0.05	61	1.2	0.0456584
0.0075	41	0.1	0.00717811	0.025	1	0.8	0.0232726	0.05	61	1.6	0.0470183
0.0075	41	0.4	0.010154	0.025	1	1.2	0.024386	0.05	81	0.1	0.0319899
0.0075	41	0.8	0.0109939	0.025	1	1.6	0.0249146	0.05	81	0.4	0.0417958
0.0075	41	1.2	0.0104764	0.025	21	0.1	0.0182181	0.05	81	0.8	0.0462165
0.0075	41	1.6	0.0102998	0.025	21	0.4	0.0227875	0.05	81	1.2	0.0457848
0.0075	61	0.1	0.00758018	0.025	21	0.8	0.0232964	0.05	81	1.6	0.0475817
0.0075	61	0.4	0.0103669	0.025	21	1.2	0.0235738	Best Solution:			
								0.005	21	0.1	0.00652987

Link: 2448, Period: INTER

Epsilon	C	Kernel Param	Error	Epsilon	C	Kernel Param	Error	Epsilon	C	Kernel Param	Error
0.005	1	0.1	0.0500458	0.0075	61	0.8	0.050649	0.025	21	1.6	0.0510024
0.005	1	0.4	0.0497597	0.0075	61	1.2	0.0513357	0.025	41	0.1	0.0496538
0.005	1	0.8	0.0499699	0.0075	61	1.6	0.0514779	0.025	41	0.4	0.0503102
0.005	1	1.2	0.0502978	0.0075	81	0.1	0.0498371	0.025	41	0.8	0.0504709
0.005	1	1.6	0.0504822	0.0075	81	0.4	0.0503031	0.025	41	1.2	0.0510321
0.005	21	0.1	0.0498478	0.0075	81	0.8	0.0508211	0.025	41	1.6	0.0513396
0.005	21	0.4	0.0502886	0.0075	81	1.2	0.0514019	0.025	61	0.1	0.0496546
0.005	21	0.8	0.0501947	0.0075	81	1.6	0.051759	0.025	61	0.4	0.0503893
0.005	21	1.2	0.0507338	0.01	1	0.1	0.0501853	0.025	61	0.8	0.0505918
0.005	21	1.6	0.0512304	0.01	1	0.4	0.0498145	0.025	61	1.2	0.0511206
0.005	41	0.1	0.049966	0.01	1	0.8	0.0499538	0.025	61	1.6	0.0516657
0.005	41	0.4	0.0503267	0.01	1	1.2	0.050113	0.025	81	0.1	0.04964
0.005	41	0.8	0.0504295	0.01	1	1.6	0.0503482	0.025	81	0.4	0.0504772
0.005	41	1.2	0.0512424	0.01	21	0.1	0.0496152	0.025	81	0.8	0.0507065
0.005	41	1.6	0.0513527	0.01	21	0.4	0.0500248	0.025	81	1.2	0.0511981
0.005	61	0.1	0.0499767	0.01	21	0.8	0.050242	0.025	81	1.6	0.0519454
0.005	61	0.4	0.0503414	0.01	21	1.2	0.0507367	0.05	1	0.1	0.0504115
0.005	61	0.8	0.050639	0.01	21	1.6	0.0508579	0.05	1	0.4	0.0500565
0.005	61	1.2	0.0515148	0.01	41	0.1	0.0496817	0.05	1	0.8	0.0503693
0.005	61	1.6	0.0515358	0.01	41	0.4	0.0501385	0.05	1	1.2	0.0507963
0.005	81	0.1	0.0500301	0.01	41	0.8	0.0504987	0.05	1	1.6	0.0509839
0.005	81	0.4	0.0503215	0.01	41	1.2	0.0508948	0.05	21	0.1	0.0497216
0.005	81	0.8	0.0508209	0.01	41	1.6	0.051128	0.05	21	0.4	0.0503069
0.005	81	1.2	0.0515947	0.01	61	0.1	0.0497258	0.05	21	0.8	0.0507422
0.005	81	1.6	0.0517503	0.01	61	0.4	0.0501373	0.05	21	1.2	0.0514902
0.0075	1	0.1	0.0499899	0.01	61	0.8	0.0506928	0.05	21	1.6	0.0519182
0.0075	1	0.4	0.049891	0.01	61	1.2	0.0510534	0.05	41	0.1	0.049733
0.0075	1	0.8	0.0499877	0.01	61	1.6	0.0513834	0.05	41	0.4	0.0503988
0.0075	1	1.2	0.0501098	0.01	81	0.1	0.0497406	0.05	41	0.8	0.0512427
0.0075	1	1.6	0.0502875	0.01	81	0.4	0.0502281	0.05	41	1.2	0.0519446
0.0075	21	0.1	0.0497409	0.01	81	0.8	0.0508227	0.05	41	1.6	0.0522432
0.0075	21	0.4	0.0500788	0.01	81	1.2	0.0511869	0.05	61	0.1	0.0497357
0.0075	21	0.8	0.0501367	0.01	81	1.6	0.0517876	0.05	61	0.4	0.0504851
0.0075	21	1.2	0.0507488	0.025	1	0.1	0.049982	0.05	61	0.8	0.0514514
0.0075	21	1.6	0.0511005	0.025	1	0.4	0.0499667	0.05	61	1.2	0.0520161
0.0075	41	0.1	0.0498574	0.025	1	0.8	0.050074	0.05	61	1.6	0.0528164
0.0075	41	0.4	0.0501869	0.025	1	1.2	0.0501837	0.05	81	0.1	0.0497442
0.0075	41	0.8	0.0504596	0.025	1	1.6	0.0505133	0.05	81	0.4	0.0505431
0.0075	41	1.2	0.0511792	0.025	21	0.1	0.0495331	0.05	81	0.8	0.0515738
0.0075	41	1.6	0.0512477	0.025	21	0.4	0.0501578	0.05	81	1.2	0.0521379
0.0075	61	0.1	0.0498556	0.025	21	0.8	0.0504148	0.05	81	1.6	0.0530498
0.0075	61	0.4	0.0501752	0.025	21	1.2	0.0506455	Best Solution:			
								0.025	21	0.1	0.0495331

Link: 24, Period: PM

Epsilon	C	Kernel Param	Error	Epsilon	C	Kernel Param	Error	Epsilon	C	Kernel Param	Error
0.005	1	0.1	0.0320684	0.0075	61	0.8	0.0321085	0.025	21	1.6	0.0321362
0.005	1	0.4	0.030299	0.0075	61	1.2	0.0325823	0.025	41	0.1	0.030536
0.005	1	0.8	0.0307831	0.0075	61	1.6	0.0330181	0.025	41	0.4	0.0316479
0.005	1	1.2	0.0308924	0.0075	81	0.1	0.030819	0.025	41	0.8	0.0316074
0.005	1	1.6	0.0309197	0.0075	81	0.4	0.0319273	0.025	41	1.2	0.0320861
0.005	21	0.1	0.0305149	0.0075	81	0.8	0.0322432	0.025	41	1.6	0.0326216
0.005	21	0.4	0.0315537	0.0075	81	1.2	0.0327394	0.025	61	0.1	0.0306532
0.005	21	0.8	0.0317414	0.0075	81	1.6	0.0330572	0.025	61	0.4	0.0318801
0.005	21	1.2	0.0321721	0.01	1	0.1	0.0320867	0.025	61	0.8	0.0318801
0.005	21	1.6	0.0324619	0.01	1	0.4	0.0303191	0.025	61	1.2	0.0322551
0.005	41	0.1	0.0306768	0.01	1	0.8	0.0307797	0.025	61	1.6	0.032693
0.005	41	0.4	0.0316812	0.01	1	1.2	0.0308843	0.025	81	0.1	0.0307514
0.005	41	0.8	0.0320905	0.01	1	1.6	0.0308844	0.025	81	0.4	0.0319615
0.005	41	1.2	0.0324691	0.01	21	0.1	0.0305098	0.025	81	0.8	0.0320577
0.005	41	1.6	0.0329601	0.01	21	0.4	0.0315909	0.025	81	1.2	0.0324187
0.005	61	0.1	0.0307921	0.01	21	0.8	0.0315422	0.025	81	1.6	0.0326565
0.005	61	0.4	0.031784	0.01	21	1.2	0.031981	0.05	1	0.1	0.0331446
0.005	61	0.8	0.0322458	0.01	21	1.6	0.0323433	0.05	1	0.4	0.0318061
0.005	61	1.2	0.0326397	0.01	41	0.1	0.0306082	0.05	1	0.8	0.0316107
0.005	61	1.6	0.0331701	0.01	41	0.4	0.0316625	0.05	1	1.2	0.0317685
0.005	81	0.1	0.0308388	0.01	41	0.8	0.0318953	0.05	1	1.6	0.0319413
0.005	81	0.4	0.031907	0.01	41	1.2	0.0322672	0.05	21	0.1	0.0315782
0.005	81	0.8	0.0323402	0.01	41	1.6	0.0328162	0.05	21	0.4	0.0322619
0.005	81	1.2	0.0328896	0.01	61	0.1	0.0307289	0.05	21	0.8	0.0324154
0.005	81	1.6	0.03327	0.01	61	0.4	0.0318178	0.05	21	1.2	0.0324773
0.0075	1	0.1	0.0321097	0.01	61	0.8	0.0320102	0.05	21	1.6	0.0327976
0.0075	1	0.4	0.0302978	0.01	61	1.2	0.0324891	0.05	41	0.1	0.0314474
0.0075	1	0.8	0.0307576	0.01	61	1.6	0.0328952	0.05	41	0.4	0.0324244
0.0075	1	1.2	0.0308918	0.01	81	0.1	0.030841	0.05	41	0.8	0.0327133
0.0075	1	1.6	0.0309216	0.01	81	0.4	0.031929	0.05	41	1.2	0.0328514
0.0075	21	0.1	0.0305015	0.01	81	0.8	0.032191	0.05	41	1.6	0.033047
0.0075	21	0.4	0.0316456	0.01	81	1.2	0.0326754	0.05	61	0.1	0.0315989
0.0075	21	0.8	0.031674	0.01	81	1.6	0.0329516	0.05	61	0.4	0.032539
0.0075	21	1.2	0.0321013	0.025	1	0.1	0.0319699	0.05	61	0.8	0.0327885
0.0075	21	1.6	0.0323927	0.025	1	0.4	0.0305093	0.05	61	1.2	0.0329543
0.0075	41	0.1	0.0306777	0.025	1	0.8	0.0307866	0.05	61	1.6	0.03322
0.0075	41	0.4	0.0317021	0.025	1	1.2	0.030973	0.05	81	0.1	0.0318478
0.0075	41	0.8	0.0319928	0.025	1	1.6	0.0309627	0.05	81	0.4	0.0326861
0.0075	41	1.2	0.0323692	0.025	21	0.1	0.030715	0.05	81	0.8	0.0327598
0.0075	41	1.6	0.0328911	0.025	21	0.4	0.0315455	0.05	81	1.2	0.0330201
0.0075	61	0.1	0.0307719	0.025	21	0.8	0.0314842	0.05	81	1.6	0.0334721
0.0075	61	0.4	0.0317899	0.025	21	1.2	0.0317625	Best Solution:			
								0.0075	1	0.4	0.0302978

Link:26, Period: PM

Epsilon	C	Kernel Param	Error	Epsilon	C	Kernel Param	Error	Epsilon	C	Kernel Param	Error
0.005	1	0.1	0.0228941	0.0075	61	0.8	0.0222799	0.025	21	1.6	0.0226393
0.005	1	0.4	0.0227627	0.0075	61	1.2	0.0222405	0.025	41	0.1	0.0229255
0.005	1	0.8	0.0228075	0.0075	61	1.6	0.0222109	0.025	41	0.4	0.0228726
0.005	1	1.2	0.0227975	0.0075	81	0.1	0.022778	0.025	41	0.8	0.0227607
0.005	1	1.6	0.0227301	0.0075	81	0.4	0.0224278	0.025	41	1.2	0.0226299
0.005	21	0.1	0.0228428	0.0075	81	0.8	0.0222711	0.025	41	1.6	0.0225526
0.005	21	0.4	0.022696	0.0075	81	1.2	0.0222066	0.025	61	0.1	0.0229327
0.005	21	0.8	0.0224131	0.0075	81	1.6	0.0221943	0.025	61	0.4	0.0228651
0.005	21	1.2	0.0222685	0.01	1	0.1	0.0227987	0.025	61	0.8	0.0227162
0.005	21	1.6	0.0222131	0.01	1	0.4	0.0227813	0.025	61	1.2	0.0225867
0.005	41	0.1	0.0228529	0.01	1	0.8	0.0227652	0.025	61	1.6	0.0225169
0.005	41	0.4	0.0226527	0.01	1	1.2	0.0227334	0.025	81	0.1	0.0229317
0.005	41	0.8	0.0222929	0.01	1	1.6	0.0226853	0.025	81	0.4	0.0228458
0.005	41	1.2	0.0222032	0.01	21	0.1	0.022771	0.025	81	0.8	0.0226577
0.005	41	1.6	0.022153	0.01	21	0.4	0.0226799	0.025	81	1.2	0.0225525
0.005	61	0.1	0.0228432	0.01	21	0.8	0.0223432	0.025	81	1.6	0.0225217
0.005	61	0.4	0.0225357	0.01	21	1.2	0.0222726	0.05	1	0.1	0.0266159
0.005	61	0.8	0.0222651	0.01	21	1.6	0.0222952	0.05	1	0.4	0.0252916
0.005	61	1.2	0.0221649	0.01	41	0.1	0.0227667	0.05	1	0.8	0.0249354
0.005	61	1.6	0.0221671	0.01	41	0.4	0.0225307	0.05	1	1.2	0.0248106
0.005	81	0.1	0.0228422	0.01	41	0.8	0.0222468	0.05	1	1.6	0.024819
0.005	81	0.4	0.0224277	0.01	41	1.2	0.022273	0.05	21	0.1	0.0247038
0.005	81	0.8	0.0222204	0.01	41	1.6	0.0222326	0.05	21	0.4	0.0247377
0.005	81	1.2	0.0221405	0.01	61	0.1	0.0227583	0.05	21	0.8	0.0246793
0.005	81	1.6	0.0221787	0.01	61	0.4	0.0224175	0.05	21	1.2	0.0245871
0.0075	1	0.1	0.0228699	0.01	61	0.8	0.0222811	0.05	21	1.6	0.0245344
0.0075	1	0.4	0.0227883	0.01	61	1.2	0.0222324	0.05	41	0.1	0.0247101
0.0075	1	0.8	0.0228259	0.01	61	1.6	0.0222172	0.05	41	0.4	0.0247899
0.0075	1	1.2	0.0227862	0.01	81	0.1	0.0227574	0.05	41	0.8	0.0245914
0.0075	1	1.6	0.0226974	0.01	81	0.4	0.0223503	0.05	41	1.2	0.0245308
0.0075	21	0.1	0.0228176	0.01	81	0.8	0.0222963	0.05	41	1.6	0.0244883
0.0075	21	0.4	0.0226657	0.01	81	1.2	0.0222253	0.05	61	0.1	0.0247178
0.0075	21	0.8	0.0224253	0.01	81	1.6	0.0222217	0.05	61	0.4	0.024747
0.0075	21	1.2	0.0222749	0.025	1	0.1	0.0232471	0.05	61	0.8	0.0245853
0.0075	21	1.6	0.022281	0.025	1	0.4	0.0229813	0.05	61	1.2	0.0244891
0.0075	41	0.1	0.0228007	0.025	1	0.8	0.0228974	0.05	61	1.6	0.0243917
0.0075	41	0.4	0.0225357	0.025	1	1.2	0.0229072	0.05	81	0.1	0.0247135
0.0075	41	0.8	0.0223099	0.025	1	1.6	0.0229007	0.05	81	0.4	0.0246784
0.0075	41	1.2	0.0222621	0.025	21	0.1	0.02292	0.05	81	0.8	0.0245363
0.0075	41	1.6	0.0222228	0.025	21	0.4	0.0229023	0.05	81	1.2	0.0244519
0.0075	61	0.1	0.0227901	0.025	21	0.8	0.0228455	0.05	81	1.6	0.0243676
0.0075	61	0.4	0.0224837	0.025	21	1.2	0.0227319	Best Solution:			
								0.005	81	1.2	0.0221405

Link: 442, Period: PM

Epsilon	C	Kernel Param	Error	Epsilon	C	Kernel Param	Error	Epsilon	C	Kernel Param	Error
0.005	1	0.1	0.0298642	0.0075	61	0.8	0.0286217	0.025	21	1.6	0.0293101
0.005	1	0.4	0.0292791	0.0075	61	1.2	0.0285062	0.025	41	0.1	0.0295028
0.005	1	0.8	0.0290542	0.0075	61	1.6	0.0287256	0.025	41	0.4	0.0293972
0.005	1	1.2	0.0289294	0.0075	81	0.1	0.0293426	0.025	41	0.8	0.0293488
0.005	1	1.6	0.0288628	0.0075	81	0.4	0.0290037	0.025	41	1.2	0.0292511
0.005	21	0.1	0.0293264	0.0075	81	0.8	0.0285911	0.025	41	1.6	0.0293729
0.005	21	0.4	0.0290527	0.0075	81	1.2	0.02857	0.025	61	0.1	0.0295201
0.005	21	0.8	0.0287747	0.0075	81	1.6	0.0287755	0.025	61	0.4	0.0293976
0.005	21	1.2	0.0287209	0.01	1	0.1	0.0299886	0.025	61	0.8	0.0292617
0.005	21	1.6	0.0286939	0.01	1	0.4	0.0293683	0.025	61	1.2	0.0293535
0.005	41	0.1	0.0293054	0.01	1	0.8	0.0290444	0.025	61	1.6	0.0293813
0.005	41	0.4	0.0290543	0.01	1	1.2	0.0289426	0.025	81	0.1	0.0295466
0.005	41	0.8	0.0287253	0.01	1	1.6	0.0288559	0.025	81	0.4	0.0293497
0.005	41	1.2	0.0286909	0.01	21	0.1	0.029517	0.025	81	0.8	0.0292611
0.005	41	1.6	0.0286626	0.01	21	0.4	0.029056	0.025	81	1.2	0.0293229
0.005	61	0.1	0.0293094	0.01	21	0.8	0.0288621	0.025	81	1.6	0.0293388
0.005	61	0.4	0.0290166	0.01	21	1.2	0.0285046	0.05	1	0.1	0.0348128
0.005	61	0.8	0.0287301	0.01	21	1.6	0.0284585	0.05	1	0.4	0.0327
0.005	61	1.2	0.0286802	0.01	41	0.1	0.0294645	0.05	1	0.8	0.0327651
0.005	61	1.6	0.0286945	0.01	41	0.4	0.0290801	0.05	1	1.2	0.0328892
0.005	81	0.1	0.0293183	0.01	41	0.8	0.0287193	0.05	1	1.6	0.0329326
0.005	81	0.4	0.0289739	0.01	41	1.2	0.028448	0.05	21	0.1	0.0314649
0.005	81	0.8	0.0287305	0.01	41	1.6	0.028574	0.05	21	0.4	0.0319552
0.005	81	1.2	0.0286517	0.01	61	0.1	0.0294206	0.05	21	0.8	0.0326697
0.005	81	1.6	0.0287296	0.01	61	0.4	0.0291238	0.05	21	1.2	0.0327192
0.0075	1	0.1	0.0299165	0.01	61	0.8	0.0286571	0.05	21	1.6	0.0332938
0.0075	1	0.4	0.029344	0.01	61	1.2	0.0284601	0.05	41	0.1	0.0314464
0.0075	1	0.8	0.0290356	0.01	61	1.6	0.028687	0.05	41	0.4	0.032078
0.0075	1	1.2	0.0288723	0.01	81	0.1	0.0293902	0.05	41	0.8	0.0327738
0.0075	1	1.6	0.028792	0.01	81	0.4	0.029085	0.05	41	1.2	0.0332245
0.0075	21	0.1	0.0293658	0.01	81	0.8	0.028518	0.05	41	1.6	0.0336166
0.0075	21	0.4	0.029075	0.01	81	1.2	0.0285448	0.05	61	0.1	0.0314932
0.0075	21	0.8	0.0287686	0.01	81	1.6	0.0287346	0.05	61	0.4	0.0323626
0.0075	21	1.2	0.0285728	0.025	1	0.1	0.030504	0.05	61	0.8	0.0327635
0.0075	21	1.6	0.028475	0.025	1	0.4	0.0295387	0.05	61	1.2	0.0333771
0.0075	41	0.1	0.0293736	0.025	1	0.8	0.0293218	0.05	61	1.6	0.0338636
0.0075	41	0.4	0.0290538	0.025	1	1.2	0.0293594	0.05	81	0.1	0.0314741
0.0075	41	0.8	0.0286519	0.025	1	1.6	0.0292791	0.05	81	0.4	0.0325643
0.0075	41	1.2	0.0285126	0.025	21	0.1	0.0295443	0.05	81	0.8	0.0328459
0.0075	41	1.6	0.0286469	0.025	21	0.4	0.029426	0.05	81	1.2	0.033489
0.0075	61	0.1	0.0293618	0.025	21	0.8	0.029296	0.05	81	1.6	0.033892
0.0075	61	0.4	0.0290525	0.025	21	1.2	0.0292178	Best Solution:			
								0.01	41	1.2	0.028448

Link: 453, Period: PM

Epsilon	C	Kernel Param	Error	Epsilon	C	Kernel Param	Error	Epsilon	C	Kernel Param	Error
0.005	1	0.1	0.0187911	0.0075	61	0.8	0.018331	0.025	21	1.6	0.0188234
0.005	1	0.4	0.0184202	0.0075	61	1.2	0.0184182	0.025	41	0.1	0.0187981
0.005	1	0.8	0.0183161	0.0075	61	1.6	0.0184738	0.025	41	0.4	0.0187451
0.005	1	1.2	0.0182436	0.0075	81	0.1	0.0183076	0.025	41	0.8	0.0187547
0.005	1	1.6	0.0181822	0.0075	81	0.4	0.0182622	0.025	41	1.2	0.0188133
0.005	21	0.1	0.0184471	0.0075	81	0.8	0.018375	0.025	41	1.6	0.0188476
0.005	21	0.4	0.0181688	0.0075	81	1.2	0.0184352	0.025	61	0.1	0.0187816
0.005	21	0.8	0.0182347	0.0075	81	1.6	0.018489	0.025	61	0.4	0.0187376
0.005	21	1.2	0.0183381	0.01	1	0.1	0.0187611	0.025	61	0.8	0.0187408
0.005	21	1.6	0.0184118	0.01	1	0.4	0.0184294	0.025	61	1.2	0.0188347
0.005	41	0.1	0.0183502	0.01	1	0.8	0.0183272	0.025	61	1.6	0.0188736
0.005	41	0.4	0.0181983	0.01	1	1.2	0.0182894	0.025	81	0.1	0.0187861
0.005	41	0.8	0.0182767	0.01	1	1.6	0.0182431	0.025	81	0.4	0.0187571
0.005	41	1.2	0.018415	0.01	21	0.1	0.018446	0.025	81	0.8	0.0187583
0.005	41	1.6	0.0184509	0.01	21	0.4	0.0183338	0.025	81	1.2	0.0188455
0.005	61	0.1	0.0183278	0.01	21	0.8	0.0182394	0.025	81	1.6	0.0188603
0.005	61	0.4	0.0182082	0.01	21	1.2	0.0183442	0.05	1	0.1	0.0247722
0.005	61	0.8	0.0183382	0.01	21	1.6	0.0183806	0.05	1	0.4	0.0226452
0.005	61	1.2	0.0184376	0.01	41	0.1	0.0184008	0.05	1	0.8	0.0227467
0.005	61	1.6	0.018489	0.01	41	0.4	0.0183134	0.05	1	1.2	0.0227342
0.005	81	0.1	0.0182947	0.01	41	0.8	0.018318	0.05	1	1.6	0.0226529
0.005	81	0.4	0.018219	0.01	41	1.2	0.0183848	0.05	21	0.1	0.0214506
0.005	81	0.8	0.018379	0.01	41	1.6	0.0184145	0.05	21	0.4	0.022046
0.005	81	1.2	0.0184459	0.01	61	0.1	0.0183828	0.05	21	0.8	0.0228318
0.005	81	1.6	0.0185256	0.01	61	0.4	0.0182776	0.05	21	1.2	0.0233432
0.0075	1	0.1	0.0187039	0.01	61	0.8	0.0183594	0.05	21	1.6	0.0236646
0.0075	1	0.4	0.0184256	0.01	61	1.2	0.0183997	0.05	41	0.1	0.021431
0.0075	1	0.8	0.018316	0.01	61	1.6	0.0184353	0.05	41	0.4	0.0223424
0.0075	1	1.2	0.018229	0.01	81	0.1	0.0183738	0.05	41	0.8	0.0232354
0.0075	1	1.6	0.0181939	0.01	81	0.4	0.0182472	0.05	41	1.2	0.0236306
0.0075	21	0.1	0.0184562	0.01	81	0.8	0.0183632	0.05	41	1.6	0.0236978
0.0075	21	0.4	0.018223	0.01	81	1.2	0.0184132	0.05	61	0.1	0.0215394
0.0075	21	0.8	0.0182705	0.01	81	1.6	0.0184439	0.05	61	0.4	0.0223792
0.0075	21	1.2	0.0183279	0.025	1	0.1	0.0193972	0.05	61	0.8	0.023282
0.0075	21	1.6	0.0183816	0.025	1	0.4	0.0188782	0.05	61	1.2	0.0235954
0.0075	41	0.1	0.0183536	0.025	1	0.8	0.0188466	0.05	61	1.6	0.0239327
0.0075	41	0.4	0.0182606	0.025	1	1.2	0.0187872	0.05	81	0.1	0.0216045
0.0075	41	0.8	0.0183085	0.025	1	1.6	0.0187407	0.05	81	0.4	0.0225908
0.0075	41	1.2	0.018387	0.025	21	0.1	0.018798	0.05	81	0.8	0.023567
0.0075	41	1.6	0.0184186	0.025	21	0.4	0.0187524	0.05	81	1.2	0.0236332
0.0075	61	0.1	0.0183241	0.025	21	0.8	0.0187457	0.05	81	1.6	0.0240467
0.0075	61	0.4	0.0182394	0.025	21	1.2	0.0187513	Best Solution:			
								0.005	21	0.4	0.0181688

Link: 454, Period: PM

Epsilon	C	Kernel Param	Error	Epsilon	C	Kernel Param	Error	Epsilon	C	Kernel Param	Error
0.005	1	0.1	0.0326908	0.0075	61	0.8	0.0316834	0.025	21	1.6	0.031916
0.005	1	0.4	0.0314589	0.0075	61	1.2	0.0319026	0.025	41	0.1	0.0313973
0.005	1	0.8	0.0310823	0.0075	61	1.6	0.0320358	0.025	41	0.4	0.0315291
0.005	1	1.2	0.0310571	0.0075	81	0.1	0.0313072	0.025	41	0.8	0.0315531
0.005	1	1.6	0.0309708	0.0075	81	0.4	0.0309091	0.025	41	1.2	0.0317251
0.005	21	0.1	0.0315381	0.0075	81	0.8	0.0316768	0.025	41	1.6	0.0319364
0.005	21	0.4	0.0309771	0.0075	81	1.2	0.0318934	0.025	61	0.1	0.0313286
0.005	21	0.8	0.0312959	0.0075	81	1.6	0.032168	0.025	61	0.4	0.0315616
0.005	21	1.2	0.0314933	0.01	1	0.1	0.032711	0.025	61	0.8	0.0315448
0.005	21	1.6	0.0316772	0.01	1	0.4	0.0313884	0.025	61	1.2	0.0318023
0.005	41	0.1	0.0314726	0.01	1	0.8	0.0310473	0.025	61	1.6	0.0320168
0.005	41	0.4	0.0309164	0.01	1	1.2	0.0310298	0.025	81	0.1	0.0312879
0.005	41	0.8	0.0315208	0.01	1	1.6	0.0310353	0.025	81	0.4	0.0314912
0.005	41	1.2	0.031606	0.01	21	0.1	0.0313899	0.025	81	0.8	0.031535
0.005	41	1.6	0.0318086	0.01	21	0.4	0.0310123	0.025	81	1.2	0.0317954
0.005	61	0.1	0.0314239	0.01	21	0.8	0.031318	0.025	81	1.6	0.032157
0.005	61	0.4	0.0308654	0.01	21	1.2	0.0316099	0.05	1	0.1	0.0343534
0.005	61	0.8	0.031578	0.01	21	1.6	0.0316757	0.05	1	0.4	0.0330982
0.005	61	1.2	0.0318344	0.01	41	0.1	0.0313034	0.05	1	0.8	0.0333396
0.005	61	1.6	0.0320383	0.01	41	0.4	0.0309781	0.05	1	1.2	0.0334264
0.005	81	0.1	0.0313147	0.01	41	0.8	0.0315393	0.05	1	1.6	0.0335666
0.005	81	0.4	0.0309426	0.01	41	1.2	0.0318001	0.05	21	0.1	0.0330968
0.005	81	0.8	0.0316524	0.01	41	1.6	0.0318186	0.05	21	0.4	0.0331287
0.005	81	1.2	0.0319298	0.01	61	0.1	0.0312449	0.05	21	0.8	0.0337397
0.005	81	1.6	0.032266	0.01	61	0.4	0.0310126	0.05	21	1.2	0.0335261
0.0075	1	0.1	0.0327242	0.01	61	0.8	0.0316636	0.05	21	1.6	0.03385
0.0075	1	0.4	0.0314553	0.01	61	1.2	0.0318121	0.05	41	0.1	0.0330375
0.0075	1	0.8	0.0310749	0.01	61	1.6	0.0319892	0.05	41	0.4	0.0334129
0.0075	1	1.2	0.0310678	0.01	81	0.1	0.0311667	0.05	41	0.8	0.0336203
0.0075	1	1.6	0.0310838	0.01	81	0.4	0.0309495	0.05	41	1.2	0.0338856
0.0075	21	0.1	0.0315453	0.01	81	0.8	0.0315956	0.05	41	1.6	0.0340231
0.0075	21	0.4	0.0309939	0.01	81	1.2	0.0317369	0.05	61	0.1	0.0329322
0.0075	21	0.8	0.0313122	0.01	81	1.6	0.032196	0.05	61	0.4	0.03359
0.0075	21	1.2	0.0315376	0.025	1	0.1	0.0326967	0.05	61	0.8	0.0335951
0.0075	21	1.6	0.031765	0.025	1	0.4	0.0317697	0.05	61	1.2	0.0340664
0.0075	41	0.1	0.0314416	0.025	1	0.8	0.0313087	0.05	61	1.6	0.0340393
0.0075	41	0.4	0.0309802	0.025	1	1.2	0.0315174	0.05	81	0.1	0.0328932
0.0075	41	0.8	0.0315912	0.025	1	1.6	0.0317187	0.05	81	0.4	0.0335946
0.0075	41	1.2	0.031762	0.025	21	0.1	0.0316265	0.05	81	0.8	0.0337192
0.0075	41	1.6	0.0318698	0.025	21	0.4	0.0313075	0.05	81	1.2	0.033889
0.0075	61	0.1	0.0313689	0.025	21	0.8	0.0316989	0.05	81	1.6	0.0339619
0.0075	61	0.4	0.0309552	0.025	21	1.2	0.0316788	Best Solution:			
								0.005	61	0.4	0.0308654

Link: 881, Period: PM

Epsilon	C	Kernel Param	Error	Epsilon	C	Kernel Param	Error	Epsilon	C	Kernel Param	Error
0.005	1	0.1	0.00991064	0.0075	61	0.8	0.00902143	0.025	21	1.6	0.0124567
0.005	1	0.4	0.00937858	0.0075	61	1.2	0.00927755	0.025	41	0.1	0.0106867
0.005	1	0.8	0.00908438	0.0075	61	1.6	0.00950393	0.025	41	0.4	0.0119903
0.005	1	1.2	0.00906308	0.0075	81	0.1	0.00881948	0.025	41	0.8	0.0120423
0.005	1	1.6	0.00900326	0.0075	81	0.4	0.0088144	0.025	41	1.2	0.0122033
0.005	21	0.1	0.00892187	0.0075	81	0.8	0.00911576	0.025	41	1.6	0.0124601
0.005	21	0.4	0.00878019	0.0075	81	1.2	0.00939968	0.025	61	0.1	0.0106752
0.005	21	0.8	0.00876533	0.0075	81	1.6	0.00963655	0.025	61	0.4	0.0119486
0.005	21	1.2	0.00891425	0.01	1	0.1	0.0102295	0.025	61	0.8	0.011982
0.005	21	1.6	0.00903852	0.01	1	0.4	0.00971989	0.025	61	1.2	0.0122561
0.005	41	0.1	0.00885659	0.01	1	0.8	0.00938102	0.025	61	1.6	0.0125388
0.005	41	0.4	0.008692	0.01	1	1.2	0.00929559	0.025	81	0.1	0.0107646
0.005	41	0.8	0.00885693	0.01	1	1.6	0.00937676	0.025	81	0.4	0.0119117
0.005	41	1.2	0.00908921	0.01	21	0.1	0.00897399	0.025	81	0.8	0.0120066
0.005	41	1.6	0.00918072	0.01	21	0.4	0.00884322	0.025	81	1.2	0.0122989
0.005	61	0.1	0.00882015	0.01	21	0.8	0.00890683	0.025	81	1.6	0.0126322
0.005	61	0.4	0.00871699	0.01	21	1.2	0.00909766	0.05	1	0.1	0.0281022
0.005	61	0.8	0.00896197	0.01	21	1.6	0.00924413	0.05	1	0.4	0.0331585
0.005	61	1.2	0.00921318	0.01	41	0.1	0.00887469	0.05	1	0.8	0.0323343
0.005	61	1.6	0.00936231	0.01	41	0.4	0.00888044	0.05	1	1.2	0.0320605
0.005	81	0.1	0.00877777	0.01	41	0.8	0.00903831	0.05	1	1.6	0.0317147
0.005	81	0.4	0.00882267	0.01	41	1.2	0.00921711	0.05	21	0.1	0.0275164
0.005	81	0.8	0.0090695	0.01	41	1.6	0.00944829	0.05	21	0.4	0.031468
0.005	81	1.2	0.00929667	0.01	61	0.1	0.00885954	0.05	21	0.8	0.03232
0.005	81	1.6	0.00948858	0.01	61	0.4	0.00888052	0.05	21	1.2	0.0318211
0.0075	1	0.1	0.0100471	0.01	61	0.8	0.0090892	0.05	21	1.6	0.0317819
0.0075	1	0.4	0.00952338	0.01	61	1.2	0.00932723	0.05	41	0.1	0.0288664
0.0075	1	0.8	0.00916975	0.01	61	1.6	0.0095325	0.05	41	0.4	0.03162
0.0075	1	1.2	0.00912936	0.01	81	0.1	0.00880573	0.05	41	0.8	0.0320117
0.0075	1	1.6	0.00911486	0.01	81	0.4	0.00888673	0.05	41	1.2	0.0319396
0.0075	21	0.1	0.00898137	0.01	81	0.8	0.00915104	0.05	41	1.6	0.032047
0.0075	21	0.4	0.00881648	0.01	81	1.2	0.00943147	0.05	61	0.1	0.0299652
0.0075	21	0.8	0.00876068	0.01	81	1.6	0.00969328	0.05	61	0.4	0.0319106
0.0075	21	1.2	0.00899509	0.025	1	0.1	0.0126197	0.05	61	0.8	0.0319581
0.0075	21	1.6	0.00909168	0.025	1	0.4	0.0133384	0.05	61	1.2	0.0321433
0.0075	41	0.1	0.00887536	0.025	1	0.8	0.0131926	0.05	61	1.6	0.0323255
0.0075	41	0.4	0.00878352	0.025	1	1.2	0.0134485	0.05	81	0.1	0.0309357
0.0075	41	0.8	0.00888738	0.025	1	1.6	0.0135988	0.05	81	0.4	0.0320426
0.0075	41	1.2	0.00913475	0.025	21	0.1	0.0107053	0.05	81	0.8	0.0319601
0.0075	41	1.6	0.00929808	0.025	21	0.4	0.0119204	0.05	81	1.2	0.0324022
0.0075	61	0.1	0.00884234	0.025	21	0.8	0.0120625	0.05	81	1.6	0.0321974
0.0075	61	0.4	0.00881191	0.025	21	1.2	0.012153	Best Solution:			
								0.005	41	0.4	0.008692

Link: 1798, Period: PM

Epsilon	C	Kernel Param	Error	Epsilon	C	Kernel Param	Error	Epsilon	C	Kernel Param	Error
0.005	1	0.1	0.00632486	0.0075	61	0.8	0.00523353	0.025	21	1.6	0.0121587
0.005	1	0.4	0.00539929	0.0075	61	1.2	0.00526505	0.025	41	0.1	0.0117088
0.005	1	0.8	0.00514354	0.0075	61	1.6	0.00533873	0.025	41	0.4	0.0117085
0.005	1	1.2	0.00510862	0.0075	81	0.1	0.00514864	0.025	41	0.8	0.011563
0.005	1	1.6	0.00509907	0.0075	81	0.4	0.0051792	0.025	41	1.2	0.011829
0.005	21	0.1	0.00508105	0.0075	81	0.8	0.0052481	0.025	41	1.6	0.0126373
0.005	21	0.4	0.00507345	0.0075	81	1.2	0.0052843	0.025	61	0.1	0.01171
0.005	21	0.8	0.00510853	0.0075	81	1.6	0.00534847	0.025	61	0.4	0.0116626
0.005	21	1.2	0.00513213	0.01	1	0.1	0.00737489	0.025	61	0.8	0.0116387
0.005	21	1.6	0.0051225	0.01	1	0.4	0.00606627	0.025	61	1.2	0.0121845
0.005	41	0.1	0.00509917	0.01	1	0.8	0.00560384	0.025	61	1.6	0.013129
0.005	41	0.4	0.00509207	0.01	1	1.2	0.00566087	0.025	81	0.1	0.0117328
0.005	41	0.8	0.00513623	0.01	1	1.6	0.00583669	0.025	81	0.4	0.0116754
0.005	41	1.2	0.005117	0.01	21	0.1	0.00533068	0.025	81	0.8	0.0116789
0.005	41	1.6	0.00509851	0.01	21	0.4	0.00538369	0.025	81	1.2	0.0122923
0.005	61	0.1	0.00510236	0.01	21	0.8	0.00550607	0.025	81	1.6	0.0133747
0.005	61	0.4	0.00510235	0.01	21	1.2	0.00570699	0.05	1	0.1	0.0374137
0.005	61	0.8	0.00513715	0.01	21	1.6	0.00582884	0.05	1	0.4	0.0354456
0.005	61	1.2	0.00510996	0.01	41	0.1	0.00532068	0.05	1	0.8	0.0353852
0.005	61	1.6	0.00509876	0.01	41	0.4	0.00539084	0.05	1	1.2	0.0361059
0.005	81	0.1	0.00510362	0.01	41	0.8	0.0056062	0.05	1	1.6	0.0359166
0.005	81	0.4	0.00511031	0.01	41	1.2	0.00579538	0.05	21	0.1	0.0354159
0.005	81	0.8	0.0051292	0.01	41	1.6	0.00587929	0.05	21	0.4	0.0347016
0.005	81	1.2	0.00510194	0.01	61	0.1	0.00532047	0.05	21	0.8	0.0347042
0.005	81	1.6	0.00508802	0.01	61	0.4	0.005428	0.05	21	1.2	0.0349286
0.0075	1	0.1	0.00682	0.01	61	0.8	0.00563719	0.05	21	1.6	0.0352458
0.0075	1	0.4	0.00571811	0.01	61	1.2	0.00581556	0.05	41	0.1	0.0345421
0.0075	1	0.8	0.00540956	0.01	61	1.6	0.0059356	0.05	41	0.4	0.0344692
0.0075	1	1.2	0.0053453	0.01	81	0.1	0.00533324	0.05	41	0.8	0.0348294
0.0075	1	1.6	0.0053519	0.01	81	0.4	0.00546054	0.05	41	1.2	0.0348409
0.0075	21	0.1	0.00513825	0.01	81	0.8	0.00568351	0.05	41	1.6	0.0347388
0.0075	21	0.4	0.00516115	0.01	81	1.2	0.00583101	0.05	61	0.1	0.0343249
0.0075	21	0.8	0.00519159	0.01	81	1.6	0.0059552	0.05	61	0.4	0.0345827
0.0075	21	1.2	0.00526138	0.025	1	0.1	0.0156578	0.05	61	0.8	0.0347645
0.0075	21	1.6	0.00529041	0.025	1	0.4	0.0128457	0.05	61	1.2	0.0346298
0.0075	41	0.1	0.00513818	0.025	1	0.8	0.0128519	0.05	61	1.6	0.0344699
0.0075	41	0.4	0.00517395	0.025	1	1.2	0.0123366	0.05	81	0.1	0.0342244
0.0075	41	0.8	0.00521464	0.025	1	1.6	0.0122918	0.05	81	0.4	0.0346572
0.0075	41	1.2	0.00527888	0.025	21	0.1	0.0119028	0.05	81	0.8	0.0346316
0.0075	41	1.6	0.00530057	0.025	21	0.4	0.0116083	0.05	81	1.2	0.0344611
0.0075	61	0.1	0.00514587	0.025	21	0.8	0.0117073	0.05	81	1.6	0.0341916
0.0075	61	0.4	0.00517773	0.025	21	1.2	0.0118121	Best Solution:			
								0.005	21	0.4	0.00507345

Link: 1799, Period: PM

Epsilon	C	Kernel Param	Error	Epsilon	C	Kernel Param	Error	Epsilon	C	Kernel Param	Error
0.005	1	0.1	0.00963569	0.0075	61	0.8	0.00928835	0.025	21	1.6	0.0112253
0.005	1	0.4	0.00920875	0.0075	61	1.2	0.0093186	0.025	41	0.1	0.011179
0.005	1	0.8	0.00916369	0.0075	61	1.6	0.00938162	0.025	41	0.4	0.0111045
0.005	1	1.2	0.0091714	0.0075	81	0.1	0.00925014	0.025	41	0.8	0.0111258
0.005	1	1.6	0.00917354	0.0075	81	0.4	0.00928911	0.025	41	1.2	0.0112424
0.005	21	0.1	0.00912559	0.0075	81	0.8	0.00928418	0.025	41	1.6	0.0113279
0.005	21	0.4	0.00914891	0.0075	81	1.2	0.00935044	0.025	61	0.1	0.0111033
0.005	21	0.8	0.00915386	0.0075	81	1.6	0.00940609	0.025	61	0.4	0.0110708
0.005	21	1.2	0.00916904	0.01	1	0.1	0.0101721	0.025	61	0.8	0.0111365
0.005	21	1.6	0.00920661	0.01	1	0.4	0.00947088	0.025	61	1.2	0.0113028
0.005	41	0.1	0.00911797	0.01	1	0.8	0.00937372	0.025	61	1.6	0.0112937
0.005	41	0.4	0.00915456	0.01	1	1.2	0.00936163	0.025	81	0.1	0.0110542
0.005	41	0.8	0.00916196	0.01	1	1.6	0.00937005	0.025	81	0.4	0.0110895
0.005	41	1.2	0.00920341	0.01	21	0.1	0.00929953	0.025	81	0.8	0.0112088
0.005	41	1.6	0.00922154	0.01	21	0.4	0.00932223	0.025	81	1.2	0.0113123
0.005	61	0.1	0.00912093	0.01	21	0.8	0.00933371	0.025	81	1.6	0.0113084
0.005	61	0.4	0.00915135	0.01	21	1.2	0.0093343	0.05	1	0.1	0.0301781
0.005	61	0.8	0.00918996	0.01	21	1.6	0.009339	0.05	1	0.4	0.0284127
0.005	61	1.2	0.00920311	0.01	41	0.1	0.00931616	0.05	1	0.8	0.0261587
0.005	61	1.6	0.00925316	0.01	41	0.4	0.00934374	0.05	1	1.2	0.0263045
0.005	81	0.1	0.00912462	0.01	41	0.8	0.0093255	0.05	1	1.6	0.0262103
0.005	81	0.4	0.00915098	0.01	41	1.2	0.00933008	0.05	21	0.1	0.0251556
0.005	81	0.8	0.00919824	0.01	41	1.6	0.00937738	0.05	21	0.4	0.0258043
0.005	81	1.2	0.0092258	0.01	61	0.1	0.00931915	0.05	21	0.8	0.0259354
0.005	81	1.6	0.00928295	0.01	61	0.4	0.00934122	0.05	21	1.2	0.0259845
0.0075	1	0.1	0.00986698	0.01	61	0.8	0.00932496	0.05	21	1.6	0.0260614
0.0075	1	0.4	0.00937056	0.01	61	1.2	0.00935642	0.05	41	0.1	0.0248791
0.0075	1	0.8	0.00929115	0.01	61	1.6	0.00940833	0.05	41	0.4	0.0259125
0.0075	1	1.2	0.00928455	0.01	81	0.1	0.00931894	0.05	41	0.8	0.0259851
0.0075	1	1.6	0.00928904	0.01	81	0.4	0.00933455	0.05	41	1.2	0.0260657
0.0075	21	0.1	0.0092425	0.01	81	0.8	0.00932392	0.05	41	1.6	0.026213
0.0075	21	0.4	0.00925449	0.01	81	1.2	0.00937831	0.05	61	0.1	0.0250419
0.0075	21	0.8	0.00929465	0.01	81	1.6	0.00944408	0.05	61	0.4	0.0259098
0.0075	21	1.2	0.00930454	0.025	1	0.1	0.0140368	0.05	61	0.8	0.0260153
0.0075	21	1.6	0.00928522	0.025	1	0.4	0.0124733	0.05	61	1.2	0.0261969
0.0075	41	0.1	0.00924106	0.025	1	0.8	0.0117187	0.05	61	1.6	0.026306
0.0075	41	0.4	0.0092614	0.025	1	1.2	0.0114576	0.05	81	0.1	0.0250983
0.0075	41	0.8	0.00930055	0.025	1	1.6	0.0113147	0.05	81	0.4	0.0258931
0.0075	41	1.2	0.00928554	0.025	21	0.1	0.0112888	0.05	81	0.8	0.02605
0.0075	41	1.6	0.00934145	0.025	21	0.4	0.0111828	0.05	81	1.2	0.0262444
0.0075	61	0.1	0.00925072	0.025	21	0.8	0.0110888	0.05	81	1.6	0.0263153
0.0075	61	0.4	0.00928054	0.025	21	1.2	0.0111446	Best Solution:			
								0.005	41	0.1	0.009118

Link: 1815, Period: PM

Epsilon	C	Kernel Param	Error	Epsilon	C	Kernel Param	Error	Epsilon	C	Kernel Param	Error
0.005	1	0.1	0.00618154	0.0075	61	0.8	0.00623988	0.025	21	1.6	0.0176737
0.005	1	0.4	0.00588274	0.0075	61	1.2	0.00699594	0.025	41	0.1	0.015865
0.005	1	0.8	0.00570872	0.0075	61	1.6	0.00731784	0.025	41	0.4	0.0158588
0.005	1	1.2	0.00548437	0.0075	81	0.1	0.0062696	0.025	41	0.8	0.0161382
0.005	1	1.6	0.00535602	0.0075	81	0.4	0.00603727	0.025	41	1.2	0.0166318
0.005	21	0.1	0.00503279	0.0075	81	0.8	0.00653685	0.025	41	1.6	0.0174543
0.005	21	0.4	0.00523804	0.0075	81	1.2	0.00710146	0.025	61	0.1	0.0158812
0.005	21	0.8	0.00530737	0.0075	81	1.6	0.00739014	0.025	61	0.4	0.0157858
0.005	21	1.2	0.00529972	0.01	1	0.1	0.00910369	0.025	61	0.8	0.0160125
0.005	21	1.6	0.00542912	0.01	1	0.4	0.00953242	0.025	61	1.2	0.0166569
0.005	41	0.1	0.00523855	0.01	1	0.8	0.00920976	0.025	61	1.6	0.017962
0.005	41	0.4	0.00535761	0.01	1	1.2	0.00907747	0.025	81	0.1	0.0157837
0.005	41	0.8	0.00533135	0.01	1	1.6	0.00894017	0.025	81	0.4	0.0156695
0.005	41	1.2	0.00551739	0.01	21	0.1	0.00693959	0.025	81	0.8	0.0157289
0.005	41	1.6	0.00555676	0.01	21	0.4	0.00717822	0.025	81	1.2	0.0168657
0.005	61	0.1	0.00542616	0.01	21	0.8	0.00671927	0.025	81	1.6	0.0185552
0.005	61	0.4	0.00540322	0.01	21	1.2	0.00677683	0.05	1	0.1	0.0447436
0.005	61	0.8	0.00537883	0.01	21	1.6	0.00729331	0.05	1	0.4	0.0439193
0.005	61	1.2	0.00566416	0.01	41	0.1	0.00703521	0.05	1	0.8	0.0464752
0.005	61	1.6	0.00590599	0.01	41	0.4	0.00708447	0.05	1	1.2	0.047232
0.005	81	0.1	0.00545847	0.01	41	0.8	0.00660515	0.05	1	1.6	0.0475278
0.005	81	0.4	0.00529587	0.01	41	1.2	0.00722634	0.05	21	0.1	0.0412559
0.005	81	0.8	0.0055064	0.01	41	1.6	0.00805007	0.05	21	0.4	0.0450199
0.005	81	1.2	0.00572146	0.01	61	0.1	0.00738498	0.05	21	0.8	0.0465041
0.005	81	1.6	0.00609799	0.01	61	0.4	0.00683016	0.05	21	1.2	0.0469647
0.0075	1	0.1	0.0076977	0.01	61	0.8	0.00681298	0.05	21	1.6	0.0472213
0.0075	1	0.4	0.00775721	0.01	61	1.2	0.00777878	0.05	41	0.1	0.0413775
0.0075	1	0.8	0.0076597	0.01	61	1.6	0.00816611	0.05	41	0.4	0.0455894
0.0075	1	1.2	0.00736153	0.01	81	0.1	0.00763535	0.05	41	0.8	0.0466959
0.0075	1	1.6	0.00710779	0.01	81	0.4	0.00682234	0.05	41	1.2	0.0469343
0.0075	21	0.1	0.00632568	0.01	81	0.8	0.00707832	0.05	41	1.6	0.0471869
0.0075	21	0.4	0.0061644	0.01	81	1.2	0.00791106	0.05	61	0.1	0.0414293
0.0075	21	0.8	0.00604652	0.01	81	1.6	0.00819435	0.05	61	0.4	0.0457819
0.0075	21	1.2	0.00622195	0.025	1	0.1	0.0209511	0.05	61	0.8	0.0467958
0.0075	21	1.6	0.00685056	0.025	1	0.4	0.0211738	0.05	61	1.2	0.0469166
0.0075	41	0.1	0.00634991	0.025	1	0.8	0.0220362	0.05	61	1.6	0.0471805
0.0075	41	0.4	0.00605112	0.025	1	1.2	0.0218609	0.05	81	0.1	0.0416119
0.0075	41	0.8	0.00602356	0.025	1	1.6	0.0218851	0.05	81	0.4	0.0460618
0.0075	41	1.2	0.00694138	0.025	21	0.1	0.0157352	0.05	81	0.8	0.0468278
0.0075	41	1.6	0.00715908	0.025	21	0.4	0.0162832	0.05	81	1.2	0.046914
0.0075	61	0.1	0.00623961	0.025	21	0.8	0.0166998	0.05	81	1.6	0.0471925
0.0075	61	0.4	0.00601173	0.025	21	1.2	0.0171857	**Best Solution:**			
								0.005	21	0.1	0.00503279

Link: 2448, Period: PM

Epsilon	C	Kernel Param	Error	Epsilon	C	Kernel Param	Error	Epsilon	C	Kernel Param	Error
0.005	1	0.1	0.0437566	0.0075	61	0.8	0.0469724	0.025	21	1.6	0.0471244
0.005	1	0.4	0.0433527	0.0075	61	1.2	0.0487474	0.025	41	0.1	0.043777
0.005	1	0.8	0.0434162	0.0075	61	1.6	0.0488866	0.025	41	0.4	0.044443
0.005	1	1.2	0.0435245	0.0075	81	0.1	0.0434081	0.025	41	0.8	0.0466236
0.005	1	1.6	0.0436442	0.0075	81	0.4	0.0453053	0.025	41	1.2	0.0472683
0.005	21	0.1	0.0432588	0.0075	81	0.8	0.047581	0.025	41	1.6	0.0481179
0.005	21	0.4	0.0440423	0.0075	81	1.2	0.0489405	0.025	61	0.1	0.04381
0.005	21	0.8	0.0458079	0.0075	81	1.6	0.049251	0.025	61	0.4	0.0449268
0.005	21	1.2	0.0469503	0.01	1	0.1	0.0437829	0.025	61	0.8	0.0470018
0.005	21	1.6	0.0479201	0.01	1	0.4	0.0434805	0.025	61	1.2	0.0478141
0.005	41	0.1	0.0434837	0.01	1	0.8	0.0434905	0.025	61	1.6	0.048964
0.005	41	0.4	0.0446381	0.01	1	1.2	0.043573	0.025	81	0.1	0.0438058
0.005	41	0.8	0.0466808	0.01	1	1.6	0.0438073	0.025	81	0.4	0.0452939
0.005	41	1.2	0.0480563	0.01	21	0.1	0.0433811	0.025	81	0.8	0.0472334
0.005	41	1.6	0.0485326	0.01	21	0.4	0.0440241	0.025	81	1.2	0.0482759
0.005	61	0.1	0.0434668	0.01	21	0.8	0.0456365	0.025	81	1.6	0.049038
0.005	61	0.4	0.0450036	0.01	21	1.2	0.0468923	0.05	1	0.1	0.0449955
0.005	61	0.8	0.0470692	0.01	21	1.6	0.0472014	0.05	1	0.4	0.045045
0.005	61	1.2	0.0488468	0.01	41	0.1	0.0434022	0.05	1	0.8	0.0449429
0.005	61	1.6	0.0488419	0.01	41	0.4	0.0446055	0.05	1	1.2	0.0454462
0.005	81	0.1	0.0435036	0.01	41	0.8	0.0464375	0.05	1	1.6	0.0462218
0.005	81	0.4	0.0454122	0.01	41	1.2	0.0476931	0.05	21	0.1	0.0446754
0.005	81	0.8	0.0475926	0.01	41	1.6	0.0479771	0.05	21	0.4	0.0455417
0.005	81	1.2	0.0493024	0.01	61	0.1	0.0433961	0.05	21	0.8	0.0464731
0.005	81	1.6	0.0492558	0.01	61	0.4	0.0449318	0.05	21	1.2	0.0479862
0.0075	1	0.1	0.0437391	0.01	61	0.8	0.0470857	0.05	21	1.6	0.048237
0.0075	1	0.4	0.0433885	0.01	61	1.2	0.0481735	0.05	41	0.1	0.0446814
0.0075	1	0.8	0.0434367	0.01	61	1.6	0.0487851	0.05	41	0.4	0.0460919
0.0075	1	1.2	0.0435273	0.01	81	0.1	0.0433878	0.05	41	0.8	0.0474402
0.0075	1	1.6	0.0436819	0.01	81	0.4	0.0452082	0.05	41	1.2	0.0484175
0.0075	21	0.1	0.0432325	0.01	81	0.8	0.0476582	0.05	41	1.6	0.0488911
0.0075	21	0.4	0.0440533	0.01	81	1.2	0.04857	0.05	61	0.1	0.0447719
0.0075	21	0.8	0.0457278	0.01	81	1.6	0.0493283	0.05	61	0.4	0.0461664
0.0075	21	1.2	0.0468374	0.025	1	0.1	0.0439037	0.05	61	0.8	0.0478945
0.0075	21	1.6	0.0476702	0.025	1	0.4	0.0434848	0.05	61	1.2	0.048774
0.0075	41	0.1	0.0433986	0.025	1	0.8	0.0436388	0.05	61	1.6	0.0493253
0.0075	41	0.4	0.044593	0.025	1	1.2	0.0439646	0.05	81	0.1	0.0448839
0.0075	41	0.8	0.0464551	0.025	1	1.6	0.0440253	0.05	81	0.4	0.0462073
0.0075	41	1.2	0.0479797	0.025	21	0.1	0.0436788	0.05	81	0.8	0.0482375
0.0075	41	1.6	0.0484423	0.025	21	0.4	0.0440944	0.05	81	1.2	0.0490722
0.0075	61	0.1	0.043364	0.025	21	0.8	0.0457143	0.05	81	1.6	0.0496439
0.0075	61	0.4	0.0449065	0.025	21	1.2	0.0466828	Best Solution:			
								0.0075	21	0.1	0.0432325