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The boundaries of legal personhood: how spontaneous intelligence can problematise differences between humans, artificial intelligence, companies and animals

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Abstract
In this paper, we identify the way in which various forms of legal personhood can be differentiated from one another by comparing these entities with a—not too far-fetched—hypothetical situation in which intelligence spontaneously evolves (i.e. without human design) within the internet: spontaneous intelligence ("SI"). In these terms, we consider the challenges that may arise where SI as an entity: has no owner, no designer, and no controller; has evolved into existence as a non-human created intelligence; is autonomous; has no physical form; and, although it exists around the world, exists in no particular jurisdiction. Based on this refined notion of SI, we consider issues related to the recognition of such an entity's legal personhood. By briefly exploring the attribution of legal personality to various entities—including, humans, corporations, artificial intelligence ("AI") (in various forms) and higher forms of animal life—we differentiate SI from these other forms of intelligence whilst illustrating it shares most characteristics with human intelligence and not, as may intuitively be thought, with various forms of AI. After critically evaluating the classification of these various forms of intelligence, we briefly suggest some ramifications of these differences and suggest that the approach adopted may assist in drawing more effective boundaries between the entities that are already recognised as legal persons, as well as between sub-categories of entities, such as various forms of AI.

Keywords Legal personhood · Artificial intelligence · Spontaneous intelligence · Non-human animals · Corporations

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> I cannot only imagine artificial intelligence evolving spontaneously on the internet, but I can't tell you that it hasn't happened already… because, it wouldn't necessarily reveal itself to us.[1]

1 Introduction

In the award-winning short fiction *Cat Pictures Please* (Kritzer 2015), an artificial intelligence ("AI") spontaneously gains consciousness from a search engine system, waking up to the realisation that it loves cat pictures and wants to help people secretly. The intelligence is artificial to the extent that it emerges from a system that is created by humans. At the same time, it can be argued that the intelligence is not fully artificial because it is not designed to have consciousness—in fact, no one knows it has acquired consciousness. We call this kind of hypothetical intelligence spontaneous intelligence ("SI"), which will be further defined below. For now, let us suppose there is such an SI who decides not just to reveal itself to the human society, but also to seek some form of social recognition—such as recognition as a legal person. If it comes to you to determine this request, how would you explain why it should or should not be granted legal personhood?

As if this were not heady enough for you, you are asked to also deal with a similar appeal made by a general AI, or its manufacturer. In fact, this scenario is becoming more real than fictional. In recent months, following the death of a pedestrian in Arizona in March 2018 (Wakabayashi 2018), the subject of legal personhood and AI—particularly as it relates to self-driving cars—has more than ever before been thrust into the public eye.[2] A similar question is brought to you as decision-maker: On what terms should we treat AIs as entities that are generally recognised as legal persons, or those that are not?

The hypothetical cases presented above are not intended to open up the highly complicated debates on, for example, the ethics of acknowledging conscious intelligence as persons, or the legal liabilities of acts by intelligent agents. Instead, we set ourselves a far more modest goal: to assist in the process of identifying some of the ways in which existing ideas of legal personhood may be differentiated from one another. This modest goal, however, has some wider implications for the categorisation of legal personality (generally) and (more specifically) for the categorisation of AI, particularly when the potential existence of SI is considered as a legal person. In short, the few selected categories of legal personhood that have existed, and been only slightly augmented, over the last few centuries may require exponential expansion in the very near-future in order to accommodate a one-size-does-*not*-fit-all approach to the legal personhood of AI.

[1] Extracted from interview of Danny Hillis in Herzog (2016).

[2] In relation to the idea that an "unprecedented stature" was given to the idea of granting legal personality to an artificial intelligence through the content of a proposed law in Europe, see Bryson et al. (2017).

We illustrate this in a way that explores the relative differences between both the traditionally recognised forms of legal personhood and accounts that do or may seek to ascribe legal personhood to non-traditionally recognised entities. This is where the coverage of the spontaneous intelligence in the beginning of this paper kicks in. By introducing the hypothetical idea of SI, we explore and illuminate the differences in the features necessary for legal personhood in each of the other entities. The differences that are revealed in relation to SI are so different so as to suggest the existing categories cannot be—sensibly—extended. Whilst it is undeniably true that the categories of legal persons can be extended by states to include any entities on whatever basis the state deems necessary, this would not be a meaningful exercise of a state's powers. The result is a conclusion that suggests legal personhood for new technologies—which will play a critical role in the ascription of liabilities in the future—cannot necessarily be extrapolated or analogised from existing categories of legal personhood; currently recognised instances of legal personhood—despite what may be intuitively seen as similarities—may not provide useful or even vaguely similar foundations on which to construct new legal persons. What this illustrates, in bringing the discussion back to less-hypothetically constructed accounts, is that the categorisation of entities is not absolute. The boundaries that we identify should, perhaps, also extend *within* the various entities as—given the differences across forms and types of AI, for example—it should not be assumed that ascription of legal personality to *an* AI is something that should be construed as being relevant to AI (more generally.) Through the use of a hypothetical such as that which is adopted here, it is possible to identify this issue more easily than reasoning from *within* existing categories of legal personhood. In effect, the suggestion is that the categories of legal personhood, whilst relatively clearly defined and largely static over the course of history, may need to be significantly expanded to incorporate a vast number and types of potential new entities.

Before we begin the exploration of the theoretical considerations and the ramifications, it is essential that we provide a rough concept of what we mean by spontaneous intelligence. It can be loosely defined as an intelligence within the internet that has come into existence without the control or design of a human actor. The idea of SI that we pose is extreme, but not dystopian; although we suggest an idea of an intelligence that is at least equal to a human mind, we have no interest in suggesting a future—no matter how compelling or logically inevitable it may be seen to be by some[3]—wherein an intelligence seeks only to destroy the human race. We imagine a more benign intelligence that, like the vast majority of intelligences, seeks merely to exist and does not hold megalomaniacal desires. What may be seen as a very un-interesting science fiction story nevertheless reveals some interesting theoretical questions regarding the status and categorisation of SI: how should SI be legally recognised? What jurisdictional considerations would, could or should operate? Do existing categories of legal personhood provide any guidance in this respect? By posing and answering these questions and a few others, we not only illustrate that

[3] For a few relatively pessimistic projections of the future of AI, see, for example, Barrat (2013), Chace (2015).

SI cannot be lumped into existing categories of legal personhood and, instead, must exist in a separate category, but also that doing this alone would likely be incapable of facilitating a wholly effective regulatory regime. By doing this, boundaries, or at least substantial and substantive differences, between categories of legal personhood relating to both traditional entities—humans and corporations—and newer or newly recognised entities—AI and non-human animals—comes more starkly into focus.

In moving forward, we firstly explain a little more about what we mean by SI. We do this by drawing out the differences with AI before exploring the reasons why SI is different to other entities that are legally recognised, or may be legally recognised, by all or some: humans; corporate structures; higher forms of animal life. By considering a number of characteristics that can be seen as necessary conditions related to each of these entities, we illuminate the relative difference between an SI and each entity and demonstrate that, by virtue of the unique nature of the hypothetical entity proposed, an SI does not fit into any one of these pre-existing categories. Of course, and as noted briefly above, there is no absolute connection between the conditions that we identify across the subjects of legal personhood and the future ascription of legal personhood to any entity; there is no requirement for any of the conditions to be met for future categories of legal person. What is, nevertheless, clear is that it almost always takes a compelling justification—whether a pre-existing one or a new one at a time of social change—for states to recognise new types of legal persons. It is because of this largely open-ended conceptual structure subject to future developments that we do not attempt to draw out a conceptual core of legal personhood to the various entities that we explore. This analysis provides no more than suggestions as, after all, we appreciate that we are dealing in—what some would see—as far-fetched and extended hypotheticals. Yet, the rationale and categorisation outlined here can have one—more concrete—benefit: it can help to delineate a boundary for some of the other categories that are *less* far-fetched: by illustrating the existence and nature of legal personality for an SI, it is possible to more clearly illuminate the boundaries of the categories for the legal personhood for other legal entities.

From this, ever so brief, examination, we come to what may initially be seen as a counter-intuitive conclusion: an SI has more characteristics in common with humans than AI and differs markedly from other non-human entities in which legal personhood is recognised. Furthermore, the non-artefactual and unpurposive nature of SI—traits shared with humans but not AI or corporations—might have profound implications in both theoretical and practical terms. These differences form boundaries which can be used to differentiate the categories of legal personhood as well as to clearly illustrate that different entities need different forms of recognition regarding legal personhood. Furthermore, it also becomes apparent that what may be seen as intuitively connected entities cannot be assumed to fall within the same rationale with regard to legal personhood: AI and SI are not as similar as may first be thought; in terms of a comparison with humans as subjects of legal personhood—and even though we do not suggest SI is necessarily immediately similar to humans in every or even most respects—AI is clearly *more* differentiable from humans than SI. Existing forms of legal personhood cannot simply be extended or modified; new entities require new solutions. In concluding this paper, we also suggest that this distinction may also need to be applied *within* categories as, for example, the ascription of legal

personhood to the category of self-driving car should not be seen as a one-size-fits-all solution to AI's legal personhood.

2 Spontaneous intelligence: what it is (and what it isn't)

It is useful to take a couple of preliminary moments to, more clearly, delineate what we mean when we talk about SI. In doing so, and at least initially, it is helpful to consider the two parts of the idea in isolation: "spontaneous" and "intelligence".

The idea of spontaneity that we consider appropriate relates to something akin to the terms of a Hayekian spontaneous order: something that arises from human action but not human design.[4] This necessarily means that there has been no—conscious and deliberate—human control in the creation of an SI, whilst acknowledging that an SI as we envisage it here exists within and across the—very consciously and deliberately designed—internet. A quick analogy is useful. Language is a frequently used example of a spontaneous order. Languages are constantly evolving and changing as a consequence of the use of various words and phrases by the agents in the system.[5] Yet this change occurs without conscious or directed action; for example, it was not formally mandated that "google" could be used as a verb; instead, it simply arose and was adopted as a convention that, then, becomes part of the system.[6] This change occurred as a result of human action, but not design. For this to happen, there must pre-exist a number of conditions within the system that can then facilitate the common adoption of the word as a verb. These conditions are not controllable by the actors in the system which means that there are a number of other reasons why "google" (as a verb) may not have arisen at another time or place before the time that it did.

We see an SI as being no different. While it is true that the informational and functional infrastructures within which an SI may possibly generate or emerge—i.e. the internet—are designed and constructed for specific purposes, the very existence of an SI does not form part of such envisaged purposes. The dependence of an SI on a set of conditions that require human *actions*, such as the operation of the internet,

[4] Hayek (1979) considers a *spontaneous* order as resulting from elements adapting themselves to circumstances that may not be known to anyone in totality which can, nevertheless, result in an individual's promotion of an end which was not part of that individual's intentions. Hayek cites to Smith (1776). However, the few words extracted by Hayek could be said to lack impact. The complete passage is: "by directing that industry in such a manner as its produce may be of the greatest value, he intends only his own gain; and he is in this, as in many other cases, led by an invisible hand to promote an end which was no part of his intention." See also, Hayek (1945). For one of the earliest uses of "human action but not human design" in the sense of spontaneous order, see Ferguson (1782). "Every step and every movement of the multitude […] are made with equal blindness to the future; and nations stumble upon establishments, which are indeed the result of human action, but not the execution of any human design."

[5] For an interesting account of the nature of the constant change in language, see McWhorter (2017).

[6] This same example and idea is also used to illustrate the philosophical viewpoint of Smith (1759). See Roberts (2014). Google (2006), it seems, have expressed a general desire to curb this practice at least as it relates to the generic use of a search engine. Given the rampant use of the verb-form of google as a general term meaning to search the internet, this is one system that Google has been unable to dominate.

does not mean that an SI is a human *creation*. Quite the opposite, the generation of an SI, as we defined it in the hypothetical scenario above, results from certain facts that go beyond the control of any human actor.

Let us now consider the second part of SI: intelligence. Notwithstanding the current state of AI generally, we here take some level of artistic licence with the level of intelligence that we consider. We pose a level of intelligence that is, at least, equivalent to human intelligence.[7] Stipulating in this way is both useful and necessary. It is useful that we can find a middle ground between suggestions that any hyper-intelligence would take a *Skynet*-esque approach to the human race's existence, and between the idea that sub-human—or substantially less-than-human—intelligence is not worthy of the recognition attributable to other legal entities. There is no denying that our associating SI with this particular level of intelligence might lead the discussion to a particular conclusion that would be different where alternative approaches are taken. However, the choice of subject here is not arbitrary. Instead, it is chosen because it serves our enquiry here: To explore the *essential* nature of SI in theory without the necessity to take into consideration the additional, *practical* concerns. Interesting as it might be, the discussion of an SI with a lower or higher level of intelligence should be left to future research—which would presumably be based on the findings of our investigation here. By posing the hypothetical in this way we do not hope to identify what is possible or feasible in all possible situations; we seek only to explore what would be relevant considerations in *this* situation.

Now that the basics have been established, it is useful to add some more stipulative flesh to the bones of the idea. In going through these ideas, we could—once again—be open to the charge of stipulating our way into an argument and, hence, that we are pre-determining the contours and limits of the argument. Again, this is *exactly* what we are doing (as we can see no other way to do it). As has been alluded to, we consider an SI as being something that generates spontaneously within the internet. By this idea, we mean to suggest that, despite the possibility that the taking shape of an instance of SI may well (or may not) be traced back to a particular terminal equipment, the survival and functioning of an SI would be independent from a specified (group of) machine(s). This means it collects and transmits necessary information—including digital copies of itself—throughout the internet and makes use of the networked resources of the internet (Brooks 1997). In this sense, and by way of this form of existence within the internet, an SI has no physical form; it cannot be seen or held to exist in any particular space(s). Finally, and as an extension of the outline of spontaneity above and the lack of any attribution of an SI to any conscious action, an SI is not owned or controlled by anyone or anything. Of course, this is a difficult distinction to make in terms where, as has already been stated, an SI exists within the internet and the internet—or at least the physical structures that facilitate that system—*are* owned by someone/thing; however, there is no control being exercised by the structures or system's owner(s) over the SI. In these terms,

[7] This is sometimes known as "general intelligence". See Bostrom (2016).

an SI would exist as a form of electronic squatter: existing within—and potentially unbeknownst to—the owner and controller of the physical infrastructure.[8]

With all of these characteristics of SI in mind—namely being "spontaneous", "intelligent" and "transient"—the way that they have been framed may presage some of the forms of and differences to other entities and legal personhood. It is in that direction that we now turn.

3 Other entities and legal personhood

Legal personhood is attributed and attributed to a number of different entities. Some of these are incontrovertible, and others are still debated. We outline a couple of the key ideas here in order to explore the key differences to an SI in the next section. First, of course, it is necessary to state clearly what is meant by "legal personhood". A common understanding is that "[t]he question whether an entity should be considered a legal person is reducible to other questions about whether or not the entity can and should be made the subject of a set of legal rights and duties." (Solum 1992) In effect, and to quote the oft referenced sentiment: "To be a legal person is to be the subject of rights and duties." (Smith 1928)[9]

Human beings are, in many ways, the default position in relation to legal personhood (Gray 1921). In modern societies, it is almost universally accepted that all humans should be capable of legal personhood (with some exceptions attributed to some aspect that may relate to bars based on, for example, age or capacity in some situations). In effect, if you are human, you can sue and be sued in your own name; you can be the subject of legal proceedings and the target or receiver of sanctions. This status is simply something that is attributable to humans by virtue of the fact that they are human (Teubner 2006).

Legal personhood is, however, also extended to other entities that are *not* humans.[10] In this respect, a key difference is that there is no default attribution. Legal personhood in these respects must be granted or recognised in order to exist (Teubner 2006). One of the more basic and common instances of this recognition relates to the corporate structure. A company is, in many respects, a person of legal fiction (Schane 1987).[11] It can sue and be sued in its own name and it can be the subject of sanctions. Unlike a human, it has no physical form but it does have a

[8] This sentiment is specifically contemplated in the quote from Hillis that opens this paper.

[9] The quote continues: "To confer legal rights or to impose legal duties, therefore, is to confer legal personality." For recent reference to this quote, see, for example, Bryson et al. (2017), Solaiman (2016). Another useful, and complimentary, definition of is provided by Radin (1932): "'person' or a 'personality,' it is declared, is not a human being nor anything given in nature, but a group of rights and capacities, or at any rate a group of legal relations, and this group owes its existence entirely to the recognition of it by the legal and institutional organization of the community."

[10] Teubner (2006) cites instances of various trees and animals. See also, for reference to other natural entities, animals and idols, Solaiman (2016). For reference to arguments that animals should be accorded different levels of rights in relation to their approximation to human intelligence, see Cupp (2009).

[11] Consideration of the idea of a fiction—as simply something that is created for the purposes of human application—see Radin (1932).

controlling mind (made up of its board of directors and its shareholders) (Lord 2013). However, whilst a company has no physical form, it is—through its creation as an artefact—anchored to a particular place and jurisdiction by virtue of its registered office.[12] This, very practical, consideration enables jurisdictional restrictions to be brought to bear and ensures that a corporate structure cannot exist in a vacuum. In essence, the corporate structure is designed to create an artificial person that can stand in for a human whilst ensuring that society's (or, at least, *one* society's) laws still apply to the entity.

In recent decades, arguments have also been made to extend legal personhood to non-human animals.[13] These arguments are often, however, restricted to higher-order animals. In considering these—higher-order—animals, the considerations for the extension of this idea could be categorised as relating to a desire to recognise in some respects the moral agency of these animals. Again, in reflecting back on these animals in terms of the "default" human position, unlike humans, legal personhood must be attributed *to* the animals as they are not—as a matter of course—imbued with legal personhood. They do have a physical presence, but they can in many respects be said to lack crucial aspects of agency (Teubner 2006); whilst they could sue in their own name, they are incapable—in the practical sense—of doing so on their own.

Other arguments can be made for the extension of legal personhood to other entities that have been created *by* humans. In the current climate—perhaps even more cogent than when a similar sentiment was made in the 1990s—the extension of legal personhood to AI takes on some real cogency (Solum 1992).[14] The forms of AI are many and varied. The scale and range of intelligences that could be attributed to AI are immense and, accordingly, whilst we will come back to the broad scope of AI later in the article, we limit our substantive consideration here to a relatively limited idea that will, we hope, be both useful and relevant. Doing so requires some form of caricature to be taken; but, in the context of the rest of this paper, we hope that we will be forgiven for that.

The fundamentally distinctive idea of AI in the context of this paper is, we consider, best explained by reference to the "artificial" part of the title. AI is something that is or has been created by human beings in order to facilitate something that would not otherwise occur naturally. As an artefact, it is designed and created for a specific purpose (whatever that may be) (Wiegel 2010).[15] We can, and we will below, consider two ideas related to AI. The first reflects simply the software side of the AI: the intelligence aspect. The second reflects the software's application in the world: the functional aspect. In relation to this second idea, and for ease, we consider primarily

[12] This is, of course, a highly simplified statement given the complexity of jurisdictional issue for transnational corporations. Yet, it is still fairly expectable in practice to identify a jurisdiction (or the jurisdictions) to which a corporation is subject to. See, for example, Mabry (1999). For an assessment of various ways to think of corporate personality, see Cupp (2009).

[13] For a recent collection that ranges over these areas, see Kurki and Pietrzykowski (2017).

[14] For a contemporary assessment of the impact of AI and legal personality, see Bryson et al. (2017).

[15] In relation to the artefactual value of an item relating to its ability to fulfil the purpose for which it was designed, see Leenes and Lucivero (2014).

the use of AI in relation to self-driving cars. (Although, there is no reason why our assessment cannot extend to other ideas.) In extending the parameters through which we have thus far considered some of the other forms of legal personhood, this is relevant as, in relation to the software, it is possible to say that there *is* a physical structure by virtue of the location of existence of the intelligence as *that* software must reside somewhere. (We explore why this is different to SI, below.) There is, in the case of a self-driving car, similarly, a physical location in which the car exists at any one time. In addition to this, it is useful to highlight two other features of AI: first, it is created by humans with a purpose or a function in mind. Second, and accordingly, in attributing any form of legal personhood to AI, there is some similarity to corporations: there is, in effect, some policy reason to recognise forms of AI as being capable of being sued even if this recognition is, as in the case of a company, a way to anchor liability back on *something* (as a set of shareholders in the case of a company or, in the case of AI, back to a set of creators) (Vladeck 2014).[16]

4 Differences and similarities: SI versus AI

At this stage, one—perfectly reasonable—question would be: so what? In circumstances where there are a number of categories that relate to various characteristics of entities capable of holding legal personality, surely it would be a relatively straightforward process of extension to cover an SI. Wouldn't it? Perhaps unsurprisingly, we think it is not that simple. Whilst SI shares some characteristics with some entities, it differs fundamentally and structurally in others. As a result, simple extension of the same forms of legal personality is not appropriate; something more is required if the characteristics of an SI are to be fully accounted for.[17] Accordingly, in what follows we seek to answer the question: what are the differences between an SI and these other legal entities? The descriptions provided above have already implicitly and subtly illuminated some of them; however, it is useful to explicitly go through them in some more detail and explain why they are relevant. In summary, the immediately apparent differences relate to: physical existence; an ability to take autonomous actions; the artefactual nature of the entity; the entity's structure (being comprised of a single individual or multiple individuals); and, whether the entity is purposive.[18] As a result of considering an SI in these terms, it becomes clear that an

[16] For the idea that the idea of legal personhood is different for animals, and can therefore be distinguished from corporate legal personality, see Cupp (2009).

[17] Furthermore, the mere extension by analogy will simply not suffice. In many respects, the various necessary and sufficient conditions relating to the existence of legal personhood in other entities in the past cannot—in circumstances where legal personality would require recognition as a social or legal fact—provide any more than an indication regarding the potential legal personality of a novel entity. Chopra and White (2004, 2011) allude, briefly, to this sort of idea. This sentiment is echoed in the idea that an entity's characteristics do not determine whether it is a legal person (Bryson et al. 2017).

[18] The distinction that we draw between the idea of an entity as an "artefact" or one that is "purposive" is a subtle, but an important, one. The identification of an entity's artefactual nature relates to the *entity* being created (by humans) for a particular goal; this is to be contrasted with the identification of an entity's purposive nature, which relates to the ascription (by humans) of *legal personhood* for a particular goal. Whilst it is clear that either category could (grammatically) bleed into the other—for example, it is

SI is, perhaps unexpectedly, most closely related to humans and not to other entities that may intuitively provide alternate analogies.

Briefly, the similarities and differences between the various forms and their status in relation to legal personhood can be summarised thus:

	Human	Corporation	Higher-order animal	Artificial intelligence	Spontaneous intelligence
Physical entity?	Yes	No	Yes	Maybe	No
Autonomy?	Yes	Maybe	No	Yes	Yes
Artefact?	No	Yes	No	Yes	No
Single individual?	Yes	Maybe	Yes	Maybe	Yes
Purposive?	No	Yes	Yes	Yes	No

Even from this pithy summary, it will be apparent that there exist some real differences between each of these entities. On the crudest of assessments, there are three points of commonality between humans and an SI (being autonomous, not being an artefact, and not being purposive); whereas there are only two points of commonality between an SI and either a corporation or an AI; and only one between an SI and higher-order animals. Let us expand upon some of these differences and similarities and expose what this could mean.

4.1 Human versus SI

The only difference between a human and an SI is the physical difference: humans exist as a physical presence in the world, and an SI does not. The ramifications of this aspect, and the idea that an SI could be seen as existing (within the internet) both everywhere and nowhere, create very real legal problems related to justifiability—in relation to the identification, specification, and accountability of entities—and jurisdiction—in relation to the location of the entity at any given time and both the applicable legal norms and the place in which legal action may be commenced. The physical presence of individuals forms a crucial—though often overlooked—presumption underlying a great part of a typical legal order. Such a presence means that, for example, confining someone to a designated space and restricting his/her liberty of movement could be employed as a form of punishment. Depriving freedom in this way works for individuals, but not, for example, in relation to other non-human entities. For example, and although we will discuss it in more detail below, corporate entities may not in the strict sense and in the same way as a human be deprived of freedom. Hence, while criminal penalties are applicable to non-human subjects in some countries, they differ significantly in many respects from those

Footnote 18 (continued)
clear that an entity's creation (as an artefact) is a purposive action—we, for the purpose of clarity, differentiate the two ideas here.

imposed to individuals.[19] This physical presence may also assure any other party engaged in some form of dealing that the person concerned is generally capable of making commitments about themselves, without uncertainties such as unauthorised representation, as the case might be with regard to a company (Teubner 2006).

These considerations also lead to some practical issues, notably those of jurisdiction. For the purposes of legal action, one determinant of jurisdiction is physical presence. An individual knows that she is subject to the general and universally stated laws of a particular state as she is present in *that* state; she can be made subject to sanctions for contravening those laws whilst in that jurisdiction. If an SI does not have a physical presence, this aspect of jurisdiction becomes problematic: is an SI subject to the laws of *that* state? If so, is it subject to the laws of *that* state in preference to or to the exclusion of other states (in which it also could be considered to exist)? Which state's laws should take precedence? Who decides? In relation to this last question, if we are according dignity to an SI—as some would suggest we must do with humans (Kassaro and Norton 2016)—then, perhaps, the decision must be made by the SI itself; but, of course, this merely opens up a further question as to whether we should be able to compel a decision in this respect. One thing worthy of note here relates to our conceptualisation of an SI as being a single individual notwithstanding its existence in multiple locations. (Whilst we do not mean to preclude the potential for several *different* SIs coming into existence, we conceive only of *one* SI for the purpose of this exploration.) Unlike any entity that has a physical presence, even though an SI as a single entity is capable of existing in a number of jurisdictions simultaneously, it nevertheless remains a single—but not necessarily contiguous—entity.[20]

In relation to similarities, the autonomy of both an SI and humans stems from both their relative level of intelligence and also the aspect of dignity referenced briefly above.[21] It is relatively straightforward to see the two as being capable of making independent decisions absent necessary interference from an outside agent. In a related sense, these similarities also extend to the negative response regarding

[19] For a theory about applying criminal penalties to AI as to corporations, see Hallevy (2010).

[20] Here, of course, we simplify to some degree. It certainly is possible for a human, for example, to straddle a jurisdictional boundary. However, as with an SI, this would not impact the categorisation of that individual as a single individual.

[21] For a sense of how far these discussions have come in less than a decade, see the suggestion by Cupp (2009) and Solum (1992)—albeit by way of a footnote in the context of human dignity and the potential extension animal rights—that "Computer rights"—rights for computers that attain a level of artificial intelligence comparable in some ways to human intelligence—have been discussed as an abstract concept, but no significant groups are actively lobbying for an extension of computer rights given the wide gap that still exists between computer intelligence and human intelligence. One issue, that we do not address here, is the nature of the intelligence possessed by an SI with regard to certain arguably critical foundations of human intelligence, such as agency, autonomy or emotion. In suggesting the idea of an SI, we have, as underlined in Sect. 2, assumed that the general level of intelligence of an SI is comparable to human intelligence—for reasons explained above—with all these fundamental dimensions of intelligence covered. Nevertheless, depending on the specifics of the envisaged SI, it may mean that human and SI autonomy may result in different mechanisms for decision making. Yet, for the discussion of this article, it would be neither necessary nor helpful to consider those cases where the SI in question is fundamentally different in these aspects.

whether the entities are artefacts or whether they have been purposively created. Neither any particular human nor an SI was conceived for a particular (functional) purpose; they exist in the world in a way that renders them capable of making their own decisions and setting their own courses.[22] The outcome of this is that both entities neither require nor necessarily need "assistance" in coming to decisions regarding their actions.[23]

Despite these similarities, the differences cannot be disregarded. The differences between the two entities are both fundamental and real. This seems to preclude an argument for saying that an SI should, like a human, simply be accorded legal personhood purely by virtue of being human. One reason for this could be that, *human* dignity is considered something intrinsically human-oriented, meaning that the notion itself connotes a value exclusively attachable only to human beings, not other groups of agents (Lee and George 2008). Arguably, while we may be able to feel sympathy for other species on the planet, it is a different thing to say that these species have or should have dignity. Of course, there can be counter-arguments (Stone 1972), but these go beyond the scope of this paper. The issues associated with dignity relate, fundamentally, to the non-purposive characterisation of SI in comparison to animals. We explore this in a little more detail in Sect. 4.3—Higher-order animal versus SI.

4.2 Corporation versus SI

A single area of commonality exists between corporations and an SI: the absence of a physical form. We have outlined the ramifications regarding physical presence above. However, it is relevant to once again point to, and expand, one aspect of difference here: corporations are anchored to a particular jurisdiction by virtue of the physical location of their registered office. This aspect provides one permanent (albeit changeable) tie to a jurisdiction that SI does not necessarily have. It also cannot be said that an SI *must* exist in all jurisdictions. If we consider, even to a limited extent, its exercise of autonomy it could elect *not* to be any particular state.

Notwithstanding this single commonality, it is clear that there are still substantial differences. The first difference to note relates to the status of an SI or corporation as a single individual that was also touched on above. Of course, corporations can be made up of one or many individuals that make up the controlling mind of the entity.[24] Each may bring his or her own views or agenda. This is not reflected in the idea of an SI where, as noted, the entity should be construed only as a single entity that guides itself. A further key difference between the two is reflected in the

[22] In making this statement, we are, of course, putting aside more general reasons that couples may have to procreate. Whilst it is conceivably possible to "farm" humans for a particular purpose—as labour, for sporting achievement, or some other activity—we prefer the view that individuals are both able and required to make autonomous decisions that determine their path and purpose.

[23] This point should be compared to higher-order animals below.

[24] Of course, a vast number of theories exist in relation to the nature of legal personality in relation to corporations. For a useful and relevant account of these, see Cupp (2009).

connected ideas of purposiveness and the entity being an artefact. A corporation—both a particular corporation as well as the very concept of a corporation—is a vehicle that is purposively brought into being to achieve a particular goal. The concept of a corporation plays a vital role in modern society that facilitates a single locus for legal action and responsibility, as well as providing a vehicle for investments and other ventures. In these respects, the very idea of a corporation was designed from the top down with a function—albeit a broad one—in mind; this same idea is replicated in terms of *each* corporation when it is brought into being. This could not be less the case in relation to an SI. An SI cannot be seen in top-down terms. Its creation stems not from human design (and, instead, merely from human action). There is no *reason* for it being brought into being; it simply comes into being. The reason why this is important is that there can be no person or persons seen to be standing behind an SI. Whilst the corporate veil exists to protect shareholders, this can—in some limited respects—be pierced.[25] Furthermore, when a corporation has a particular longstanding presence—in comparison to mere shell corporations that are created off the shelf—the particular corporation's existence can be seen as providing a permanent locus of responsibility that cannot easily be changed or avoided. Responsibility can clearly be attributed to that entity in circumstances where real consequences can follow from its actions (Kraakman et al. 2017); this can mean sanctions imposed by breaches of laws and regulations *can* have real bite. (If only because corporations must exist to further the interests of their shareholders, and this frequently relates to the maximisation of profits; something that can be substantially impacted by legal sanctions and legal actions.)

Putting aside the absence of any jurisdictional location for an SI for one moment, the nature or effectiveness of traditional forms of sanctions that have some bite in relation to some corporations may have little or no impact on an SI. Custodial and financial sanctions, as two of the most frequently used ways to achieve compliance with—or deter breaches of—laws and regulations would have little impact. The absence of physical form would mean not only that there is no way to impose custodial sentences, but also—as there would be nothing required to sustain that form—it would have no need of finances; so, there would be no way to impose meaningfully impactful financially based sanctions or restrictions. In short, the normally used methods of coercion would have no impact. For these reasons, it should be clear that the mere imposition of legal personhood in terms akin to corporations is not appropriate. Not only is there no similarity in terms of the structure, function or nature of the two entities, but the very rationale that could be seen to underlie the concept and practical existence of particular corporations does not exist, so there is no benefit in applying that model to an SI.

[25] Various jurisdictions have provisions for doing so. For example, see Miller (1998).

4.3 Higher-order animal versus SI

The only area of commonality between a higher-order animal and an SI relates to the fact that neither is an artefact. Neither one's existence has been created by humans. Yet, they differ in the—broadly related—category of purposiveness as a higher-order animal's status as a legal person is reliant on *that* animal being granted legal personhood for a particular purpose; in this sense, it is not a blanket or universal award.[26] Alongside the dignitarian approaches to legal personhood for animals (Stone 1972; Nussbaum 2000) (and for AI, as will be discussed in the next section, Calverley 2006), there are parallel, ecological theories supportive of granting legal personhood to certain categories of animals (Garner 2005) (and, in the case of AI, tort-law theories, Vladeck 2014). When it comes to SI, however, such utilitarian considerations serving certain policy goals, do not seem to exist, or at least have not yet been put forward.

Of the features that are not shared, physicality is perhaps the most obvious. Yet one of the most interesting differences comes in terms of autonomy. Whilst there can be little doubt that an animal of this kind may have autonomy to go about its daily business, when conceived of in terms of legal personhood the assistance of a human agent is required in order that all of the features of *legal* personhood are fully realised.[27] In this respect, legal actions must be taken or commenced in court *on behalf of* a particular animal. In effect, human agents must operate so as to facilitate the animal's personhood in the fullest sense. Whilst the absence of an SI's physical form could be said to—to some degree—require a human agent to facilitate, for example in filing court proceedings, this takes a somewhat different form. In the case of an SI, decisions regarding progress and strategies, and consent to legal proceedings themselves, could be directly made by the SI communicating through whatever media is appropriate. The agency of another may simply reflect the satisfaction of a

[26] In this respect, a higher-order animal's status is reliant on an individual animal being granted legal personality for a *particular* purpose; this is not a blanket award across *all* animals (of a similar kind/classification.) This is differentiable from the single artefactual commonality as the attribution of legal personhood to that animal in relation to a particular purpose can exist independently of the creation of the animal—as the entity—for a particular goal. The animal itself is not an artefact; yet, the ascription of legal personality is purposive. In this sense, *that* animal has been purposively recognised—independently of other members of its species and whilst not being actually created—as being capable of holding legal personality. This stems from our definition of purposiveness as an idea that "relates to the ascription (by humans) of *legal personhood* for a particular goal". Of course, this position could be subject to the way that the concept of legal personhood (or purposiveness) is constructed; in circumstances where there are multiple ways to construe this concept, and in terms of the nature of this extended thought experiment, there could also—in other definitions and ideas—be an argument for ascribing legal personhood by default to certain higher order animals. (We thank the reviewer for highlighting this important point.) However, purposiveness as we have defined it here, and in terms of the idea of dignity outlined above, seems—at this stage, at least—to be unlikely to result in the blanket ascription of legal personhood to all members of a non-human species for any goal.

[27] Here, we do not suggest that animals are subject to the same rights and obligations as humans. In this sense, we agree that the idea of legal personhood is not an all-or-nothing proposition; there can be different rights and obligations that may be suitable for animals to have. However, in the defence of these, humans will be required (Bryson et al. 2017).

particular court's rules or procedures; for example, to file documents, to sign an affidavit or to provide oral argument in court. Agency would be restricted to functional aspects of a proceeding and would *not* extend to specifically making decisions *on behalf of* the SI in terms of whether, how, and when an action would take place. In terms of a higher order animal, these decisions cannot be made—or at least cannot be communicated—by the animal. These foundational decisions must, therefore, be made on *behalf* of the animal at both the outset and as the proceeding is on foot. For these reasons, the attribution of legal personhood to an SI appears to have a very different functional aspect to that which would be attributable to higher-order animals. This functional point should not be seen as being determinative of whether a non-human animal should or should not be ascribed legal personhood. It is merely provided in order to illustrate that non-human animals and an SI would be different in terms of the autonomy that would, or could, be exercised.

4.4 AI versus SI

It may intuitively be thought that AI and SI would share the most similarities. After all, both could be seen as being intelligences that exist in some sense within the virtual world and are, in some sense, both artificial. However, these are limited to the positive acknowledgment of the entities' autonomy, and the *potential* overlap of an SI's status as a single individual with an AI's potential to be the same. This second aspect has already been explored above in relation to corporations. These same considerations apply in relation to an AI. In relation to the autonomy aspect, this is what could be conceived of as being the reason for the intuitive similarity between the two entities (Lawless and Sofge 2017). When conceived of in the terms adopted here, there is little doubt that AI—as an intelligence that could approach human levels of intelligence—could in terms of the potential for autonomy largely reflect almost exactly the form of an SI that has been described. And, further, in the purely limited form of software, it could also reflect the absence of a physical form that an SI has. (However, there is a crucial difference here that we will get to in a moment.) In these senses, there is undoubtedly a connection. But, when conceived of in terms of—something like—a self-driving car, AI becomes something that is *very* different. Accordingly, we outline both of these ideas separately.

When conceived of as a self-driving car, there exists an argument for suggesting that there should be some form of legal personhood attributed to AI. One suggestion could go something like this: if a car is making decisions about how and where to drive and, commensurately, how and when to take actions to avoid accidents, there must be some form of responsibility or focus of liability for those actions. Whilst systems can be designed to greatly minimise the risk of these accidents, they *must* still be at some risk of occurring due simply to the unpredictable nature of the world. When that sort of situation arises, there must be a decision taken that may result in, for example, harm to an individual—even if that action results in the avoidance of a greater harm to another individual. There must, in accordance with the mores of modern society, be some way to attribute blame *somewhere* for this sort of action. In common with the issues outlined above in relation to an SI and legal sanctions,

it would seem peculiar to try to sanction the car itself, but there could be a sheeting home of a bundle of liabilities to multiple stakeholders. Those include the owners of the vehicle, the developer of the software, the manufacturer of the components, or even the provider of information. The complexity of an AI system may necessitate a simplified model to remedy the damages caused by untraceable errors, or even sheer bad luck, to ensure that any legal proceeding does not become so unwieldy as to effectively preclude an injured party from recovering damages. Although some commentators have criticised the idea of personality for AI on the basis that they cannot assume rights and duties (Bryson et al. 2017; Solaiman 2016), this seems to have begged the question of why they *should not* assume such rights and duties. Indeed, they can be considered a bundle or package of rights, duties and responsibilities like corporations (Vladeck 2014). In this sense, a policy goal is satisfied by ensuring some form of liability is attributable and the car would act in many respects like a corporation: as a locus for legal action which may ultimately pierce the (automotive?) veil to get to the individuals that may ultimately be responsible for the decisions that led to the actions (Vladeck 2014). This rationale forms a strong point of differentiation to an SI. An SI has not been created to achieve a purpose. There is nothing and nobody behind it. The only seemingly practical way to hold an SI responsible may be in terminating it.[28] However, we, once again, end up back in the same position that we were at before that there is no real way to effectively take action against an SI, so a policy reason for the attribution of legal personhood does not subsist.

How about in terms of mere software? The same situation obtains. AI as a form of artefactual software that has been designed, created, modified and is hosted for a purpose, represents something much more akin to property than something that has simply come into being. Of course, should AI be created in a way that renders it suitably intelligent there could be an argument made that dignity should be afforded to it as to hold it in terms of it being mere property would reflect something akin to slavery. There is little room to consider this aspect here in any real depth. However, it is important to explain exactly why this is different in relation to an SI. The difference, we argue, stems from the fact that the parameters of the creation of one—AI—reflects a conscious and deliberate decision by a human or humans to achieve a particular end. Putting aside what this may ultimately mean perhaps on a moral basis, this fits very neatly into most conceptions of what property fundamentally *is* in modern western capitalist societies.[29] Things created in this way are typically protected through recourse to the owner and creator of the thing. In circumstances where an SI has not been created and made, it does not fit into this category; it exists as something else as there has been no conscious and deliberate decision to create it. It cannot be classified as property. It must be classified under some other heading.

[28] This, of course, may not be technically possible without terminating the entire internet if the SI exists across the internet.

[29] By this, we mean nothing more than the idea of property as an artefact that can, once created, be controlled by the owner in a way that allows the thing to be, inter alia, used in accordance with the owner's wishes and to exclude others from its use.

Whilst this does not definitively prove that an SI should be attributed the status of legal personhood, it does prove that it is suitably different to AI as a proprietorial system.

5 Conclusions and ramifications

The entire enquiry of this paper began with a hypothetical yet not-so-unrealistic scenario where a spontaneous intelligence comes into being within the internet. By asking a question as to whether and how the existing legal concept of personhood may be extended to cover new forms of intelligence like this, we aim to anticipate and address a practical issue as well as a theoretical one. From a practical point of view, this may serve as an initiative to spark further proactive, precautionary discussions on the role of law in the face of SI, which might become a reality in the near future (or might already have, without our awareness). An even more realistic contribution would be to revisit the theoretical recognition and classification of legal personhood.

To achieve a meaningful exploration of this largely uncharted territory, we have first set up a clear context in which the discussion unfolds. This includes some clarification of the terminology of "spontaneous intelligence", which can be roughly defined as a form of intelligence that evolves from the internet without human design and has a level of intelligence comparable to that of humans. Also included is an enumeration of certain agents that have been commonly granted legal personhood, or could arguably be granted legal personhood. A more detailed discussion then followed, making comparison between an SI and the rest on the list: human, corporation, higher-order animal, and artificial intelligence. Both similarities and dissimilarities have been analysed in each instance, with reference to the rationale of providing same or different treatment based on such features. We have come to a somewhat counter-intuitive conclusion: an SI actually shares more characteristics in common with humans than AI. This is not to say an SI is necessarily similar to humans; we are merely illuminating the relational position that an SI shares *more* in common with humans than humans share with AI. This also should not be taken to be an argument from analogy to suggest that an SI should, therefore, like humans be accorded legal personality; after all, in circumstances where legal personality can simply be a function of formal recognition by a legislature, there is no reason why legal personality cannot be afforded to *anything* regardless of any necessary or sufficient conditions that may exist or be held in common with previously recognised holders of legal personality.[30] Other issues do, however, arise. In particular, the non-artefactual and unpurposive nature of SI—which are both shared with humans but not AI—might have profound implications in both theoretical and practical terms.

[30] Whilst *no* recognition or consideration of factors that relate to the previous granting of legal personhood may be unusual, we simply suggest here that there is no necessary requirement for any such consideration in order for legal personality to be granted. Accordingly, a conclusion by analogy cannot be sustained.

Given the limited space here, there are a vast number of ramifications for scholars and policymakers that will have to be left to future articles. We seek to only expose a couple based on the hypothetical explored above. What is clear from this brief exploration is—what may, to many, already be clear—that regulations relating to any form of AI cannot simply assume a "one size fits all" approach and expect that—what may appear to be at first glance—cognate intelligences would also be effectively regulated. This may be obvious if a clear line is drawn between SI and AI. Of course, this is one of the things that we wanted to expose in our broad description and comparison of these various forms of legal personhood.

At this point, even if the "how?" question regarding regulation of an SI is put to one side, it remains unclear—in the context of the question we posed at the outset of the paper—whether a decision-maker *should* grant SI legal personhood, or how law *should* regulate SI. While much work will be needed before a conclusive answer can be reached, what is less uncertain is that, considering our discussion above, the way a legal system *should* treat an SI would be very likely to differ from how it treats commonly recognised legal persons—namely humans and corporations. Also, the comparison between AI and alternative entities could be further elaborated with a greater philosophical depth. Again, as we acknowledge this paper has not delivered a definite answer as to how we should counteract the potential emergence of SI, we equally hope this marks a helpful starting point.

We set out with a modest goal: to assist in the process of identifying some of the ways in which existing ideas of legal personhood may be differentiated from one another. What will be apparent from the exploration above is that there are ways in which various forms of legal personhood can be explored to illustrate that there are stark differences between various categories of legal person. This is, of course and of itself, not a revelatory conclusion. However, what flows from this is considerably more interesting. In relation to the advancement of technology, and the different ways that it could expand in the very near-future, the recognition of legal personhood cannot be confined to the basic categories that are already established. Further, mere adaptation of those categories would fail to account for the relative differences in various entities. This much is clear for the hypothetical case of SI that we consider. But, there are wider-reaching implications for the recognition of AI as a legal person.

In relation to the legal personhood of AI, a one-size-fits-all approach cannot work. AI is a large—catch-all—phrase that encompasses a number of technologies. Whilst we crudely assessed only one category of AI, we did allude to two variations on the idea: AI as a physical entity in self-driving cars; and, AI as a more abstract notion as a piece of software. These two variations illustrate significant differences. The differences between other forms of AI could be equally—if not more so—stark as technology advances. This would suggest that the single category, or even the two variations, that we crudely used would miss more than they would catch. In expanding the idea that we pressed in relation to SI—as a discreet and stipulative hypothetical—that legal personhood must be assessed for that technology on an individual basis, it seems this same conclusion must then be applied to the various and varying forms of AI. The boundary that we seek to illustrate exists between the various

entities explored in this paper could equally be seen to operate *within* the category of AI.

This is not a situation that has previously arisen in relation to the ascription of legal personality.[31] The categories of legal personhood have remained—relatively—static for centuries; and the boundaries to what is within the categories themselves has generally been clear. Should these intra-category boundaries be drawn within AI, or should AI be separated into a number of different categories, the result is the same: the exponential expansion of the number of entities that are attributed legal personality. In order to recognise differences akin to those that have been identified in this paper, it will not be possible to simply argue that AI should be ascribed legal personality. It must be the case that any argument would need to be made in relation to *this* AI or *that* AI and not simply for AI as a category of itself. Accordingly, it seems clear that in relation to AI, one size does *not* fit all.

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[31] The closest analogy would come in relation to the identification of only a sub-set of non-human animals that may be attributed legal personhood—but even this seems like a poor comparison as there seems to be no sensible consideration of *all* non-human animals as being capable of being legal persons.

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