THINGS OWNING THINGS

Russell Belk*

***Contact Person**
Schulich School of Business
York University
4700 Keele Street
Toronto, ON
L4P 3E9 CANADA
Tel. 905 596-0079
e-mail rbelk@schulich,yorku.ca

THINGS OWNING THINGS

ABSTRACT

The prospect self-driving and self-owning automobiles that sell rides using applications like Uber and Lyft opens a number of new behavioral, legal, and ethical ownership issues. Autonomous self-owning machines could very likely succeed economically and out-compete less efficient human competitors. Their potential fields of endeavor range from transportation, care-giving, and surgery to prostitution, surveillance, and warfare. Although previously dealt with primarily in science fiction and fantasy, there are serious moral issues raised by the coming wave of robotics and related technologies. Among the possible scenarios are that such machines will become our slaves or our masters. Such personifications are not mere anthropomorphisms, for if such autonomous machines are given rights of self-ownership and property ownership, we would effectively grant them the legal status of persons – a status with far-reaching consequences. In this paper I explore such potential consequences in order to demonstrate the need for research and thinking about the rights and responsibilities of robots.

In an August 2013 presentation at the [Alan] Turing Festival in Edinburgh, former Google engineer and Bitcoin developer Mike Hearn, discussed a concept that he attributes to Gregory Maxwell: driverless cars that own themselves (Hearn 2013; Kelion 2015). It would work like this. Starting with funds obtained through a crowdfunding source like Kickstarter or a loan from an auto maker, self-driving cars would be purchased and licensed to themselves. They would offer taxi-like rides similar to those currently provided by human-driven cars using applications like Uber and Lyft. Consumers would summon rides with a smartphone app and would immediately receive bids that they or their phones would select among. Because no one's labor would need to be compensated and the bidding algorithm for rides would not include an excessive profit component, such driverless cars would quickly out-compete human-driven for-profit ride services. The cars would accumulate a reserve for fuel, repairs, and improvements. After repaying any initial loan they would own themselves. They would hire human mechanics to repair their hardware and human programmers to improve their software.

They would also set aside some money so that they might have "children." These children would be other self-driving cars that their "parents" purchase and set up in a similar ride service. They too would set aside enough money from their fares to repay their parents for having given them birth and to have children of their own. Eventually there would be large fleets of such cars competing with each other on the basis of their distance from potential passengers and their consumer-rated reputations for good service (Masum and Tovey 2011; Solove 2007). If there got to be too many competing cars in a particular location, some would migrate to a new, more underserved, community in order to balance supply and demand. In Hearn's scenario, these cars would not rely on artificial intelligence (AI); they would only rely

on computer programs written by humans which would also dictate the car's eventual death when repair and other costs became too high relative to revenues.

What I would like to consider in this paper is the basic idea of things owning other things, including themselves. I want to expand beyond the sphere of self-driving automobiles as well as consider what the additions of AI and sentience would do to such scenarios. In essence, this paper envisions a more literal translation of ANT's (Actor Network Theory's) formulation of agentic objects (e.g., Callon 1986; Latour 1987, 2005: Law 1999). Latour (2005) explains:

> There is hardly any doubt that kettles 'boil' water, knifes 'cut' meat, baskets 'hold' provisions, hammers 'hit nails…. try to maintain that hitting a nail with and without a hammer, boiling water with and without a kettle, fetching provisions with or without a basket…that the introduction of these mundane implements change 'nothing important' to the realization of the tasks (71).

But rather than exhibiting the passive causal force that Gell (1998) called secondary agency, self-owning objects would exhibit a primary agency that initiates and motivates actions that affect other objects, people, and environments. They would own themselves in a strong agentic sense not only behaviorally, but also legally and morally. This is arguably true even if they relied on human-supplied programming to initiate their actions, but it is certainly true if they possessed enough artificial intelligence to (re)program themselves, learn, and evolve. This possibility offers a new view of ownership that has not previously been considered outside of the fantasy and science fiction worlds of robots and autonomous toys (e.g., Colatrella 2012; Grau 2011; Kuznets 1994; Lanier, Rader, and Fowler 2013). Even if this turns out to be a "what if" exercise, by considering the possibility of object self-ownership and, more generally, ownership by non-humans, we open up new conceptualizations of ownership and its effects that are not evident

when we assume that only humans can own things. As will be seen this may lead to new opportunities as well as new potential problems, not least in the economic, moral, and ethical spheres.

Who or What Can Own Things?

Despite a general presumption that ownership is a uniquely individual human right, there are several other possibilities that are already recognized. First of all there are things that no one can own—the ocean, the air, a gesture, a view, or a privately held thought, for example. Secondly, there are things that are normally jointly owned—homes, sidewalks, public parks, a university, or a corporate brand for instance. Thirdly, there are things that are owned de facto by non-humans as when we say that this is the dog's bone, the cat's toy, or the house's roof. Some of these cases of ownership by someone or something other than an individual human are established by social or legal convention, while others (e.g., the ocean, the air) seem to be beyond human control. For those that depend on social or legal convention, perceptions of what can be owned can change, as with the enclosures of the commons in Medieval Europe. Polanyi (1944) maintains that land, labor, and capital are all "fictitious commodities," which only became alienable and capable of being bought and sold with the rise of capitalism. As Rifkin (2014) notes, "After centuries in which people belonged to the land, the land now belonged to individual people in the form of real estate" (31). The same was true of labor and homes which became sources of income and capital.

Generally speaking property law involves the rights and responsibilities of individuals within a legal system. Even the many and growing recognitions of the influences of networks or assemblages of people and objects in our lives privilege the individual or individuals when it comes to ownership (e.g., Bennett 2010; Bogost 2012; Brown 2004; Clark 2003; DeLanda 2006;

Deluze and Guattari; Harman 2009; Hodder 2010; Knappett 2008; Schwenger 2006; Verbeek 2000/2005). The same is true of the growing recognitions of the possibilities of sharing and collaborative consumption (e.g., Aigrain 2012; Belk 2007; 2010, 2014; Bhardi and Eckhardt 2012; Botsman and Rogers 2010; Gansky 2010; Grassmuck 2012; Widlock 2004; Woodburn 1998). And the de facto ownership of things that we appropriate in our environment such as a student's seat in the classroom, or a couple's identification of "our song," or my place at the family table, assume that the individual has a proprietary relationship with the thing and not the reverse.

Personhood. However, it is generally agreed that the law is a normative system that is subject to modification. Consider the changes in laws enfranchising blacks, women, and gays with the same rights as others, for example. The legal concept at stake here is not whether someone is human, but whether they are a person who can possess or acquire rights and responsibilities in the eyes of the law. As Rorty (1976) frames it:

> The issue of whether the class of persons exactly coincides with the class of biologically defined human being—whether corporations, Venusians, Mongolian idiots, and fetuses are persons—is in part a conceptual question. … If Venusians and robots come to be thought of as persons, at least part of the argument that will establish them will be that they function as we do: that while they are not the same organisms that we are, they are in the appropriate sense the same type of organism or entity (322).

Such judgments are controversial and subject to differences of opinion, as is illustrated by the heated arguments about the point at which a fetus becomes a person (Calverley 2011). Despite such dilemmas, I will not attempt to establish that machines, robots, computers, smartphones, or

other "intelligent" devices are or are not persons. It is sufficient to recognize that they *might* someday be regarded as persons in a legal sense.

Ownership. But even if we grant that a robot might be recognized as a person, it does not necessarily follow that such a robot possesses the specific right of ownership. An example is again found in the fetus which, at some point in its development is considered to be a person, but still cannot be regarded as owning things other than its own life. This is hardly a negligible right of ownership, but it would not extend to the fetus owning land, possessions, or houses (other than the mother's womb, which it is more properly temporarily sharing). One of the key prerequisites for ownership on which this distinction may hinge involves intentionality and volition. Because the fetus has not participated in selecting, purchasing, and acquiring such property, it cannot in a Lockean sense claim ownership. And it is doubtful that a parent can will something to a specific unborn child.

Autonomy. Autonomy is defined as "systems capable of operating in the real-world environment without any form of external control for extended periods of time" (Bekey 2005, 1). In order to be autonomous for an extended period, self-owning robots or driverless cars would need to have the rights to purchase fuel, repairs, and upgrades. No doubt governments would also impose responsibilities like buying insurance and paying taxes. Would it not follow that these machines would also be able to purchase or invest in the ownership of other machines? And if they might own other machines, why not also land, buildings, retail shops, banks, factories, computer networks, and indeed all the things that humans are able to own? And to the extent that lower labor costs, 24/7 hours of operation, and smarter programming allow success in competition with humans, is it not possible that such machines might come to own economic empires? Competition with other machines would merely hasten the rate of development of

better programming. However, for the time being, the humans who do their programming and the governments that regulate commerce could likely build some safeguards against such economic juggernauts, assuming that we found them to be a bad thing (Bryjolfsson and McAfee 2014). With AI the story might be different. But before considering the additional variations on ownership and its consequences introduced by artificial intelligence, we need to more fully consider the basic questions raised by things owning things. This is the subject of the next section.

Applying Property and Criminal Laws to Things versus People

Driverless Autonomous Cars. It might seem that the same civil and criminal laws applicable to the people who own property might also be applicable to machines which own property in the same jurisdiction. And to a certain extent this is true. Let's use driverless cars as the example. Just as a driver who is speeding can be given a ticket and forced to pay a fine, so could a driverless car. In the case of an accident, both could be made to pay for casualty and property damages with the help of insurance. In severe cases of disobeying traffic laws both humans and self-owned cars might have their driving licenses suspended or revoked.

However, there are other cases where the application of laws regarding ownership rights and responsibilities would be more difficult to apply equally to both people and things. Suppose an accident involving driving negligence results in the serious injury of a passenger, pedestrian, or the occupant of another vehicle. In the case of a human driver, the driver could be arrested, tried, and sentenced to time in prison. However, it is difficult to see how any of these procedures and penalties could be applied to a driverless car. As Sparrow (2007) argues, robots cannot be punished because they cannot suffer, although Lokhorst and van den Houven (2012) disagree with the premise that robots will never be able to suffer. A criminal car could be shut down or

"executed" by demolition perhaps, but this would be a much more severe punishment if it were to be applied to a human.

Besides damage done *by* self-owned driverless cars, consider damage that might be done *to* such vehicles. What if someone steals such a car's tires or battery? If apprehended, should the perpetrator face the same penalties as would be the case with human-owned cars? If someone covers the car with graffiti are they damaging private (if non-humanly owned) property or are they harming a person? These are the easier questions. But what if someone "kills" a driverless self-owned car. If the car is a legal person, is this then a crime against a person or a thing? Or what if one driverless car "kills" a human person versus another driverless car-person? If such questions seem far-fetched with a driverless car, suppose instead that it was a humanoid robot (an android) with a name and a personality.

Robots and Androids. There is a long-standing human tendency to fashion robots in our own image, going back at least to 270 BCE and water-driven automata (Thorndike 1958). Both Homer and Plato wrote about statues that came to life. The Jewish legend of the Golem, Mary Shelly's Frankenstein monster, and a large number of science fiction stories and films have fired our imagination of humanoid robots. The term robot comes from a 1920 Czech stage play by Karel Čapek's entitled *R.U.R* (Rossum's Universal Robots). "Robot" derives from the Czech word *robota* meaning forced labor and the root word *rab* or slave. Indeed this is an apt root, for subsequent fictional treatments have explored issues of robot rights and asked whether such humanoid machines are slaves, property, or persons. For example, Isaac Asimov (1976/1984) wrote the story "The Bicentenial Man" about the android Andrew Martin who longed to be fully human. A large part of the robot's motivation was to escape the virtual slavery that was his position in society. The rather unfaithful film version directed by Chris Columbus (1999) also

introduces a human love interest for the android. But in both cases Andrew Martin so longs to be free that he does succeed at becoming human, even though the cost is his mortality and death (Short 2003). There is a certain quasi-Christian martyrdom in this story as well as a clear valorization of humanity and human superiority.

Another android analyzed by Short (2003) is Data on the television series *Star Trek: The Next Generation*. It is in the episode "The Measure of a Man" (broadcast in 1989) that we see most clearly the complex issues of ownership, humanity, and property. It involves a trial to adjudicate whether or not Lieutenant Commander Data is the property of Starfleet Command and can be disassembled in order to see how his computer brain works or whether he is instead an artificial human with the right to self-determination and the right to life. His defense is based on demonstrating that he is sentient, self-aware, loyal and sentimental (i.e., emotional), and deserves more than a fate of slavery or objecthood as Descartes would frame it. Although Data has creatively taught himself to paint, play the violin, and write poetry, his efforts are derivative more than original. However, the same might be said of many human efforts in these domains. In the first episode of *Star Trek: The Next Generation*, a crew member refers to Data as "Pinocchio" and during his trial a telling demonstration of his thing-like nature is offered when the prosecutor turns off Data's on/off switch, at which point he goes numb. The prosecutor offers that "Pinocchio is broken: its strings have been cut." Notably, Pinocchio is the story of a puppet who longs to be "a real boy" (Massimo 2012). Data does exhibit an intense curiosity, especially about what it means to be human. Moreover he has a unique personality and demonstrates affection, nostalgia, and caring. Ultimately the trial goes in his favor and he remains "alive" as "he" rather than "it," at least until he sacrifices himself to save the Star Trek crew in the film *Star Trek Nemesis*. Like the Andrew Martin story, there is android martyrdom here.

If a future trial of a non-fictional android robot were to have a similar outcome to Data's trial, it would set an important precedent. Not only would it establish that machines can achieve quasi-human status in the eyes of the law, it would also establish the concept of robot rights as a corrective to a status as mass-produced servants or slaves. In her book, *Alone Together: Why We Expect More from Technology and Less from Each Other*, Sherry Turkle (2011b, 5; see also 2011a) recalls being interviewed by a journalist who accused her of bigotry of the same sort displayed by those who oppose gay and lesbian marriage. Her supposed bigotry derived from her objection to marriage between humans and robots. At the other end of the moral spectrum are those who argue that, despite the repugnance of the concept of human slavery, robots should indeed be regarded as no more than ever-helpful slaves (e.g., Bryson 2010; Peterson 2012). A somewhat more moderate proposal is to regard robots as having the same legal status as animals (Kelley, Schaerer, Gomez, and Nicolescu 2010).

Sexbots. One arena in which such issues may be tested is in the context of sex robots or "sexbots." Just as sex and pornography helped the success of VHS tape recorders, DVD players, and the Internet, sex may also help the robotics industry. Although there are already robotic sex dolls available for $1,000 to $7,000 and the film *Her* made falling in love with a voice-interactive computer operating system seem plausible (Linden 2015), the present state of such non-sentient sex robots is quite rudimentary (see Layser 2010). Nevertheless, Yeoman and Mars (2012) predict that soon there will be a thriving sex industry with robot prostitutes. They also suggest that such sex will be more moral than patronizing human prostitutes, and that it will stop human sex trafficking, curtail sexually transmitted diseases, and allow guilt-free sex outside of marriage. Presumably laws would change accordingly to legalize sex with robot prostitutes, if indeed old statutes involving human prostitutes were seen to apply to sex-bots.

It is possible that rather than "renting" a sex-bot, we might instead purchase and adopt one as a lifetime companion (Levy 2007; Scheutz 2012; Whitby 2012). It also seems likely that someone would envision applying Mike Hearn's model of self-ownership by ride-sharing cars to sex robots as well. However no doubt issues would arise with regard child robot prostitutes. And if such robots eventually became sentient, the same issues of slavery, property, and personhood that were raised in "The Bicentennial Man" and "The Measure of a Man" would likely arise and be seen in a new light as sexploitation.

Controlling Robots. PhD biochemist turned prolific robotic science fiction writer Isaac Asimov (1950/1991) famously formulated the Three Laws of Robotics:

1. A robot may not injure a human being or, through inaction, allow a human being to come to harm.
2. A robot must obey orders given it by human beings except where such orders would conflict with the First Law.
3. A robot must protect its own existence as long as such protection does not conflict with the First or Second Law.

A number of variations on these laws have been proposed and they have also been compared to the Ten Commandments. As Asimov (1950/1991) and Anderson (2011) point out, such laws basically condemn robots to slavery. In *The Bicentennial Man*, for example, Andrew Martin is accosted by bullies who demand that he take off his clothes and dismantle himself. Because of the First Law of Robotics (not harming humans) and the Second Law (obeying the orders of humans) he cannot defend himself. He is only saved by the intervention of a human who explains that the bullies have an irrational fear of his greater intelligence and autonomy.

However the fact that the U.S. military funds much robotics research and has already used robots and drones to intentionally kill human beings, suggests that Asimov's legal ideals have already been breached. We are just beginning to feel the impact of robot warfare and rules of robot combat have yet to be established (Guarini and Bello 2012). Nevertheless military robots are multiplying. When the U.S. invaded Iraq in 2003 it had no robots on the ground. In 2004 there were 150 combat robots in operation there. In 2005 the number had grown to 2400, and by 2008 there were over 12,000 in a dozen varieties that operated on air, land, and sea (Singer 2009). While they did not prove overwhelmingly influential in changing the course of that war, they are becoming increasingly effective in tasks such as targeted killing, bomb disposal, and retrieving wounded soldiers. Robot uses and regulations (or lack thereof) already have very real consequences. And in this case the possibility of robotic weapons being autonomous and self-owning has very different implications than service-oriented self-driving taxis, as a number of science fictions treatments of the attack of the robots envision. Combat robots are already regarded as persons by their fellow soldiers who name them, mourn their "deaths" and sometimes insist on giving them full military funerals (Guarini and Bello 2012; Singer 2009).

What Other Types of Objects Might Own Themselves and Other Objects?

Besides cars, weapons, and robots, what other sorts of objects might be susceptible to owning themselves and other objects? It seems feasible that other sorts of ambulatory or mobile things could achieve such autonomy. This would include planes, trains, ships, trucks, and, as Hearn (2013) envisioned, drone quad copters that could deliver objects in a number of environments. He speculated, for example, that if there is a group of people in a hot environment

where a cold drink would be really appreciated, quad copters could deliver a soft drink vending machine at the right place and time.

But although mobility and autonomy make us more likely to attribute agency to robots (Scheutz 2012), there is no reason that objects would have to be mobile in order to be autonomous and capable of agency and ownership. Gregory Maxwell, whom Mike Hearn credits with coming up with the concept of machine self-ownership, envisioned a computer cloud server as being capable of ordering more computers (its "children") as it approaches capacity. Such computer interaction through the Internet suggests that there might well be networks of different autonomous or semi-autonomous objects that interact with each other via what is now referred to as the Internet of Things (Rifkin2014). Suppose that a self-owning car transporting a passenger home sends a message to his or her refrigerator to begin to thaw dinner and deposit it in a cooking device a suitable length of time before the passenger arrives home. Home, for that matter, need not be a fixed abode if housing were to become shared or collaboratively consumed as with car-sharing or ride-sharing services like Zipcar, Uber, or Lyft, at least while the user is travelling away from a more permanent home. Something more like AirBnB or CouchSurfing would be a model in this case, except that the units would own themselves. Japan already has "love hotels" where the guest drives into a single car garage, inserts a credit card, and rents and enters a room, without ever seeing another human being. Moreover with the Internet of things, RFID (radio frequency identification), and geo-location it is quite possible that autonomous objects will know when and where other objects can be found. And what one connected device knows, could potentially be shared with any and all devices. Sharing may be difficult to cultivate among humans (Belk 2010), but there are likely to be fewer reservations with information-sharing among non-competing machines. Even without ownership, short-term

rental of resources can conceivably facilitate supply chain arrangements by conducting most of the transactions currently done by humans, but with greater efficiency and lower costs. There are considerable implications of such arrangements for the human labor market (e.g., Freeman 2014), but that is not my focus here.

Since, as we have seen, the corporation is a fictive person, rather than rely on a board of directors, it too might become autonomous, almost regardless of the type of products or services it provides. We see fanciful prototypes in many Disney animations such as *Toy Story*, *The Brave Little Toaster*, *Cars*, and *Planes*, as well as many anthropomorphized tales of dolls, puppets, furniture, and stuffed animals coming alive and pursuing active lives and adventures of their own (e.g., Honeyman 2006; Kuznets 1994; Sammond 2005). Along with utopic as well as dystopic science fiction portrayals of robots and our long standing fascination with human-like automatons and more recent anthropomorphic brand mascots (Brown 2014), we seem to be enchanted by such representations of autonomous objects. This is perhaps the reason that at least some of us are coming to embrace the forecast movement of robots from the industrial assembly line into the home.

Sentience and What Robots Want

Sentience involves feeling rather than thinking. It begins with the senses and adds subjective emotions. A sentient robot or other machine moves beyond sensation to perception. A sentient robot would also be self-aware, conscious, and able to learn. It would be able to experience pleasure and pain (Anderson 2011). Jeremy Bentham (1799) pointed out that reason and communication are less important to determining the moral standing of an entity than sentience:

> What…should [draw] the insuperable line? Is it the faculty of reason, or perhaps the faculty of discourse? But a full-grown horse or dog is beyond comparison a more rational, as well as more conversable animal, than an infant of a day or even a month old. But suppose they were otherwise, what would it avail? The question is not, Can they reason? Nor Can they talk? But Can they suffer? (quoted in Anderson 2011, 288).

Even self-consciousness, which Kant suggested as a requirement for moral standing, would disqualify the infant from having moral standing. But assuming that robots can be sentient and able to suffer and enjoy, there is still a question of motivation. Can robots desire?

Ziff (1959) concluded that it is ridiculous to assume that a robot could care about something or want anything. He assumed that robots could not be sentient creatures and that they could only act according to the programming of those who created them. Yet, as McDermott (2011) observes, science fiction has no trouble depicting robots turning against their human operators out of fear that these humans will turn them off. And readers and viewers have no trouble accepting such motivations. But would robots really have a self-preservation drive?

Omohundro (2008) argues that in addition to any narrow goals (e.g., win at chess, answer all questions accurately) that have been programmed into them, advanced AI robots will have at least four more basic goals or drives: self-protection, acquisition of resources, efficient use of resources, and creativity. Such a robot would strive to avoid being shut down because this would block fulfilling its narrower goals (Barrat 2013). Unless carefully contained, such a drive could involve killing humans in its efforts toward self-preservation. Similarly, the goal of resource acquisition could lead to dire consequences:

> Unless we very carefully define what the proper ways of acquiring resources are, then a system will consider stealing them, committing fraud and breaking into banks as great

> ways to get resources. The systems will have a drive toward doing these things, unless we explicitly build in [a respect for human] property rights (Omohundro 2007).

He suggests however that robots could instead be programmed to be altruistic, but that all of this requires some clever anticipation because robots may be thinking in a timeline measured in hundreds of years rather than the more limited timeframe of humans.

Sentience causing action in a robot involves liking something and desiring to pursue and achieve it. It can emerge out of AI, but is often thought to require something more -- emotions or a certain "spark" of originality and discernment. It also requires a second-order desire or wanting to want a thing, experience, or outcome, and feeling unsatisfied when it is not being pursued or achieved. McDermott (2011) illustrates:

> Imagine a super-Roomba that was accidentally removed from the building it was supposed to clean and then discovered that it had a passion for abstract-expressionist art. It still seeks places to dock and recharge but believes that merely seeking electricity and otherwise sitting idle is unsatisfying when there are abstract expressionist works to be found and appreciated (105).

If the super-Roomba were a machine that owned itself and perhaps other machines, it is easy to imagine other second-order desires involving owning more things or out-competing other devices in its inventoryof possessions or accumulation of profits or other goals that, as a sentient device, it might set for itself and find rewarding.

If a humble vacuuming device seems unlikely to become a real estate, taxi, or stock market tycoon, we should remember the potential connectivity of the forecast Internet of Things where our devices communicate with each other as well as draw on the power of the Internet generally. Online shopping, banking, and ticket acquisition show the human potential for

commanding resources from a simple terminal or computer chip at near instantaneous speed. Robots could do all this online without the shopping and pondering that slows us humans.

Hopes and Fears

Hopes. Based on an analysis of nearly 1000 science fiction films, Chris Barsanti (2014) argues that "because robots are anthropomporphized, we see them as either these saviors and friends—or as villains here to kill us" (Steinberg 2015). On the friendly side, even without sentience robots hold promise as care-givers. More than 25 years ago the Japanese government realized that there would not be enough young people to care for its growing older population. Rather than outsource their care to foreigners, they decided to build robots. One example is Paro, a therapeutic furry robotic seal that responds to caresses, makes eye contact, and has states of "mind" depending on how it is treated (Turkle 2011a, b). People in nursing homes where Paro has been placed also respond to Paro, talk to it, and talk about it to others. What seems to matter most is not so much artificial intelligence as what can be perceived as robot caring feelings and empathy. Such robots are "human enough" to serve as effective therapeutic surrogates for human care-givers.

Sony introduced the robotic dog Aibo in 1999 and sold approximately 150,000 of them at prices ranging from $600 to over $2000. But the company recently announced that it would discontinue its maintenance services for Aibo, to the great dismay of many owners who interact with the robotic dog daily as well as name it, clothe it, and encourage it to interact with others' Aibos (Mochizuki and Pfanner 2015). Owners have formed support groups and independent repair shops to help take care of the remaining Aibos. They also get together with other owners so the robotic dogs can "play" with each other. The thought of their Aibos dying is no less traumatic than euthanizing a living pet dog. These and other humanoid robots in Japan are seen

less as possessions and more as family members (Shaw-Garlock 2009). Like Paro, cuteness and neo-natal features in Aibo and other therapeutic robots also seem useful in creating a positive human responses to such creatures (Marovich 2014; Robson 2014). Clearly Paro and Aibo are unlikely to ever turn on humans. In fact Anderson (2011) argues that because of their programming, robots are more likely to consistently behave in an ethical manner than most humans.

Fears. Opposing such friendly robot accounts are more fearful accounts of robots harming us. It doesn't require machine sentience or even super-intelligence for machines to do harm to humans. For example, program bugs in stock market trading software have lost hundreds of millions of dollars in minutes (Marcus 2014). Lives could be lost due to programming glitches in self-driving cars, military robotic weapons, or digital doctors who prescribe treatments. Although Microsoft's Research Chief, Eric Horvitz, reassured the scientific community that ongoing work on artificial intelligence at the company poses no threat to humanity, Elon Musk, the CEO of the electric car company Tesla and the rocket company SpaceX has suggested that AI is the greatest "existential threat" that humankind faces (Lewis 2015). Likewise Microsoft founder Bill Gates has said he fears that AI could grow too strong for people to control (Rawlinson 2015). And Stephen Hawking said that:

> According to Moore's Law, computers double their speed and memory capacity every 18 months. The risk is that computers develop intelligence and take over. Humans, who are limited by slow biological evolution, couldn't compete, and would be superseded (Dingman 2014).

Also relying on Moore's Law, Bekey (2005) and Barrat (2013) suggest that robots whose intelligence surpasses that of humans would have unknown consequences and could be

dangerous to humanity. Kurzweil (1999) predicted that by 2030 machines will believably claim to be conscious and intellectually superior to humans. At that point ("the singularity") it is not at all clear that they would continue to obey their human creators.

There is perhaps a sort of anthropomorphism behind such projections. Rather than simply projecting life onto future robots, we project human traits such as greed and aggressiveness onto them, perhaps with good reason. We have only to contemplate the remote deaths brought about by drone aircraft to see the destructive potential of robotic machines. If there can be criminal humans, why not criminal machines? If machines can own themselves, perhaps there is a possibility that rather than us owning machines, machines could come to own or control an enslaved human population to serve them. In that case Pinocchio will have turned from puppet to puppeteer and we humans will have become the puppets.

Conclusions

Nourbakhsh (2013) specifies one vision of the future with autonomous machines and the questions it would raise:

> We have invented a new species, part material and part digital, that will eventually have superhuman qualities in both worlds at once, and the question that remains is, how will we share our world with these new creatures, and how will this new ecology change who we are and how we act (xv).

The presumptions here are that we humans are the ones in charge and that it is our world to share with the machines. The darker scenarios above suggest that it could be the machines that are in charge and that they are the ones who or which will decide what they will share with us. In either case, the latter questions of how superhuman machines will change our conceptions of who we are and how we behave remain. If we are what we possess (Belk 1988) and machines

own an increasing proportion of the world's resources, perhaps renting out resource access to us humans, the very way that we define ourselves and our humanity may need to change. Whether we would react with subservient acquiescence or confrontational rebellion in such a scenario is a matter of speculation.

In a more benign scenario either humans will have built in sufficient safeguards to remain in control of resources, including machines which would then serve us, or a happy compromise of mutual dependence would emerge as is now largely the case among diverse people of the world. In this scenario we might well define ourselves, at least in part, through the alter-ego of the humanoid robots that we own, just as we now do through our pets, avatars, and online personas (Belk 1988; 2013; Nishio, Wantanabe, Ogawa, and Ishiguru 2012). Taking this an extra step, Nourbakhsh (2013) envisions future humans as puppet-masters controlling one or more robots who act in our stead in different locations simultaneously. They would act as physical surrogates for us in the same way that virtual agents like Apple's Siri are beginning to do as online digital surrogates.

Importantly, this benign scenario is most likely if we regard humanoid robots as our property. If instead they are allowed to be owners of property, in granting them rights of property ownership we are also granting inalienable rights to control this property within the limits of the law. In other words, through Kant's theory of will, we would grant humanoid robots what would otherwise be called "human rights." Once they are recognized as agentic property owners rather than property, it would arguably be illegal and unethical to attempt to control them as if they were our slaves.

One of the fundamental principles of identity is that we own ourselves (Wikse 1977). It is based on this principle that we gain a sense of self as someone who possesses free will rather

than merely being controlled by outside forces. And to the extent that this principle applies to humans who own themselves, it ought also to apply to machines that own themselves and are autonomous decision makers. Thus, the seemingly innocent premise with which we began – Hearn's proposal for self-owning cars – is much more consequential than may have been initially supposed. A self-owning car, by this line of argument, may be said to be an individual decision-making self as well as a legal person. The legal, ethical, moral, and human consequences of decisions about machine ownership could have far-reaching implications for life and even human survival.

As noted at the outset of this article, we cannot presently know what the future holds regarding robotics -- technologically, socially, or legally. Wilder scenarios than those considered here have been envisioned both in science fiction and in the speculations of roboticists. For example, Nourbakhsh (2013), a professor of robotics at Carnegie Mellon University, envisions a future in which rather than trying to build durable robots from mechanical and electronic parts we instead attempt to roboticize the human body in an extension of current advanced prosthetic technologies and future nanobot technologies, harvesting recently dead bodies in the same way that we now harvest the organs of brain-dead patients. Based on this premise he then asks what would be the legal ramifications of robot motherhood. "Can the robot be a legal agent, even if purchased by a man expressly to carry and produce offspring, then act as a supernanny? What happens to the robot mother-child relationship if the father dies?" (Nourbakhsh 2013, 92). This suggests that we must consider the biologically based work on cyborgs and posthumans (e.g., Bensford and Malartre 2007; Clark 2005; Hales 1999; Warwick 2012). Benford and Malartre (2007) note the difficulty of applying Asimov's Three Laws of Robotics in an age of cyborgs: "Robots ordering other robots must not override human commands. But with the advent of

cyborgs, how is a robot to know a true human?" (169). Cyborgs and posthumans raise a host of other ethical, legal, and social issues that will not be considered here.

Nourbakish (2013) speculates about an even more distant future of transferring or duplicating consciousness and thoughts from one body to another body or another vessel and asks:

> If mind duplication were possible, suffice it to say that even greater threats to the concepts of identity and accountability, not to mention human rights, property rights, and suffrage, would undermine any system of societal law in place today (107).

The legal and ethical issues are complex enough within the currently feasible scenario of machines owning themselves and other machines. It is time to start worrying about such issues immediately. If we can develop farsighted workable solutions to the issues raised by machine ownership today, we may have a foundation for tackling such more difficult issues tomorrow.

Reference

Aigrain, Phiippe (2012), *Sharing: Culture and the Economy in the Internet Age*, Amsterdam: Amsterdam University Press.

Anderson, Susan (2011), "The Unacceptability of Asimov's Three Laws of Robotics as a Basis for Machine Ethics," in Michael Anderson and Susan Leigh Anderson, ed., *Machine Ethics*, Cambridge: Cambridge University Press, 285-96.

Asimov, Isaac (1950/1991), *I, Robot*, New York: Spectra.

Asimov, Isaac (1976/1984), "The Bicentennial Man," in Isaac Asimov, Patricia Warrick, and Martin Greenberg, ed., *Machines that Think: The Best of Science Fiction Stories about Robots and Computers*, New York: Holt, Rinehart, and Winston.

Bardhi, Fleura and Giana Eckhardt (2012), "Access Based Consumption: The Case of Car Sharing," *Journal of Consumer Research*, 39, 881–98.

Barrat, James (2013), *Our Final Invention: Artificial Intelligence and the End of the Human Era*, New York: Thomas Dunne.

Barsanti, Chris (2014), *The Sci-Fi Movie Guide: The Universe of Film from Alien to Zardoz*, Canton, MI: Visible Ink Press.

Bekey, George (2005), *Autonomous Robots: From Biological Inspiration to Implementation and Control*, Cambridge, MA: MIT Press.

Belk, Russell (2010), "Sharing," *Journal of Consumer Research*, 36, 5, (February), 2010, 715-734.

Belk, Russell (2007), "Why Not Share Rather than Own?" *Annals of the American Academy of Political and Social Science*, 611 (May), 2007, 126-140.

Belk, Russell (2013), "Extended Self in a Digital World," *Journal of Consumer Research*, 40 (October), 477-500

Belk, Russell (2014), "You are What You can Access: Sharing and Collaborative Consumption Online," *Journal of Business Research*, 67 (8). 1595-1600.

Benford, Gregory and Elisabeth Malartre (2007), *Beyond Human: Living with Robots and Cyborgs*, New York: Tom Doherty Associates.

Bennett, Jane (2010), *Vibrant Matter: A Political Ecology of Things*, Durham, NC: Duke University Press.

Bentham, Jeremy (1799), *An Introduction to the Principles of Morals and Legislation*, chapter 17, Oxford: Clarendon Press.

Bogost, Ian (2012), *Alien Phenomenology, or What It's like to be a Thing*, Minneapolis, MN:

University of Minnesota Press.

Botsman, Rachel and Roo Rogers (2010), *What's Mine is Yours: The Rise of Collaborative Consumption*, New York: Harper Collins.

Brown, Bill (2004), "Thing Theory," in Bill Brown, ed., *Things*, Chicago: University of Chicago Press, 1-16.

Brown Stephen and Sharon Posonby-McCabe, eds. (2014), *Brand Mascots and Other Marketing Animals*, London: Routledge.

Brynjolfsson, Erik and Andrew McAffee (2014), *The Second Machine Age: Work, Progress, and Prosperity in a Time of Brilliant Technologies*, New York: W. W. Norton.

Bryson, Joanna J. (2010), "Robots Should be Slaves," in Yorick Wilks, ed., *Close Engagements with Artificial Companions: Key Social, Psychological, Ethical and Design Issues*, Amsterdam: John Benjamins, 63–74.

Callon, Michel (1986), "Some Elements of a Sociology of Translation: Domestication of the Scallops and the Fishermen of St Brieuc Bay," in John Law, ed., *Power, Action and Belief: A New Sociology of Knowledge*, London: Routledge and Kegan Paul, 196-229.

Calverly, David (2011), "Legal Rights for Machines Some Fundamental Concepts," in Michael Anderson and Susan Leigh Anderson, ed., *Machine Ethics*, Cambridge: Cambridge University Press, 213-27.

Clark, Andy (2003), *Natural Born Cyborgs: Minds, Technologies, and the Future of Human Intelligence*, Oxford: Oxford University Press.

Colatrella, Carol (2012), "Science Fiction in the Information Age," *American Literary History*, 11 (3), 554-65.

DeLanda, Manuel (2006), *A New Philosophy of Society*, London: Bloomsbury.

Deluze, Gilles and Felix Guattari (1987), *A Thousand Plateaus*, Minneapolis: University of Minnesota Press.

Dingman, Shane (2014), "Even Stephen Hawking Fears the Rise of Machines," *The Globe and Mail*, December 2, online edition, http://license.icopyright.net/user/view/FreeUse.act?fuid=MTkwMDg1OTA%3D, last accessed March 24, 2015.

Freeman, Richard B. (2014), "Who Owns Robots Rules the World: Workers can Benefit from Technology that Substitutes Robots or other Machines for their Work by Owning Part of the Capital that Replaces them," *IZA World of Work*, http://www.sole-jole.org/Freeman.pdf, last accessed March 27, 2015.

Gansky Lisa (2010), *The Mesh: Why the Future of Business is Sharing*, New York: Portfolio.

Gell, Alfred (1998), *Art and Agency: An Anthropological Theory*, Oxford: Clarendon.

Grassmuck, Volker (2012), "The Sharing Turn: Why We are Generally Nice and Have a Good Chance to Cooperate Our Way out of the Mess We Have Gotten Ourselves Into," in Wolfgang Sützl, Felix Stalder, Ronald Maier, and Theo Hug, eds., *Cultures and Ethics of Sharing*, Innsbruck, Austria: Innsbruck University Press, 17-34.

Grau, Christopher (2011), "There is no 'I' in 'Robot': Robots and Utilitarianism," in Michael Anderson and Susan Leigh Anderson, ed., *Machine Ethics*, Cambridge: Cambridge University Press, 451-63.

Guarini, Marcello and Paul Bello (2012), "Robotic Warfare: Some Challenges in Moving from Noncivilian to Civilian," in Patrick Lin, Keith Abney, and George Bekey, ed., *Robot Ethics: The Ethical and Social Implications of Robotics*, Cambridge, MA: MIT Press, 129-44.

Harman, Graham (2009), *Prince of Networks: Bruno Latour and Metaphysics*, Melbourne: Re.Press.

Hayles, N. Katherine (1999), *How We Became Posthuman: Virtual Bodies in Cybernetics, Literature, and Informatics*. Chicago: University of Chicago Press.

Hearn, Mike (2013), "Mike Hearn, Bitcoin Developer – Turing Festival 2013," Turing, Edinburgh International Technology Festival, https://www.youtube.com/watch?v=Pu4PAMFPo5Y, last accessed March 28, 2015.

Hodder, Ian (2012), *Entangled: An Archaeology of the Relationships between Humans and Things*, Malden, MA: Wiley-Blackwell.

Honeyman, Susan (2006), "Manufactured Agency and the Playthings Who Dream It for Us," *Children's Literature Association Quarterly*, 31 (2), 109-31.

Kelion, Leo (2015), "Could Driverless Cars Own Themselves," *BBC News, Technology*, February 15, 2015, online edition, http://www.bbc.com/news/technology-30998361, last accessed March 12, 2015.

Kelley, Richard Enrique Schaerer, Micaela Gomez, and Monica Nicolescu (2010)," Liability in Robotics: An International Perspective on Robots as Animals," *Advanced Robotics*, 24 (13), 1861-71.

Knappett, Carl (2008), "The Neglected Networks of Material Agency: Artefacts, Pictures and Texts," in Carl Knappett and Lambros Malafouris, ed., *Material Agency: Toward a Non-Anthropocentric Approach*, New York: Springer, 139-56.

Kurzweil, Raymond (1999), *The Age of Spiritual Machines*, New York: Viking.

Kuznets, Lois R. (1994), *When Toys Come Alive*, New Haven, CT: Yale University Press.

Lanier, Clinton, Scott Rader, and Aubrey Fowler (2013), "Anthropomorphism, Marketing

Relationships, and Consumption Worth in the *Toy Story Trilogy*," *Journal of Marketing Management*, 29 (1-2), 26-47.

Latour, Bruno (1987), *Science in Action: How to Follow Scientists and Engineers through Society*, Cambridge, MA: Harvard University Press.

Latour, Bruno (2005), *Reassembling the Social: An Introduction to Actor-Network-Theory*, Oxford: Oxford University Press.

Law, John (1999), "After ANT: Complexity, Naming, and Topology," in John Law and John Hassard, ed., *Actor Network Theory and After*, Oxford: Wiley-Blackwell, 1-14.

Layser, Anthony (2010), "Roxxxy TrueCompanion: World's First Sex Robot?" *Assylum.com*, January 12, https://www.youtube.com/watch?v=2MeQcI77dTQ, last accessed March 26, 2015).

Levy, David (2007), *Love + Sex with Robots: The Evolution of Human-Robot Relationships*, New York: Harper Perennial.

Lewis, Colin (1015), "AI will not Kill Us, Says Microsoft Research Chief," *BBC News*. January 28, online edition, https://www.youtube.com/watch?v=VuFe8uIZbBU, last accessed March 24, 2015.

Linden, David (2015), "The Future of Virtual Sex," *Wall Street Journal*, online edition, February 13, http:www.wsj.com/articles/the-future-of-virtual-sex-1423845474, last accessed March 16, 2015.

Lokhorst, Gert-Jan and Jeroen ven den Hoven (2012), "Responsibility for Military Robots," in Patrick Lin, Keith Abney, and George Bekey, ed., *Robot Ethics: The Ethical and Social Implications of Robotics*, Cambridge, MA: MIT Press, 145-156.

Marcus, Gary (2014), "Artificial Intelligence Isn't a threat—Yet," *Wall Street Journal*,

December 11, online edition, http://www.wsj.com/articles/artificial-intelligence-isnt-a-threeatyet-1418328453, last accessed March 24, 2015.

Marovich, Beatrice (2014), "The Powerful Authority of Cute Animals," *The Atlantic*, May 14, online edition, http://www.google.ca/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&ved=0CB0QFjAA&url=http%3A%2F%2Fwww.theatlantic.com%2Ftechnology%2Farchive%2F2014%2F05%2Fthe-beckoning-cat%2F362108%2F&ei=51ARVfHPI4T2yQTeq4HACA&usg=AFQjCNHYHP-FPVSxVjlD7_OtRdHE5q_uxg&sig2=fFhkFeVvdOaQLvIWj012LA&bvm=bv.89184060,d.aWw, last accessed March 24, 2015.

Massimo, Riva (2012), "Beyond the Mechanical Body: Digital Pinocchio," in Katia, Pizzi, ed., *Pinocchio, Puppets and Modernity: The Mechanical Body*, New York: Routledge, 201-14.

Masum, Hassan and Mark Tovey, ed. (2011), *The Reputation Society: How Online Opinions are Reshaping the Offline World*, Cambridge, MA: MIT Press, 175-84.

McDermott, Drew (2011), "What Matters to a Machine?" in Michael Anderson and Susan Leigh Anderson, ed., *Machine Ethics*, Cambridge: Cambridge University Press, 88-114.

Mochizuki, Takashi and Eric Pfanner (2015), "In Japan, Dog Owners Feel Abandoned as Sony Stops Supporting 'Aibo'," *Wall Street Journal*, February 11, online edition, http://www.wsj.com/articles/in-japan-dog-owners-feel-abandoned-as-sony-stops-supporting-aibo-1423609536, last accessed March 24, 2015,

Nishio, Shuishi, Tesuya Wantanabe, Kohei Ogawa, and Hiroshi Ishiguru (2012), "Body Ownership Transfer to Teleoperated Android Robot," in Shuzhi Sam Ge, Oussama

Khatib, John-John Cabibihan, Reid G. Simmons, Mary-Anne Williams, ed., *Fourth International Conference on Social Robotics*, Berlin: Springer Verlag, 398-407.

Nourbakhsh, Illah (2013), *Robot Futures*, Cambridge, MA: MIT Press.

Omohundro, Stephen (2007), "Foresight Vision Talk: Self-Improving AI and Designing 2030," http://selfawaresystems.com/2007/11/30/foresight-vision-talk-self-improving-ai-and-designing-2030/, last accessed March 30, 2015.

Omohundro, Stephen (2008), "The Basic AI Drives," https://selfawaresystems.files.wordpress.com/2008/01/ai.drives.final.pdf, last accessed March 30, 2015.

Peterson, Steve (2012), "Designing People to Serve," in Patrick Lin, Keith Abney, and George Bekey, ed., *Robot Ethics: The Ethical and Social Implications of Robotics*, Cambridge, MA: MIT Press, 283-98.

Polyani, Karl (1944), *The Great Transformation*, Boston: Beacon Press.

Rawlinson, Kevin (2015), "Microsoft's Bill Gates Insists AI is a Threat," *BBC News*, January 29, online edition, http://www.bbc.com/news/31047780?print=true, last accessed March 24, 2015.

Rifkin, Jeremy (2015), *The Zero Marginal Cost Society: The Internet of Things, The Collaborative Commons, and the Eclipse of Capitalism*, New York: Palgrave Macmillan.

Robson, David (2014), "The Rise of Human-Like Robots, Cars and Drones," *BBC News*, October 29, http://www.bbc.com/future/story/20141029-do-we-want-human-like-machines, last accessed March 25, 2015.

Rorty, Amélie (1976), "A Literary Postscript: Characters, Persons, Selves, Individuals," in Amélie Rorty, ed., *The Identities of Persons*, Berkeley, CA: University of California

Press, 301-323.

Sammond, Nicholas (2005), *Babes in Tomorrowland: Walt Disney and the Making of the American Child, 1930-1960*, Durham, NC: Duke University Press.

Scheutz, Matthias (2012), "The Inherent Dangers of Unidirectional Emotional Bonds between Humans and Social Robots," in Patrick Lin, Keith Abney, and George Bekey, ed., *Robot Ethics: The Ethical and Social Implications of Robotics*, Cambridge, MA: MIT Press, 205-22.

Shaw-Garlock, Glenda (2009), "Looking Forward to Sociable Robots," *International Journal of Social Robotics*, 1, 249-60.

Short, Sue (2003), "The Measure of a Man?: Asimov's Bicentennial Man, Star Trek's Data, and Being Human," *Extrapolation*, 44 (2), 209-23,

Singer, P. W. (2009), "Military Robots and the Laws of War," *The New Atlantis*, online edition, http://www.thenewatlantis.com/publications/military-robots-and-the-laws-of-war, last accessed March 27, 2015.

Solove, Daniel J. (2007), *The Future of Reputation: Gossip, Rumor, and Privacy on the Internet*, New Haven, CT: Yale University Press.

Steinberg, Don (2015), "Invasion of the Friendly Movie Robots," *Wall Street Journal*, February 25, online edition, http://www.wsj.com/articles/invasion-of-the-friendly-movie-robots-1424976398, last accessed March 23, 2015.

Thorndike, Lynn (1958), *A History of Magic and Experimental Science during the First Thirteen Centuries*, Vol. 1, New York: Columbia University Press.

Turkle, Sherry (2011a), "Authenticity in the Age of Digital Companions," in Michael Anderson and Susan Leigh Anderson, ed., *Machine Ethics*, Cambridge: Cambridge University

Press, 62-76.

Turkle, Sherry (2011b), *Alone Together: Why We Expect More from Technology and Less from Each Other*, New York: Basic Books.

Verbeek, Peter-Paul (2000/2005), *What Things Do: Philosophical Reflections on Technology, Agency, and Design*, Robert Crease, trans., University Park, PA: Pennsylvania State University Press.

Warwick, Kevin (2012), "Robots with Biological Brains," Scheutz, Matthias (2012), in Patrick Lin, Keith Abney, and George Bekey, ed., *Robot Ethics: The Ethical and Social Implications of Robotics*, Cambridge, MA: MIT Press, 317-32.

Whitby, Blay (2012), "Do You Want a Robot Lover? The Ethics of Caring Technologies," in Patrick Lin, Keith Abney, and George Bekey, ed., *Robot Ethics: The Ethical and Social Implications of Robotics*, Cambridge, MA: MIT Press, 233-48.

Wikse, John R. (1977), *About Possession: The Self as Private Property*, University Park, PA: Pennsylvania State University Press.

Widlock, Thomas (2004), "Sharing by Default: Outline of an Anthropology of Virtue," *Anthropological Theory*, 4 (1), 53-70.

Woodburn, James (1998), "'Sharing is not a form of Exchange': An Analysis of Property-Sharing in Immediate-Return Hunter-Gather Societies," in C. M. Hann, ed., *Property Relations: Renewing the Anthropological Tradition*, Cambridge: Cambridge University Press, 48-63.

Yeoman, Ian and Michelle Mars (2015), "Robots, Men and Sex Tourism," *Futures*, 44 (4), 365-71.

Ziff, Paul (1959), "The Feelings of Robots," *Analysis*, 19 (3), 64-8.