MEET KISMET:

A ROBOT WITH A PERSONALITY

Military Applications of AI

AI on the Operating Table

Meet Your Robotic Housekeeper

Will Robo-Criminals Have Rights?

Will Robots Eliminate Us?

The Rights of Robots

Sohail Inayatullah looks to the courtrooms of the future where robotic attorneys represent a robotic plaintiff and defendant in front of a robotic judge.

Traditionally robots have been construed as inanimate, or dead. However, an argument can be made that, with advances in artificial intelligence (AI), robots will one day be considered "alive". After all, AI constructs can already:

- imitate the behavior of any other machine;
- exhibit curiosity by investigating their environment;
- display self-recognition (i.e. react to the sight of themselves);
- recognise members of their own machine species;
- learn from their own mistakes;
- be as "creative" and "purposive" as humans, even to the extent of looking for purposes they can fulfil;
- reproduce themselves much like biological evolution, with random changes of elements having the same effect as mutations in living species; and
- have an unbounded lifespan through self-repairing mechanisms.

As long ago as 1971 Rorvick wrote that "a generation of robots is rapidly evolving, a breed that can see, read, talk, learn, and even feel [emotions]." Even Weizenbaum (1976), a harsh critic of AI, admitted that computers are sufficiently "complex and autonomous" to be called an "organism" with "self-consciousness" and an ability to be "socialised". He could see "no way to put a bound on the degree of intelligence such an organism could, at least in principle, attain", although from his critical vantage point, not in the "visible future".

While AI and robotics are relatively new innovations, if the growth in computing power continues at its present rate we can safely forecast that robots by the year 2100 – most likely sooner – will differ only in physical form from humans.

Robotic Crimes

In the very near future it is expected that computers will begin to design their own software programs. Indeed, one can make the argument that they already are. Anderson (1985) pointed out that, since "the Copyright Act limits copyright protection to the author's lifetime, which is clearly inappropriate for a computer, it would then seem that a change in the law may be needed to provide proper protection for programs with non-human authors".

We will no doubt see an avalanche of cases: robots that have killed humans; robots that have been killed by humans; robots that have stolen state secrets; robots that have been stolen; robots that have taken hostages; robots that have been held hostage; robots that carry illegal drugs across borders; and robots that illegally cross national borders.

Robots that cause damage or break other human laws will raise various complex issues. At present, robot damage will simply be a tort case, much like if your car was damaged. But an attorney will one day surely argue that the robot has priceless worth. It is not a car. It talks, it is loved and it "loves". The robot, then, has been injured, its program and wires damaged. In this scenario we will need to have special tort laws for robots.

The legal system is today unprepared for the development of robotic crimes. In 1985 the *Morbidity and Mortality Weekly Report* recorded the first death caused by a robot. This accident occurred when a machinist at a Michigan company entered a robot's work envelope. Apparently not programmed to take human frailty into account, the robot used its arm to pin the man to a safety pole, killing him with the force. This case is considered an industrial accident and could have possibly been avoided if the robot had an improved sense of sight and more careful programming.

Once robots (and all sorts of artilects) begin to program themselves according to external stimuli, they may begin to commit crimes completely independent of earlier human programming. If a robot can commit a crime then a number of problematic questions will arise. Can a robot intend to commit a crime? How is a robot to be punished? Is it sufficient to reprogram it? To take it apart? To penalise its owner, designer, manufacturer or programmer?

Such questions also raise problems in criminal trials that involve robots. Many court procedures will need to be adapted to accommodate the needs of such cases. This situation will be exacerbated by the development of robots that serve as witnesses for robots or provide expert testimony.

To understand the legal principles that can be applied to robots we must first have an understanding of the emerging electronic judiciary.

Artificial Intelligence

The Electronic Judiciary

In the next 50 years courts themselves may be run by robots. Judges are faced with a rapidly expanding case-load where they must analyse legal documents, settle plea bargains, determine sentences, keep abreast of social, economic and political issues as well as act as court administrators. Furthermore, as the courts continue to act as political and social decision-makers, judges must cope with complex scientific and technological issues. As Bazelon (1981) noted, "judges have little or no training or background to understand and resolve problems of nuclear physics, toxicology, hydrology, biotechnology or a myriad of other specialties". Computer technology should be incorporated into the judicial process to aid in decision-making.

The first step will be judges using computers to search for the most appropriate precedent to fit the present case. The development of a legal reasoning robot could serve as a valuable adjunct to a judge's ability to render fair decisions. As a logic-oriented companion and massive knowledge bank with the ability to instantly recall legal facts, precedents and procedures, a web-based legal robot would greatly assist the judicial system by speeding up court procedures, minimising appeals based on court error, and preventing legal manoeuvring, resulting in fewer cases brought to court.

Eventually, as enough statistics are compiled, judges may not be that necessary, except at the appellate level. Judges could then be free to pursue vigorously the legal and philosophical dimensions of social problems. Of course, humans would be necessary during the pre-trial phase. Attorneys would enter the facts into computers and a motions judge could monitor discovery and fact-finding. Computers would then decide the case outcome.

As most cases are settled out of court we will see the continued development and sophistication of negotiation and mediation programs. Those in dispute would enter their side of the problem, the computer–robot would interact with each side and aid in reaching a settlement.

Computers might inspire trust as they can instantaneously and anonymously provide relevant precedents to both parties, and they can inform the parties how the case might be settled (in terms of probabilities) if they went to trial or if they settled.

In addition, AI programs, as we are seeing in computerised psychotherapy, allow individuals to relax and "open up". Besides being impressed by the intelligence of robotic judges, we might gain trust in the machines because of the authority they command, leading to an increased belief in the fairness of the judiciary.

Of course, fairness is not a given; it is a political issue. Law, unlike mathematics, is laden with assumptions and biases. Decision-making is an act of power. Initially the use of computers will shift power in the court system from judges to programmers. If judges allow AI to enter their courtroom they will do their best to keep control of the law and programmers.

However, given the anticipated development of robotics, eventually we may see computers changing the programming and developing novel solutions to cases. If computers can develop creativity then judges and other experts will have to find new roles and purposes for themselves.

It may seem ludicrous now, but one day robotic attorneys may negotiate or argue in front of a robotic judge with a robotic plaintiff and defendant.

Legal Principles

To understand in more concrete terms the legal future of robots, we must understand what legal principles will be applied to conflicts that involve robots. Lehman-Wilzig's (1981) article on the legal definition of artificial intelligence is extremely useful. He presents various legal principles that may be of relevance to robot cases, including product liability, dangerous animals, slavery, diminished capacity and agency.

Product liability would be applied as long as robots are believed to be complex machines. Product liability will be especially problematic for AI because of the present dis-


Legal Advice on the Web

The Australasian Legal Information Institute (AustLII) makes legislation and court rulings available over the Internet. However, they are about to take a step into a much more advanced form of IT, making a legal predictor available in cyberspace.

AustLII's "intelligent" resource will provide inferencing tools to enable lawyers, academics and organisations to determine whether certain actions are within the privacy and copyright laws. The AustLII Inferencing Development Environment (Aide) is rule-based rather than case-based and allows the user to test the legal implications of a particular scenario.

If successful Aide may be extended to other areas of the law, but it is not suited to fields where judicial discretion is common, such as family law. Its makers claim, however, that it "can quickly clear up questions relating to vast and complex legislation, helping to pinpoint problem areas and assisting with planning".

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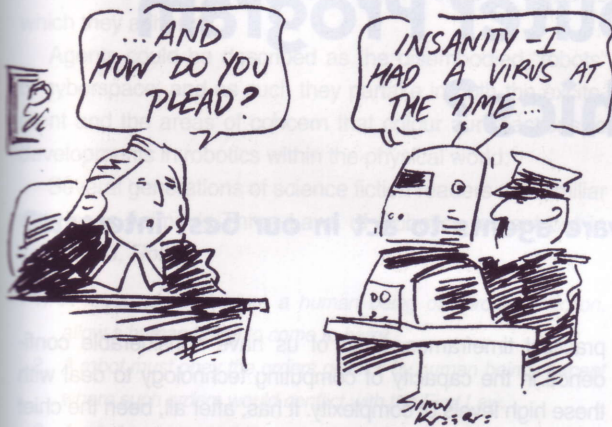
tinction between hardware and software. Who is responsible for the robot that kills: the manufacturer of its arms, the software designer, the owner, or is there no liability? Will we see no-fault computer insurance law?

The danger that robots may cause would logically increase once they can move. At this stage the law relating to dangerous animals may be applicable to robots. Like animals, they move and give a sense of intelligence, although whether they actually are intelligent is a political and philosophical question. Once they are seen as animals then the slippery slope to full rights will continue.

The next phase will that be of robots as slaves. In this case, a robot could not institute proceedings itself for damages that cause pain and suffering, since a slave has no such rights

Who, then, is responsible for the errant robot? Will a clever owner argue that the slave understood the intent of its actions? Will that then lead to the slave becoming responsible? What if the manufacturer is sued instead of the owner? Certainly, the manufacturer – liable in civil cases and potentially guilty of wrongdoing in criminal cases – would argue that the robot understands intent and can learn. If this line of argument succeeds, then the robot could pursue its own case. Most likely it will be neither owner or manufacturer but the software designer held responsible.

However, if the robot is held responsible, and not the owner, manufacturer or software designer, will punishment be through elimination? Who has the right to terminate the robot? It would not be surprising if right-to-life groups for robots arise in the 21st century.

The legal category of "diminished capacity" – whereby a robot is legally independent but does not understand the actions it is committing – is unlikely to stand given the likely intelligence of robots. A far more useful analogy is the whiz kid: high in brain power but low in wisdom.

More useful again, yet also ultimately problematic, is the law of agency. As Lehman-Wilzeg (1981) writes:

To begin with, the common law in some respects relates to the agent as a mere instrument. It is immaterial whether the agent himself has any legal capacity, for since he is a sort of tool for his principal he could be a slave, infant, or even insane... it is possible for one not sui juris [capable of taking legal responsibility for his acts] to exercise an agency power. Indeed, the terms automation and human machine have been used in rulings to describe the agent.

Nor must there be any formal acceptance of responsibility on the part of the agent... The only element required for authority to do acts or conduct transactions... is the communication by one person to another that the other is to act on his account and subject to his orders. Acceptance by the other is unnecessary. Thus, generally speaking, anyone can be an agent who is in fact capable of performing the functions involved. Here, then, is a legal category already tailor-made for such a historical novelty as the humanoid.

Eventually humans may see robots in their own right, not only as our mechanical slaves to buy and sell. Of course, at present the notion of robots with rights is unthinkable, whether one argues from an "everything is alive" Eastern perspective or the Western view that "only man is alive". Interestingly, Aboriginal leader Pat Dodson (1998) has no problem with granting rights to robots. He does, however, fairly assert that until others get their rights, robots should wait in turn.

Nevertheless I can imagine a day when a bold lawyer rewrites history and argues that a robot should be treated legally as a person. Or will it be the robot that argues for itself?

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