

Applications and Ethical Issues

CS 486/686: Introduction to Artificial Intelligence
Fall 2013

Example Applications

- Security Games
 - Limited security resources: Selective checking
 - Adversary monitors defenses, exploits patterns
- How do you assign limited resources to defend targets?

Example Applications



ARMOR
(LAX)



PROTECT

Example Applications

- Beyond Security
 - Scheduling ticket checking/collection on the LAX metro
 - Patrolling for poachers/illegal timber harvesters
 - ...

Wildfire Resource Management



Wildfire Resource Management



Advertising

- Targeted ad campaigns
 - Numerous AI techniques
 - naive Bayes
 - SVM
 - decision trees
 - NLP (including bag of words model, stemming)
 - graphical models (i.e. Bayes Nets)

Health Domain

- Machine learning for detection of fetal hypoxia during labour and delivery
 - Support vector machines
- Fall detection amongst the elderly
 - Decision trees
- Rehabilitation after strokes
 - MDPs/POMDPs
- Robotic exercise coaches

Other Domains

- Recommendation Systems
- Tutoring systems
- Biodiversity and conservation research
- Transportation scheduling
- Disaster management
- ...

Ethical Issues

- In this course we have looked at whether we **can** develop AI
 - We also need to consider whether we **should**
- All new technologies have unintended consequences
 - Is AI different than other fields?
 - “*We first shape the tools and thereafter our tools shape us*”, Marshall McLuhan (1964)

Service Robots



- PaPeRo
 - child-minding robot
 - video-game playing, conduct conversations, face recognition, determine if a child goes out of range,...
 - tests show that children like them (bond well with them)
 - But, should children be left in the care of a robot for longer periods of time?
 - Importance of human contact? Negligence?

Service Robots

- Relative increase in the number of elderly compared to younger caregivers
- Pros: allows the elderly to maintain independence
- Cons: reduction in human contact leading to isolation



Military Uses of AI

- DARPA and BAE (for example) are big funders of AI research
- Unmanned vehicles
- Robotic weapons
- Wars between machines?
- Human decision-making taken out of the loop?



Privacy Issues

- AI has the potential to mass-produce surveillance
 - The UK has a large network of surveillance cameras
 - Other countries monitor Web traffic and telephone calls (see recent news)
 - AI technology helps in the data processing/information gathering

Accountability Issues

- Medical systems
 - what if a doctor using a medical diagnostic system ends up making an incorrect diagnosis?
- Autonomous vehicles
 - who is at fault if an autonomous vehicle is in an accident (or is speeding)
- Monetary transactions
 - who is responsible if a trading agent misbehaves?

AI and the End of the Human Race!

- Any technology in the wrong hands can cause harm
 - but what if the “wrong hands” is the technology itself?
 - A lot of science fiction literature on this topic

The Matrix
Terminator
etc...



AI and the End of the Human Race!

- Any technology in the wrong hands can cause harm
 - but what if the “wrong hands” is the technology itself?
 - A lot of science fiction literature on this topic
- Where can things go horribly wrong?
 - Utility function specification
 - Ultraintelligent machines and the “intelligence explosion”

The Singularity

- Will this really be an issue?
 - Technological progress might be limited
 - Limits on computability and computational complexity
 - Note: some people embrace the idea of the singularity (eg. transhumanism and Ray Kurzweil)

The Singularity

- If the Singularity is coming then maybe we should design our current AI systems so that they will treat us well
 - eg. Asimov's Three Laws of Robotics
 - What is the right design? Should it evolve?

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- If the Singularity is coming then maybe we should design our current AI systems so that they will treat us well
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 - What is the right design? Should it evolve?
- If robots/AI systems are so intelligent then what rights should they have?