

# Artificial Intelligence in the World

Prof. Levy

Fromm Institute

Spring Session, 2017

# Lecture 3 agenda

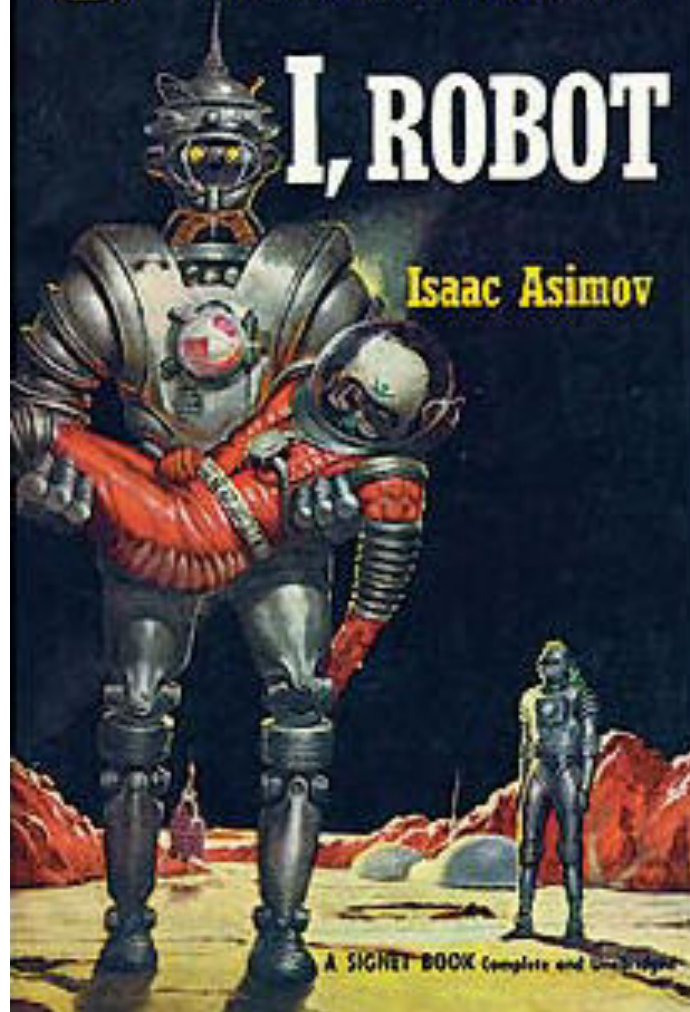
- **Robots** – laws, applications, technology, examples, impact
- **History of computing** – 1965 - 1980
- Key people in AI – **Andrew Ng**
- Review of key questions about AI – applied to **robots**

51202  
SIGHT  
BOOK

MAN-LIKE MACHINES RULE THE WORLD!  
Fascinating Tales of a Strange Tomorrow

# I, ROBOT

Isaac Asimov



A SIGHT BOOK Complete and Unabridged

# Asimov's Laws of Robotics (1942)

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

# Asimov's 0<sup>th</sup> Law

- A robot may not **harm humanity**, or, by inaction, allow humanity to come to harm.
- A robot may not **injure a human** being or, through inaction, allow a human being to come to harm.
- A robot must **obey the orders** given it by human beings except where such orders would conflict with the First Law.
- A robot must **protect its own existence** as long as such protection does not conflict with the First or Second Laws.
- (see Wikipedia)

# Technology needed for home robots

- Standard protocols for communication
  - WiFi, Internet (TCP/IP), Bluetooth
  - Communication with central **computer**
    - & with **other bots** in the home
  - Communication with bot in the **car**
  - Communication with **online** web services
- Voice communication bots (speech)
- Locomotion?

## Robots at home (1)

- **“Smart home”** central platform (computer)
  - **Nest** – thermostat, smoke & fire detector, ...
- **Alexa, Siri, Google, Cortana** in the home
  - Speech recognition, connected to Internet

## Robots at home (2)

- How do we establish **trust** with a home robot?
- AI/robot with “Artificial Emotion” (AE)
  - Voice tone, attitude, gestures that communicate **feelings**
- **Annoying robots**
  - Robocalls
  - Countermeasure: roboanswerer??



## Robots at home (3)

- **Annoying robots**
  - **Robocalls**
  - Countermeasure: roboanswerer??
- **AI in marketing** – marketing to your **home bot**
  - McKinsey exhibit: marketing to the smart home

# Some unusual robots in development (1)

- +**Cozmo** A palm-sized robot, from Anki in San Francisco
- +**BallBot** (Carnegie-Mellon University)
- +**Jackrabbot** (Stanford University)
- +**Soft Robot-Octopus** (Scuola Superiore Sant'Anna, Pisa, Italy)
- +**BERT2** – a humanoid/expressive robot
  - (University College London and the University of Bristol)

# Some unusual robots in development (2)

- ***Robot suit* / Jeff Bezos**

- <https://youtu.be/8NHwvbVyKi0>

- ***Erica* / Hiroshi Ishiguro**

- <https://www.youtube.com/watch?v=57Maw9Sn89w>
  - (1:45 – 4:30)(10:30 – 11:40)(13:30 to end)

## Some unusual robots in development (3)

- Robotic **cheetah** – Univ. of Twente (NL)
  - <https://www.utwente.nl/en/news/!/2017/4/21747/ut-researcher-creates-robotic-cheetah>
- Robots in **surveillance teams** – Cornell / ONR



## People of AI – Andrew Ng

- Andrew Ng is VP & Chief Scientist of **Baidu**;
- Co-Chairman and Co-Founder of **Coursera**;
- Adjunct Professor at **Stanford** University.
  - In 2011 he led the development of Stanford University's main **MOOC** (Massive Open Online Courses) platform
  - taught an online Machine Learning class that was offered to over 100,000 students, leading to the founding of Coursera.



## Andrew Ng current work

- Ng works on **machine learning** with an emphasis on **deep learning**.
- He founded and led the “Google Brain” project which developed massive-scale deep learning algorithms. This resulted in the famous “**Google cat**” result, in which a massive neural network with 1 billion parameters learned from unlabeled YouTube videos to **detect cats**.
- He continues to work on deep learning and its applications to **computer vision and speech**, including such applications as **autonomous driving**.



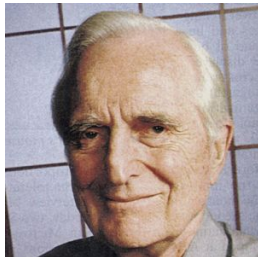
## Andrew Ng on AI

- What does Andrew Ng think about Deep Learning?
- When will self-driving cars be available to consumers?
- Andrew Ng blog on job displacement
- Is A.I. an existential threat to humanity?
- <http://www.andrewng.org/>

# History – from 1965 to 1980 (1)

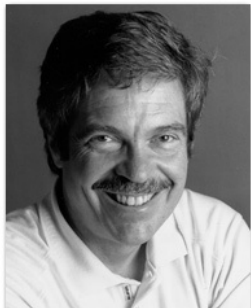


- 1965 – Ted Nelson – **hypertext**
- 1967 – **ARPANET** design begins (leads to Internet)



- 1968 – **Doug Engelbart** – “The Mother of all Demos”
  - *Mouse, Desktop, Pull-down menu, Hypertext*

- 1972 – Nolan Bushnell, Al Alcorn – **Pong** (Atari)



- 1973 – **Xerox PARC**
  - **Alto** Alan Kay –; **Ethernet** Bob Metcalfe





# History – from 1965 to 1980 (2)

- 1975 – hobby computers
  - **Altair**
  - **BASIC** programming language (Bill Gates & Paul Allen)
  - **Apple I** (Steve Jobs & Steve Wozniak)



- 1977 – first commercial PC – **Apple II**
- 1979 – **Steve Jobs** visits Xerox PARC, sees the Alto
  - which leads to Lisa/Macintosh
- 1980 – IBM commissions Microsoft to develop
  - an Operating System (PC-DOS) for the **IBM PC** (1981)

# Key questions

- **Is it AI or IA?**
  - Intelligence in a machine vs. Augmentation for a human
- **What is intelligence?**
  - In machines
  - Reading & writing as distinguishing characteristics?
- **What is consciousness?**
  - Can a machine ever become conscious?
- **Fictional view?**
  - SciFi – uploading my consciousness/personality into a machine
  - SciFi – creating a synthetic world for my consciousness
    - *The Matrix*