AI for Engineering Students
A Non-Technical Introduction

by Ahmed Abdelkader
Agenda

- What is AI?
- History of AI
- Famous Examples
- Main Problems
- Case Studies
What is AI?

- The science and engineering of making intelligent machines ~John McCarthy

- AI research is that which computing scientists do not know how to do cost-effectively today ~pragmatic definition

- **Synthetic Intelligence**
  - GOFAI: human-like intelligence in machines
  - Real vs simulated intelligence (aircrafts vs submarines)
History* of AI

1942:
- Three Laws of Robotics ~Isaac Asimov

1948:
- “You insist that there is something a machine cannot do. If you will tell me precisely what it is that a machine cannot do, then I can always make a machine which will do just that!” ~John von Neumann

1950:
- Turing Test ~Alan Turing
- Chess playing as search ~Claude Shannon

1956:
- The name AI is used for the first time ~John McCarthy
Agenda

- What is AI?
- History of AI
- Famous Examples
- Main Problems
- Case Studies
Turing Test

- Pass 5-minute conversations 30% of the time

- “AI researchers have devoted little attention to passing the Turing test”
  ~Russell, Norvig

- Chinese room argument

- CAPTCHA: Completely Automated Public Turing test to tell Computers and Humans Apart ~Reverse Test
Chess

- Mac Hack VI
  - Macro-assembly, 16K memory
  - 10 positions per second
  - First time a computer won a game in a human tournament (1967)

- Deep Blue vs Kasparov
  - 2 matches (96, 97)
  - *The most spectacular chess event in history*
Agenda

✔ What is AI?
✔ History of AI
✔ Famous Examples

• Main Problems
• Case Studies
Main Problems (Subfields)

- **AI winter**

- **1966: the failure of machine translation**
  - "the spirit is willing but the flesh is weak."
    - → "the vodka is good but the meat is rotten."
  - "out of sight, out of mind" → "blind idiot."

- **1974: Frustration with Speech Understanding**
  - respond to voice commands from a pilot
  - Recognize spoken English, but only if the words were spoken in a particular order
Main Problems (Subfields)

- Deduction, reasoning, problem solving
- Knowledge representation
- Planning
- Learning
- Natural language processing
- Perception
- Social intelligence
- General intelligence
Agenda

✔ What is AI?
✔ History of AI
✔ Famous Examples
✔ Main Problems

• Case Studies
Natural Language Processing

- **Cleverbot**
  - 1997, the number of conversations > 65 million
  - Turing Test at the 2011 Techniche festival
  - 59.3% human vs 63.3% for actual humans

- **Watson**
  - Open domain question answering: NLP + IR + KR + ML
  - 200 million pages of structured and unstructured
  - 4 Terabytes of disk << the full text of Wikipedia
  - 90 servers with a total of 2880 POWER7 processor cores (3.5 GHz) and 16 Terabytes of RAM

- **Siri**
Autonomous Cars
Thank You!

Questions?
Room Cleaning