Note: To best understand what Oggie's on about – which was extremely unorganised, it's best to read the lecture slides & read the lecture notes below.

For lecture 1 and 2, he mostly just criticises what's on the lecture slides – some good points, some not

AI Principles Lecture 1

Key Policy Points – Oggie loves when students challenge him. He will challenge the lecture slides as well. He thinks it's a great way of learning and understanding.

Topics in the module

- History and Philosophy of AI
- Machine Learning
- Search
- Automated Reasoning
- Bayesian Probabilistic Reasoning

Science is a human creation, so it's important to understand how things are they we they are.

Point on Search – Oggie does not think search is AI

- Because this is not 'intelligent' per se

Automated Reasoning

- There is no intelligence here, it's mechanical

Bayesian Probabilistic Reasoning

- Provides infrastructure for AI

Value of humans in AI

- AI is not very good at teaching at the moment
- But in the future, AI might be very good at teaching, not just learning

How amazing AI is

- Computer Go…
    - Oggie thinks this is bullshit

- Basics of some of the key technologies underlying it…

    - Monte Carlo Tree Search
    - Deep Learning

Robbin algebra = Boolean algebra needed to solve Sudoku

Oggie also thinks solving sudoku is not AI…

Good math but not AI…

- Nothing smart about the solution itself

For something to be intelligent, there should be a learning aspect! According to Oggie…

How human brains work vs Searching

- Intelligence shortens or doesn't do searching…

Automating mathematical solver

- Designing the search can be smart
- But search itself is not smart

What is amazing about AI?

- Not Sudoku, not automated math

This is more interesting though – IBM Watson AI wins Jeopardy

- Understanding human language
- This is different from learning mathematical language
    - Have to understand the question
    - Then also have to come with an intelligent answer

Natural language processing

Machine learning (this involves a learning process)

So intelligence has an element of learning!

- For example, English speaking kids knowing how to use ‘a’ and ‘the’
- They learn by examples…

Knowledge representation – riding a bicycle, imagination – how is this represented? How does brain represent this?

6-Player Poker

- This is not an achievement of AI according to Oggie…
- But Oggie finds this part interesting
    - “Brown and Sandholm developed a program, dubbed Pluribus, that learned how to play six-player no-limit Texas hold’em by playing against five copies of itself”
    - Again
        - THE LEARNING ELEMENT OGGIE LIKES!

The the key is to differentiate between

A dumb search vs actual learning

- Learning requires learning agents
- These agents learn from experience

Inspiring examples:

- Digital Pathology
    - Image of a tissue sample, for example
        - Learns where to look in a tissue sample
            - Knowledge representation
        - Beating human pathologists analysing human tissues
        - Detect patterns
            - Relevance
            - Irrelvance
                - Then learn which bits of tissues are particularly problematic
                    - Then makes diagnosis and prognosis
- Another example
    - Ancient coins
        - Understanding ancient coin images
            - Machine to describe the coin for me
                - To talk like an expert
                - Able to teach an AI agent
                    - AI agents were able to make inferences

- Just like how kids pick up on a language or languages
- An AI agent should be able to ‘pick-up’

Oggie's – Discovering hospital admission patterns using models learnt from electronic hospital records

- Able to predict the development of future disease of a particular individual based on that person's medical history
- This is AI!

Learning (intelligence) > Searching

Lecture 2

The Turning Test & Attacks on AI

History and philosophy of AI

- Human intelligence vs AI
    - Creativity?
    - Emotion?
    - Art?
- Oggie loves art…
    - Van Gogh and Monet

Can computers create art?

- Input = Monet, Van Gogh, etc.
- The machine was TAUGHT
    - To change a photo to paint like a specific artist
- Machine learning
    - Computers can now paint like human painters

So can computers be creative?

- Yes, perhaps

Also, we can teach computers to go from painting to photo

But can computers come up with creative ideas on its own without human intervention?

Oggie's article – Hoechst Is All You Need: Lymphocyte Classification with Deep Learning

- Shows that pathology samples of tissue
- Impossible to distinguish between two types of immune cells
- But computer could!

The Philosophy of AI

- The Turning Test
    - Oggie's question: mechanical automaton first appeared… when was this?
        - Talos
            - Giant automaton
                - Wasn't human, wasn't God
                - It was an automaton made of mechanical parts to protect Europa in Crete

- Alan Turing
    - He's a mathematician
    - But Oggie doesn't respect him as a hero…

- The Turing Test
    - Highly recommend reading it
        - Can we get a computer to imitate a human being?
        - Clarifies what the problem is
    - At the time great piece
    - Not as of present

- The Imitation Game
    - Interrogator in one room
        - Digital computer in another room
        - A person in the third room
    - Can the person tell?
        - Correctness vs humanness

Part II: Attacks on AI

- Weak AI and Strong AI
    - Strong AI
        - Computer is a mind
    - Specific tasks vs general intelligence
    - General intelligence is strong AI
        - Wide range of diverse problems
        - Weak AI only solves specific problems
            - How to get to Birmingham
            - Etc.

Attacks on The Turing Test

- Theological objection
    - Man has a soul, machines do not
- Machine's disabilities
    - But just because machines cannot do something now, doesn't mean it can't do it at all in the future
    - Machines are already becoming creative
- Computers cannot do something new
    - This is not true
    - Neural networks

Alan Turing also stresses the aspect of learning – fundamentals of AI

Arguments from Consciousness

- No mechanism could feel pleasure, grief…

Arguments from continuity in the nervous system

- The brain does not operate digitally
- Computers can simulate continuous behaviour

Oggie thinks all the counter arguments listed against Turing is not very good…

Godel's Theorem

- Oggie thinks this is not very well applied in the lecture notes
- Doesn't make sense philosophically
- Perhaps read the lecture slides on this part and see if you agree

Eliza

- Emulate psychotherapy

Turing Test – Why does a human decide? Average human? Intelligent human? How are the questions chosen?

There are lots of problems with the Turing Test

The Chinese Room

- This is one of the most famous attacks on AI
- Oggie was very unimpressed with this argument
- It's much like the Turing Test
- Thought experiment
    - See page 30 of the lecture slide

- Conscious computers are impossible
- Intelligence vs consciousness – they are different

Locked in a Chinese Room

- In tray and Out tray
- Read the lecture slides to see what this test is

Oggie: Turing never defines what understanding is?!

What do we mean by understanding?

Oggie thinks Wittgenstein's work is important because he emphasises language

- Language, context
- This defines how human beings think

Understanding means

- Various associations of knowledge
- Evokes associations in reaction to an input
- All just symbols

This is quite consistent with Wittgenstein's language game

Oggie – attacks that Turing doesn't define 'understanding' and other terms

Language game has evolution

Reality and symbols

Daniel Dennette – Oggie recommends this philosopher

Oggie recommends this Book: **The Mind's I (Daniel Dennette)**

Part 3: Killer Robots and the End of Humanity

Oggie doesn't like this part at all…

What's the problem? (see lecture slide 39)

- Emotional decision vs Logical decision
- Emotional decision can preceded logical decision
- Oggie tries not to do this

Oggie doesn't like AI in military

But thinks AI in autonomous vehicles, etc. is better

Oggie recommends his paper : AI, Democracy, and the Importance of Asking the Right Questions

- Touches upon philosophy of AI

Thank you Oggie for wasting my 3 hours during exam period…