ID1214 Artificial Intelligence and Applied Method Autumn Period 2

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Seminar 1:

What is:

* Artificial Intelligence?

“The study of mental faculties through the use of computational models.”

(E. Charniak & D. McDermott)

The science concerned with understanding intelligent

behavior by attempting to create it in the artificial.

(T. Smithers)[15]

Artificial Intelligence can be described as a computer with human like capabilities, a computer that can think independently. If we want to look at this in more detail, we must look at what is meant by intelligence. The definition of intelligence is the ability to acquire and apply knowledge and skills. We can use this to define Artificial Intelligence as a system set up by humans that can acquire and apply skills and knowledge by itself. Intelligence is composed reasoning, learning, problem solving, perception and linguistic intelligence [11]. If a system or computer is intelligence it will display these characteristics. We can, for simplicity, think of Artificial Intelligence as a computer that can ‘think’ for itself. This is often thought of as a computer that can solve real word problems and better its own solution. A famous test of whether a computer can ‘think’ for itself or not is the Turing test. The Turing test was set up by Alan Turing in 1950 to examine whether a computer could mimic a human response. The test is conducted by an examiner and two test subjects, one human and one computer. The examiner has a conversation with both subjects and from this must decide which is the human and which is the computer. If the examiner is unable to tell which is the computer and which is the human, then the computer is said to be able to think for itself. AI today is far more advanced with things like Apples’ Siri or Amazons Alexa, we now have virtual AI assistance in our day to day lives.

* Fundamental AI- problems and solutions?

One major problem for artificial intelligence is that they require a lot of computing power. The algorithms required to create an AI system are very complex and power hungry and a huge amount of data is needed for these systems. The solution to this issue is supercomputers [12]. A supercomputer is a computer that performs at or near the currently highest operational rate for computers. Traditionally, supercomputers have been used for scientific and engineering applications that must handle very large databases or do a great amount of computation (or both) [13]. These computers a very expensive and this slows down the rate at which AI can expand, however, as computer performance increases this becomes less of an issue.

Another issue faced by AI is data security. As we know, AI requires a lot of data to create accurate models. Sourcing this data can be quite difficult. Despite the huge amount of data online on such websites like google and Facebook, people are reluctant to give up this data as they feel that it will be used for unethical purposes or they feel that giving up this personal data may be harmful to their privacy. For this reason, data collection is an issue for AI.

* Search, planning and scheduling?

Search algorithms, such as beath breadth first, depth first or Dijkstra’s algorithm, are algorithms that show how nodes are connected within a network. This might be a road network, or a network of connected routers and it might be useful to know the weight of all the paths through the network. It is common for AI to use these search algorithms. For example, google maps would use this to show you the best route to the location you are looking to find.

Planning involves assembling a sequence of actions that lead to the solution of your goal [14]. All problems require planning to reach a conclusion. We can think of planning as a chain of states, the computer moves from one state to the next until it reaches its conclusion. Planning often involves checking if there is any possible solution and then optimizing it and altering it to fit the problem at hand.

Scheduling is like planning, but instead of being concerned about what to do it focuses on when to do them. For this reason, planning and scheduling go hand in hand.

5 Questions:

1. What is Machine Learning?

Machine learning is a branch of Artificial Intelligence. It gives the system the ability to learn and improve automatically without being explicitly programmed to do so [1]. Machine learning involves programs that can access data and use it to learn independently. Machine learning algorithm make use of statistics to find patterns in large amounts of data [2]. This is what gives AI the ability to think for itself.

1. What is a Turing test?

A Turing test was a way to test if a computer was capable of thinking like a human or not. It consisted of a human observer and two anonymous respondents, the computer, and another human. After some time, or a certain amount of questions, the observer is asked to decide which was the human and which was the computer. The test was repeated many times to increase accuracy and if the computer was corrected more than half of the time it could be concluded that the computer had the ability to think like a human [10].

1. Are there any negative impacts of AI?

### Artificial Intelligence is often perceived in a negative, harmful manner. We often imagine artificial intelligence being used in war or as weaponry. According to economist.com the navy us AI to listen for “guerrilla footsteps or truck ignitions” [3]. Although the use of AI in warfare is a cause for concern it is not the only way in which we can be affected negatively.

### Artificial intelligence is often used in creating targeted advertisements which leads to a rise in consumerism, this has negative impacts on both the consumer and the environment. Large companies use artificial intelligence and machine learning to track what we search for and when we search for it to create custom adverts that lure us in to spend more money [6].

### Another negative impact artificial intelligence is an increase in job loss. A common area where we can see AI replace human workers is in shops, cashiers are often replaced by automatic self service checkouts. Almost three quarters — or 71 percent — of consumers have used self-checkout in supermarkets [16]. As robots are faster and cheaper than humans, we can expect to see an increase in AI workers which correlates to an increase in job loss which is not good for those who will loose their job.

1. Discuss the impact of AI on the medical world.

There has been a tremendous uptake of artificial intelligence in the world of health care. Robots equipped with artificial intelligence and machine learning have been used to assist in surgery with the aim that one day these robots can perform surgery themselves. It is believed that these robots would be far more accurate than their human counterpart due to their huge database of information and their greater precision. According to Forbes, “One study that involved 379 orthopaedic patients found that AI-assisted robotic procedure resulted in five times fewer complications compared to surgeons operating alone” [8]. It is also believed that computers are far more accurate when it comes to image analysis. This service would have a huge impact on the world of healthcare as it could provide a much-needed support to areas that are too remote for healthcare, provided they have access to such technology. AI could also aid in diagnostics as it would be much possible to send a picture of rashes, cuts, and bruises for analysis by the AI system. This would reduce patient waiting time would focus the attention of hospitals to those who really need it.

1. What is the difference between strong AI and weak AI?

In general, it is hard to pinpoint Artificial Intelligence down to one definition. For this reason, it is also difficult to distinguish between weak AI and strong AI. According to MachineDesign the difference between strong AI and weak AI is to do with how they process data. Take Apple’s Siri for example. Siris listens out for keywords and responds accordingly, it is sensing for things that is like what they know. This gives people the illusion that they are talking to a human like entity, but they are not. In fact, there is just an algorithm set in place to look for keywords in our speech and work based on that. In essence, weak AI cannot think for itself.

Strong AI, although not as advanced as human cognition, has some sort of decision-making built in. For example, a machine might hear “good morning” and start to associate that with the coffee maker turning on [9]. We see strong AI when we look at systems that are able to formulate strategies that were not previously shown to the AI, for example when AI teaches itself to play video games, or when AI can out manoeuvre the world best players.

References:

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