

AI Assignment 01

Q1 Alan Turing paper is a cornerstone of philosophy in AI. Turing in this proposes an Imitation game as a Criteria for assessing machine intelligence and addresses some objections to the idea. There are many objections of his that still carry weight.

Turing objected that machines cannot truly think because they lack consciousness. This fact still holds true to this day even though AI has become so advanced it is still just simulating intelligent behavior instead of thinking on its own. Another objection that Turing considers is that human behavior is too complex and informal to be captured by rules. AI to this day struggles with tasks requiring common sense and contextual understanding.

Some of Turings Rebuttals are valid while others not so much. Turings refutation of the mathematical objection is partially valid. He correctly points out that humans have cognitive limitations, but does not fully address the deeper philosophical implications of

Gödel's Theorems for machine intelligence

Since he wrote his paper many advancements in AI have been made that has caused many objections to emerge. The most talked one being the ethical implications and moral concerns. Issues such as bias in AI systems, the potential for misuse and the moral status of AI entities. The next most talked about objection is the idea that AI could surpass human intelligence and become uncontrollable.

Turing's prediction was reasonable but overly optimistic as he predicted that by early 2000's, AI Chatbots could convincingly simulate human behavior in limited contexts but failed much more rigorous scrutiny. Even though AI has made significant strides in NLP, fully passing the Turing Test remains elusive.

AI Assignment

Q2

1- A computer can play table tennis at a decent level trained by Google Deepmind. It is capable of beating all beginners and 55% amateur players. However it does lose to advanced players.

2- It can play a decent game at competitive level & beating top human bridge champions in certain scenarios. However it still struggles with intricacies of bidding and communication with partners.

3- AI can write funny jokes through NLP. However, because it has no emotions of its own it cannot make very good ones.

4- AI can improve document analysis to improve quality and efficiency of client related work. However its accuracy is not very high. The legal advice given must be correct to build trust, a mistake by the AI can destroy that trust.

5- Yes it can potentially through advanced algorithms in the field of automated theorem proving such as DeepMind's AlphaGo which discovered new theorems in areas like knot theory.

6- It cannot on its own, but can assist surgeons perform a variety of surgical procedures. It faces the challenge of precision, accuracy and latency.

7- A robot controlled by a computer can't but could face difficulties in object recognition, dish placement and organization and automated decision making.

8- It cannot, but it can assist in construction like 3D printing buildings. It faces challenges like requiring human-like creativity and problem solving.

Q3

Agent Description:

AI powered chatbot designed to assist customers about a competition hosting website. The chatbot learns over time and improves through past interactions using ML and NLP.

Characterizing the environment:

It is Accessible as the chatbot has access to all customer queries and ~~lets~~ relevant data about the website.

It is Non-Deterministic because the user inputs are unpredictable.

Sequential

It is Episodic as each interaction allows the chatbot to learn and make better responses.

It is not Static because the database and competitions on the website can change.

It is continuous because of real-time messages.

Q1. True

A perfectly rational agent maximizes expected performance based on available information. If the information is incomplete it cannot make such optimal decisions. For example, a robot vacuum cleaner cannot efficiently clean the room if it is only aware of its nearby surroundings.

2. True reflex

A ~~rational~~ agent behaves based on the current percept. Some environments require planning and memory to act rationally.

For example A maze-solving agent cannot solve a maze on just reflex, it needs to plan and remember the routes it took before.

3- False

Rationality is how well an agent maximizes its performance. If all agents were rational in a given environment then even poor a reflex agent would

be rational which contradicts the definition of rationality.

For example in a chess game if a ~~non~~^{reflex} agent moves randomly then it would not perform optimally as compared to a learning agent.

4. False

An agent function maps a given percept history to an action while an agent program implement the said function.

For example a self driving car's agent function might decide to slow down based on road condition while its agent program process multiple inputs to make this decision.

5. False

There are ~~infinite~~ infinite agent functions but not all are computable. Some require a lot of memory.

For example an agent function predicts outcome of a halting problem but cannot be implemented as the problem is undecidable.

Q True

Yes it is possible to have an environment where it is rational through random task selection.

For Example A rock paper, scissor agent playing against an opponent that plays randomly can do well by always playing randomly as well.

7- True

It is possible if the strategy is optimal for multiple environments.

For Example a sorting algorithm agent that sorts number efficiently whether the list is large or small.