AI - Assignment
Q1

Turing's paper starts with defining the ~~ing~~ imitation game and its components, which are the interrogator and a machine. The goal of his version of the game, now known as the Turing test, aims to verify an AI's ability to pass itself off as a human to a human interrogator during a given length of interrogation time. Longer times without any ~~ind~~ identification of the AI's true nature mean that it is more complex. Now to address Turing's views ~~on~~ ~~t~~ given in the paper. He addressed several opposition to his views and now I will give my own opinion on which of those still hold water and which do not.

~~The~~ ~~It~~

The theological objection, ~~I~~ most believe, is not worth discussing as the faith is inherently an illogical action to ~~men of~~ most people today and these ~~se~~ people, using the stated reasoning as ~~justifit~~ justification, dismiss any discussion involving theological knowledge and its similarity, or difference, to scientific knowledge. Nevertheless, it is important to state that, as a Muslim, I am of the belief that machines cannot think, or at least, they cannot think in the same way a human does. To elaborate on that statement, AIs like chatgpt, Deepseek, neuro-sama (AI Vtuber), Tay AI etc. all

all seem very human at first glance. Verily, prolonged exposure may only deepen this opinion as we see chatbots like Deepseek have very forgiving prompts which can infer meanings as a human could, Neuro-sama, who can so vividly express emotions using voice tones, facial expression and even choice of words and this is an AI ~~by just 1 per created by just 1 person~~ created mostly by one person and was only meant to play a ~~B~~ game ~~abt~~ about pattern retracings. We have ever experienced an AI that managed to get misled and have skewed opinion in a very human fashion in Tay AI. ~~It may be thought that I am being contra~~ The one failing all of these AIs have is that we, ~~as~~ can understand them, the mathematics ~~as~~ can and has explained all of these phenomenon. The same cannot be said about ~~the~~ the human brain, even after developing the field of psychology for millenia the question "Why do humans think?" has not been answered. We ~~know~~ ~~how~~ God's creation is still a mystery to us while ours is understood therefore ~~and~~ an AI's thoughts cannot be equated to ~~the~~ a human's. Lastly, Turing claims that Muslims believe that women are soulless, this is completely non-factual as no recognized sect of Islam holds such a belief.

Moving on, the "~~Heads~~ "Heads in the Sand" objection is still relevant today as AI applications have been integrated into every part of life and interaction is almost guaranteed. The advancement of storage capacity of computers, as Turing predicted, have directly caused the advancement of AI to accomplish any and every task. Society has shown that many people have relegated a lot of their thinking to AIs as well, evidenced by the fact that students of today may achieve even greater breakthroughs than the legends of the past like Einstein and Turing but could not write a decent paper on that breakthrough since that job was always given to chatGPT. In addition, pop culture has deepened this distrust of AIs due to games like Detroit: Become Human and the Terminator movies. Finally, even intellectuals in the field of AI believe that AI can and will become superior due to the sheer number of neurons available to them has already surpassed those ~~of humans~~ available in the human brain.

Furthermore, the mathematical objection is still relevant since Godel's theorem has not been disproved and Turing's halting problem is not an impossibility but this is only a technicality due to ~~the~~ the resources

available to modern systems. Many of the problems where Godel's theorem and Turing's halting problem apply are impractical and very rarely arise in real-world application. Turing's opinion that humans are also limited is still valid as well. In conclusion, the mathematical objection persists but it does so without undermining the potential of modern AIs so I would say it is less of a question of "Is it relevant?" and more of "does it exist?". The answer to the former is 'no', and the answer to the latter is 'yes'.

The ~~argument~~ argument from consciousness is not ~~still~~ relevant today because of the effectiveness of AI in passing the imitation game. All the challenges described by Prof. Jefferson have already been overcome as AI is widely used to produce music and write stories. AI is not ~~goo~~ able to create good pieces but I do not think that was a ~~challenge~~ part of the challenge, simply being able to do these tasks and being able to justify their choices as an artist would, at least for a time, be good enough in my eyes. In the end, it is better to drop this argument as Turing suggested since if we are to judge the consciousness of AI, we must first

quantify
~~[illegible]~~ our own concious ness and that has not been done yet.

The argument from various disabilities is perhaps the one that is least relevant today because of the absolute skyrocketing of computational power, storage capacity and complexity of algorithms. Let us take the example of natural language processing or NLP, ~~in NLP~~ in AI applications, specifically chatbots. The objection Turing mentioned was about the inability of machine X to do task Y when it was designed for task Z, now Apply this to neuro-sama. Originally designed to play OSU, a pattern tracing game, the AI has been updated to include various more features such as talking, 'seeing', playing other games etc. All of these functionalities are added on the foundation ~~that~~ of playing OSU, now let us connect this to NLP. Neuro-sama, as an entertainer, has a persona and that is as the daughter of her creator vedal, the AI has shown multiple times that it can imitate the emotions towards her 'father' that its persona demands and it does it so well that it seems to be a real connection. In actuality, we know that the AI uses matrices of vectors to form connections between words like 'father' and 'daughter' and find new connections which have a similar co-relation. It collects

these words and forms meanings from them, extrapolating those meanings to create sentences and compiling those sentences to create narratives. It does all of this in real-time whilst taking constant input which also affects the co-relation of words. All this is only possible due to the resources available to modern computers and the optimization of algorithms. Therefore, we can see that an AI designed to play OSU can now play as an entertainer so well that it has overtaken every other streamer on its platform. In conclusion, an AI having the ~~eq~~ capacity to work on any task is a reality in today's world. ~~All that is needed are new instructions~~

Lady Lovelace's objection is also not relevant due to the same reasons that have made the disability argument irrelevant. The best example of this are images or videos created completely by AI, many examples exist of such media containing either unusual objects or recognisable objects in an unusual manner. They evoke an uncanny feeling like the painting of Saturn eating his son. In addition, AIs have managed to make advancements in ~~a~~ fields of study ahead of humans like the newer method of matrix multiplication which is more optimized than every other ~~m~~ method. These

events show that computers have indeed managed to surprise us and learn something we never taught them. It may be argued that these only occurred because of human input pointing them in the correct direction but that can be claimed of all human advancements as well since any breakthrough is the work of multiple people, their knowledge being passed on and improved or ~~expa~~ expanded upon.

In regards to the argument from Continuity in the Nervous System, it is not relevant today since computers have been proven, with examples, to be proficient in mimicking humans and the problem described by Turing, of the difference between a continuous and discrete machine would be resolved using probabilities as Turing showed so there is not much I can add to this.

~~Regarding the argument from informality of behaviour I do not think it remains relevant today because~~

The argument from informality is still credible today as human decision-making is flexible and adaptive. Some may say that modern AI systems are also sufficiently flexible but their decisions are based on rigid rules and are data-driven whereas human deliberation metrics are more abstract. ~~Furthermore~~

Furthermore, the limitations of discrete systems explained by Godel's incompleteness theorem and Turing's halting problem still apply, making a truly, ~~completely~~ adaptive system an ~~impossible~~ impossibility. However, the human mind can also be partly explained ~~as well~~ so the boundary between human thought and machine calculation is not absolute so the objection is not exactly insurmountable either.

The objection from ESP (Extrasensory Perception) is irrelevant today since the concept is widely considered a fantasy and lack of convincing evidence supporting ESP despite extensive experiments like MKULTRA have convinced most of the non-existence, or at least, our inability to properly control or ~~re~~recreate ESP events. Thus, I believe it is prudent to remove this objection from mind when discussing the imitation game from today's perspective.

The objections ~~of~~ from Turing's time ~~have~~ are a good representation of the general objections one could have of AI and many are still relevant today. If a new objection was to be made, it would be about the rather foolish

FRA:-

notion that job security will be completely obliterated due to AI and cause an irreversible status quo of humans becoming obsolete resulting in widespread unemployement. This seems reasonable at first glance due to the effects of an emerging technology but this kind of emergence of an industry defining technology has happened before in the Industrial Revolution. Hundreds of workers could be replaced by a single machine and people protested against it, citing similar justifications as those given against the integration of AI but the actual result of the revolution was just that jobs changed. Therefore, I believe that just as new jobs were created to replace the ones lost, the same would happen now. Turing did believe that computers would do human tasks but not to this extent and certainly, he did not anticipate a threat of replacement as seen in his agreement of the mathematical objection..

Turing's estimate was surprisingly close to the truth as chatbots had the ability to pass a short Turing test as early as 2014 and the success rate has only increased since then. His work remains as the basis of AI

and much of his work holds up today. However, there have been unforeseen problems with this technology and there is still a strong debate of whether AI will enhance or disrupt our existence.

Q2

1- AI can do

2- AI can do

3- AI can do

4- AI cannot reliably do since laws are a messy web of principles, loopholes and very nuanced situations and AI currently cannot replace a qualified professional

5- AI can do but it does still have limits as ~~due to~~ some theorems and proofs require too deep of an understanding of mathematics than AI can process.

6- AI cannot do since patients and surgeons alike do not trust AI to make critical decisions as a surgeon would.

7- AI can do

Q8- AI can only have a supporting role since construction requires the adaptability and oversight of humans.

Q3 Agent description for an NPC AI in a real-time strategy game like Hearts of Iron IV:-

The agent will be able to build, train new units, engage in combat on all theatres (Air, Land, Naval). It should be able to adapt to game scenarios, react to player actions and optimize it's own resource and troop management. It can also make spy agencies to reveal information about other NPCs or the Player.

~~Accessible since~~
Environment Characterization:-

1- Accessible since it will always know about its own resources while other entities' resources will only be hidden under a game mechanic (spies).

2- Stochastic since opponent action and world events will introduce uncertainty.

3- Sequential since agent actions will affect the game in future states.

4- Dynamic since real-time player and NPC input will need to be considered by the Agent for its decision-making.

5- Both discrete and continuous since the actions, like moving or attacking units, is discrete and continuous since the game will be real-time.

A Hybrid agent architecture would therefore be best suited for this environment.

Q4

1- True

Example:- a self-driving car that fails to detect an obstacle due to fog may not make a rational action.

2- True.

Example:- A chess-playing agent would ~~need~~ need to consider previous moves and future possibilites to strategize.

3- False.

Example:- For an agent solving a maze, random moves are irrational, a goal based approach would be better.

4- False

Example:- A roomba's agent would define function based on dirt detection while its agent program would include algorithms for motion planning and obstacle avoidance.

5- False

Example:- An agent that computes the optimal move for chess by evaluating all possible future board states is computationally infeasible, since chess has more positions than atoms in the universe.

6- True

Example:- For a lottery selection, an agent selecting numbers at random is rational since winning is random.

7- True

Example:- A pathfinder agent will be rational for 2 ~~separate~~ seperate mazes assuming the cost function is the same.

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