(AI) Assignment (01)

Talha Rusman.
(231-0065)

Question (01):-

Introduction:

Alan Turing's 1950 paper Computing Machinery and intelligence proposed Turing as a method to assess wether machines can exhibit wise conduct equal to that people. In paper Turing anticipated and addressed more then one objections that to gadget intelligence, some of which stay applicable today. This essay examines the objections that also maintain weight, evaluates the validity of Turing's refutations, explores new objections that by mean of by yr 2000, a gadget would have 30% chance of passing a 5-minute Turing Test with unskilled interrogators.

Relevant Objections

1. The consciousness Argument.

one priciple objection is that machines lack subjective enjoy and learn know-how. John Searle's chinese Room argument (1980) reinforces this problem, suggesting that AI can simulate

compression without truely understanding. Turing discarded this via emphasizing behavioral standards in place of internal states, but the debates over AI awareness maintains.

2. The mathematical Objection

Godel's incompleteness theorems mean that human reasoning may surpass computational systems as there will continually be truths that machines can not prove within their very own system. AI has made development in formal good judgment and automated theorem proving but this limitation remains a legitimate challenge to gadged intelligence.

3 The Argument from informality of Behavior.

Human intelligence operates without strict, predetermined rebulies, taking into account flexibility and flexibility. AI, however, follows specific programming and lacks unstructured spontaneity. While system learning has advanced adaptability, AI nonetheless struggles with unstructured choice-making. Supporting this objection.

New objections Since (1950)

1) Ethical and Bias Concerns :-

Modern AI structures are educated on full-size datasets which contain biases. These biases can lead to unfair or unethical decisions, elevating worries approximately accountability and accept as true with. Turing did no longer foresee these dilemmas, making this a colorful modern-day task.

2) The Black Box Problem.

~~models perform~~ Deep gaining knowledge of models perform in methods that are hard to interpret, even for their creators. This lack of transparency increases worries approximately belief, protection, and choice-making in AI, posing an ~~difficulty~~ difficulty that Turing did not longer anticipate.

3) The Artificial General Intelligence (AGI) Challenge.

Turing assumed that scaling up computing energy and complexity might result in human-like intelligence. However, modern-day AI stays slim in scope, excelling in specialized tasks

however failing at standard reasoning. The hole between AI and human intelligence continues to be vast.

Evaluating Turing's 2000 Prediction

Turing expected that by using 2000, a system might have 30% threat of fooling an unskilled interrogator in a 5-minute communication in 2014 chatbot Eugene Goostman reportedly this take a look at, however critics argue that its fulfillment relied on deception in preference to true intelligence. Today AI, together with ChatGPT, demonstrates fantastic conversational skills, yet it nonetheless struggles with deeper reasoning and contextual know-how while Turing's prediction became partly accurate, AI has now not yet accomplished trendy intelligence.

Conclusion:-

Turing's work stays foundational in AI research and many of his objections and responses preserve to shape modern-day discussion. While some of his

reflections keep, demanding situations do like bias moral worries, the black container trouble and AGI boundaries monitor gaps in his original vision. AI has made great strides, however real human-like intelligence stays an ongoing undertaking. Turings legacy keep to inspire improvements, however the quest for proper gadget intelligence long way from whole.

Question (02):-

1)

→ Partially Solved!

→ AI-powered robots, inclsive of these evaluated by means of Omron and Toopheus, can play table tennis at fast-rate stage, but now not at a international-magnificence competitive degree.

Challenges:

-> High-velocity real-time choice-making

-> Precision in movement and stability

-> Predicting human player techniques

2)

Mostly Solved.

AI has efficiently played bridge at a aggressive level. Nook, evolved by way of WINKKAI, defeated human bridge champion the usage of reinforcement getting to know and rule based reasoning.

Challenges (still enhancing):

->Bridge requires imperfect and teamwork making it harder then chess or Go.

-> Communication among companions remains a undertaking, as AI can not explicitly trade strategies like human

3)

Not fully Solved.

While AI can generate coherent tales (GPT-4, claude, Gemini), humor is nuced and context-based. Challenges

Challanges

->understanding irony, sarcasm, and cultural references

->Generating humor this is deliberately humorous, rather than randomly amusing.

-> Humor regularly includes ~~wordplay~~ wordplay, exaggeration

or surprising twists, which are nonetheless difficult for AI.

4)

Partially Solved

AI legal assistants (Harvey AI, Ross, GPT) provide case, regulation research, agreement analysis, and simple criminal recommendations

Challenges:

-> Legal reasoning involves interpretation, which is hard for AI

-> Laws vary by using jurisdiction and are constantly changing.

-> AI cannot represent clients in courtroom or offer nuanced, moral legal strategies.

5)

mostly Solved

AI has found new theorems, such as

-> Deepmind's Alpha Tensor (new matrix multiplication algorithm)

-> AI-assisted proofs in topology and combinatorics.

Challenges:

-> AI-generated proof on occasion lack intuitive motives for human.

-> Higher-level innovative insights are still frequently human-driven.

6)

=> Partially Solved

=> AI-assisted robot surgical procedure is not Unusual (Da Vinci Surgical System, Mako Robotic Surgery)

Challenges :-

-> AI does not perform Surgery independently - a human health care provider Supervises.

-> Real-world Surgeries involve Surprising Complications that AI cannot yet handle autonomously.

7)

=> Not fully Solved.

=> General purpose household robots (Tesla optimus, Figure AI) can control items but working with diverse, and unstructured home environments.

Challenges:

-> object recognition and variation (each domestic has distinctive dish shapes and and preparations).

-> ~~Dexterity and adaptableness teach climate has limited~~

-> Dexterity and adaptableness to unpredictable situations (eg. fragile glassware).

-> Planning actions successfully for extraordinary layout.

8)

-> Not fully solved.

-> AI can assist layout buildings (generative architecture), and robots assist in creation (brick laying robots, three-D printing homes)

Challenges.

-> construction calls for adapting to environment variables.

-> Hard is tough for modern AI.

-> Coordination of couple of AI-pushed structures is not best best

-> AI lacks the selection making capacity for unexpected issues on creation website online.

Question (3)

Domain: Ticket Managment System

Since I have experience working on one-stop Managment System for student service requests, I'll define AI agent that automates ticket assignment, prioritization and resolution in a Customer Support system

Agent Description: AI-Powered Ticket Managment Agent
This AI Agent is designed to handle customer support tickets, automatically categorize them, assign them to right agents, and predict resolution times. It ensures that urgent issues are prioritized and that service requests are handled efficiently.

Agent Capabilities:
-> Categorizes tickets (Billing, Technical Support, General Inquiry)
-> Assigns priority levels (critical, high, Medium low)
-> Routes tickets to the most suitable support agent.
-> Predicts resolution time based on historical data
-> Analyzes agent performance

Characterizing the Environment.

Accessible:

Type → Fully Accessible.

Justification: The System has access to ticket data.

Deterministic.

Type: Non-Deterministic

Justification: The outcome of ticket resolution depends on human factors

Episodic

Type: Episodic

Justification: Each ticket is an independent episode: Solve one ticket doesn't effect others.

Static:

Type: Dynamic

Justification: New tickets arrive continously, and priorities can change

Continuous:

Type: Continuous

Justification: The System runs in real-time handling a continous flow of service requests.

Best Agent Architecture: Learning Based Decision Agent

Since ticket managment involves classification, Prediction, and decision-making, the best architecture would be:

1) Perception Module:
-> Use NLP to analyze ticket descriptions.
-> Extracts keywords to determine urgence.

2) Rule Based System:
-> Pre defined rules handle cases

3) Machine Learing Model:
-> Decision Tree / Random forests for ticket classification
-> Neural Network (RNNs) for predicting resolution time
-> Reinforcement Learning for optimizing agent assignments

4) Decision Module:
-> Assigns the ticket to the most revelent agent based on past performence
-> Adjusts tickets priority dynamically if resolution delays occur.

Question (Qd) :-

1)

-> False

=> A partially observable agent can still act rationally by maintaining an internal model of the world.

Example:

A self driving car in foggy conditions can still drive optimally using sensor function.

2)

=> True

=> Pure reflex agents respond only to current perception which doesn't work in sequential decision-making.

Example: Chess

A reflex agent cannot look ahead and make future move, so it is irrational in complex strategies.

3)

=> False.

=> Certain environment need particular knowledge or reasoning and there can still be random agents.

Example:

A random-move chess bot against Stockfish is not rational.

4)

⇒ false

The agent function maps perception to actions theoretically, while the agent program processes sensor data

Example: A

A robotic vacuum cleaner may filter noisy sensor data before making a decision.

5)

⇒ false!

⇒ The number of possible agent function is exponentially large making some infeasible to compute.

Example

A brute-force chess-playing agent storing every possible board position is impractical

6)

=> True

=> In some stochastic environments, randomization can be rational

Example:

Rock-Paper-Scissors - choosing randomly prevents the opponent from predicting moves.

7)

=> True

=> An agent designed for one optimal strategy may remain optimal ~~in different environments from predicting move~~ in different environments with similar constraints.

Example:

A sorting algorithm (like QuickSort) is a rational in both data base indexing and file organization environments.