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Sec: B

QUESTION NO. 01

- Which objection still carry some weight? & are his refutations valid

In his paper, Alan discusses 3 objections
- Theological Objection
- Heads in the sand objection
- Mathematical objection

* Theological Objection being that machines cannot exhibit intelligent behviour since they lack a soul

He acknowledged that the idea of only humans having a 'soul' was rooted in religion & philosophy but it was not not a valid objection to identify the intelligence of a machine. Turing believed & gave the example of galileo that the idea of intelligence & consciousness may have to be redefined with the passage of time.

He also argued that if machines couldnot have souls in the same way as humans do they could still exibit intelligent behvior.

Alan provides similar arguments in response to the other 2 objections.

Verdict:- With the recent advances in AI & the developing of General Purpose AI like ChatGPT & Big chatbot, we can say that one of the objections carry weight in contemporary times & Alan Turing was correct. and his refutations are valid

- New objections from developments since he wrote the paper:

~~Yes, there are a number of objections that can be~~

No, if anything the recent advancement in the field of AI has proven that machines can indeed exibit intelligent behavior & can take rational decisions despite not having human like consciousness or soul.

- He predicts that by 2000 ---. Do you think this is reasonable?

Yes, But I would argue that Alan turing was a bit over optimistic since it took around 22 more years than his prediction i.e. in 2022 when ChatGPT (the first global scale general purpose AI) was released that has a very good chance of passing a 5-minute test with an unskilled interogator.

So yes, alan was correct but his timing of prediction was a bit off.

QUESTION NO. 02

01) Playing a decent game of table tennis

Yes on Dec 10, 2021 a group of researchers were successfully able to program a robot that taught itself to play ping pong in just 90 minutes!

3) Playing a decent game of bridge

Yes, A/c to an article published in the guardian in March, 2022 an AI program was able to beat eight world champions at bridge.

4) Discovering & proving new mathematical theorems.

No, AI itself cannot discover & prove new mathematical theorems. Although AI techniques can be useful to prove mathematical conjectures where very amount of data available is huge and cannot be studied via classical methods.

5) Writing an intentionally funny story.

Yes, modern general purpose AI like ChatGPT can write intentionally funny stories.

7) Translating spoken English to urdu in real time.

Yes, this is possible Google Pixel Phones & Google Assistant can perform theses tasks using ML & AI.

QUESTION NO. 03

Domain Chess game

Page Description

01) Performance measure:-

Winning the chess game

02) Actuators:

Robotic arms connected with motors & a computer that instructs them to move pieces.

03) Environment:-

Chess board, The AI players pieces, opponent pieces etc.

Sensors:-

Camera for getting input about the current condition of the board.

Capacitive touch sensors that allow the robot to hold the pieces of chess while moving them & feeling it.

QUESTION NO. 04

Case	Performance Measure	Enviroment	Actuators	Sensors
1) Playing Soccer	Scoring goals & winning the game	Soccer field, position of friendly & opponent players	The soccer players themselves	Soccer player's eyes which allows them to act on the input & make moves.
2) Exploring subsurface of Arabian sea.	Accuracy & depth of information gathered.	subsurface of Arabian Sea, temperature, water pressure etc	Drilling equipment, underwater vehicles & other machinery used to explore & collect information	Sonar senors, Seismic seniors, under water cameras etc.
3) Performing a high jump	height cleared by the athlete in a high jump	Indoor/outdoor stadium, takeoff board, landing mat	The athlete themselves	laser sensor to measure the height of the jump, Cameras etc.
4) Knitting a sweaters	Quality of the product, fit, appearance & durability of the product.	Location that is suitable to working with yarn & needles.	The knitter themselves who is responsible for knitting the sweater (could be robot/ could be a human too)	Touch sensors, Camera, measuring tape for measurement.

QUESTION NO. 05

False

1) Such an agent can be rational because it will try to make the best decision on the basis of the percept it recieves.
Yes it may not be always correct, but it will be rational.

3) True, all the agents in a give task environment can be rational, this is totally possible.

4) False, an input to the agent program & agent function can be similar but it is not necessary nor is it always true.
The input to an agent program depends on what kind of input it recieves via its sensors. while agent function just mathematically maps those percepts on actions that can be taken.

5) True, an agent function mathematically maps the percepts recieved on actions which can be taken by the agent program.
Thus every agent function can be implemented by a progjm/machine combination.

7) True, Yes it is possible provided the agent has the computing power & rationale to navigate its way through both environments.