

20231499_CT5134_Answersheet_Part1

Q.1. (A)

- AGENT :
 - An agent is a computer system that carries out a action to get the best possible outcome, it is an independent entity and works on behalf of the owner taking decisions for him without the owners interference.
 - The agent is intelligent and has a capacity to take it's own actions and does this by taking inputs from its environment and giving real-time decisions.
- Multiagents:
 - Multiagents a group of agents working together to get a solution, all the agents have their own goals and actions. They interact with each other and the environment to give optimal solution.
 - Examples where such systems can be used is online trading, disaster response etc.
- Abstract Agent Architecture:
 - Suppose the environment has a set of states then the agents that are in that environment has a number of possible actions that they can perform to go to the next state that can change the state of the environment, then this interaction of agents and environment is defined by set of runs, this behaviour can be non deterministic and can be used to perform a action in the state.
 - The behaviour of the agents in environment is the set of all such runs, the property is called invariant property of agent behaviour. The abstract architecture is series of all these functions, 1: observing environment ,2: the action , 3: output to percept environment and action mapping.
- The Prisoner's Dilemma:
 - This is a situation where 2 prisoners are locked and each one of them have an option to confess or be silent, based on their both answers their fate depends i.e duration of the jail period, each prisoner considered as an agent will take decision that will give him the best outcome, i.e take rational decision.
 - This dilemma talks about how both of them can take decision considering what each might say and then based upon the prediction get the best output for one self.
- Agent Environment:
 - Everything that surrounds the agents but that which is not part of the agent is the environment, this can be anything, it can be observable or not, discrete or continuous in nature, the agents take input and gives output to the environment and perceives it with help of sensors , effectors etc.

Q .1. (B)

- Objects vs Agents:
 - agents have control over their behaviour objects are obedient.

- object approaches define relationship by static behaviour while agents are complex
- agents have a higher sense of abstraction than objects .
- agents are dynamic while objects are static
- objects are normally centralised while agents can be both centralised and decentralised.
- Agents vs Expert system
 - Agents make decision based on realtime environment while expert systems are just programs
 - They depict intelligence and mimic human behaviour while expert systems just solves complex problems
 - expert systems tend to imply reasoning while agents react to environment.
- zero vs non zero game
 - In zero sum game all the gains - losses equal to zero i.e in system one losses then other definitely wins, while in non zero sum games this is not the case the aggregate gains and losses can be more or less than zero.
 - Zero game is competitive in nature while non zero isn't
 - zero sum can be solved with minmax algorithm or nash equilibrium and it has a pareto optima
 - examples include zero asin chess, poker etc while prisoners is a non zero one.
- supervised vs unsupervised
 - the model ,input, output all given in supervised while only output given in unsupervised
 - algorithms trained using labelled data in supervised against that in unsupervised
 - supervised uses training data while unsupervised does not
 - learning method is offline in supervised while realtime in other.
 - Supervised includes all classifications etc while k means etc is unsupervised.
- Darwinianism Vs Lamarckianism.
 - darwin theory discredits internal vital force theory while other builds notion of it
 - disappearance happens due to continuous variation while in lamarckism the more usage the more development happen
 - Darwin focuses on struggle for existence while other discredits it
 - only useful data is transfered to next generation is darwin while all traits transfered is lamarck
 - built on the principle of survival of fittest while lamarck does not

Q 2 A

- I think there are three possible outcomes as to when cooperation might be found in prisoners dilemma game-

- First, when the two agents in the game know that they can play more than once or rather are going to play more than once then this scenario can happen, as this might trigger the possibility of facing the agents again so its better to be cooperative at first which is not the case normally as it is not a rational action.
- The second scenario where this might happen is if the 2 prisoners already know each other, i.e. there is some sort of trust in them as they are familiar with other another in this case it might be case that because of this trust they might cooperate.
- The final scenario according to me is the case where they can interacted with one another and decide that they both will cooperate, in this case there is no matter of prediction are the common decision as already been made .
- In all these above scenarios it can happen that cooperation is seen between them.

Q 2 B

- In nash equilibrium the agent should be satisfied with his choice and that he should consider the prediction of the other agent before making decision. The agent can act autonomously and flexibly to meet the objective, , it is a output after consistent list of actions , each agent maximises his payoff given then action of other agent, at nash equilibrium one cannot go to other state as this is the best one so no change possible.
- In the given example according to theory one has to select value that might be less than $\frac{2}{3}$ average value, in the graph we can see that most people have given values above 67 which is utterly wrong as the maximum value can be 100 so $\frac{2}{3}$ of that so everyone should have been given value less than 67.
- While in actual people should have considered a nash equilibrium concept then they would have decided upon $\frac{2}{3}$ of 67 and moving forward other will do the same so again $(\frac{2}{3})^2 * 67$ should have been chosen as this is what nash equilibrium might has suggested and the value of answer would have been around 30 and go on like this until finally In the final most iteration the nash equilibrium would have been achieved when the answer given by everyone will be exactly 1.
- In this way nash equilibrium might have been used to get the optimal.