

BIT 4405 EXPERT SYSTEMS ASSIGNMENT**QUESTION ONE**

- Designing games is about creating very interactive experiences for the players. These experiences can be achieved by in-cooperating narratives, challenges, graphical representations, sounds, timing of events and phenomena, and the entities that directly interact with the player, be it opponents, allies, or other objects in the game environment. AI techniques will become indispensable to coordinate the ever growing complexity and dynamics of games. Game developers can use ad hoc cheats that offer players the illusion of intelligence, instead of any deep intelligence. This can work well until extended interaction reveals the tricks used breaking down the game experiences. As hardware capabilities improve, new types of interaction will emerge that would need better AI.
- In recent years, AI games has improved very much. For example, the usage of advanced AI techniques in mainstream commercial games, mostly applied to control NPC (non playable characters). From robotic research, systems for collision avoidance based on Reciprocal Velocity Obstacle (RVO) techniques have been made available as libraries.
- Advances in Natural Language Processing (NLP) have opened up new opportunities to support natural dialogues with NPCs, either companions or enemies and to support interactive storytelling. In the multiplayer online battle arena League of Legends [Riot Games] NLP trained models have been used to recognize and remove toxic behavior from the player chat channels. These applications of AI are proprietary solutions bound and tuned to a particular game and not accessible and reusable by other parties. Also, their application in serious games has been quite limited.
- Platform-independent game AI - due to the diverse ability of software platforms, programming languages, browsers and operating systems, favorable conditions for the reuse of software by game developers should be accommodated by a shared architectural framework.
- Some racing games gather data about how players drive, that is then processed using machine learning techniques. This allows for the creation of “drive-avatars” that mimic a specific player driving style and can then be used to play against.
- Adaptive gameplay has to be accommodated with various algorithms used for matching two human players, such as True Skill and variations of Elos(ranks), or matching game task difficulty to player’s skill, such as the Computerized Adaptive Practice algorithm.

QUESTION TWO

Defense departments have a decision-making problem that requires some expertise. They need to make sure that it is getting the best possible deals when it procures goods and services. To do so this department employs a number of different methods, including competitive bidding and negotiation. However, these methods can be time-consuming and expensive. Artificial intelligence and expert systems can be used to help the DOD make better decisions when it procures goods and services. For instance, expert systems can be used to help the DOD analyze data about past

procurement. This data can be used to create models that can predict how likely different suppliers are to offer the best deals. Expert systems can also be used to help the DOD negotiate better deals. For instance, expert systems can be used to identify the best strategies for negotiating with different suppliers. The experts systems can be used to help the DOD make better decisions about which goods and services to procure. For example, expert systems can be used to identify the best suppliers for different types of goods and services.

QUESTION THREE

Assume, The below symbols are represent the propositions as given above ,

there are:-

‘ n ’ means it is a nice day

‘ s ’ means it is summer

‘ w ’ means it is winter

‘ a ’ means i go to the golf course

‘ b ’ means i go to the ski resort

‘ c ’ means i go to work

‘ d ’ means i go to class

A) It is a nice day and it is summer.

$\Rightarrow n. s \Rightarrow a$ (I go to the golf course)

\Rightarrow I play golf

\Rightarrow I have fun. Therefore, we can conclude that I went to the golf course,

I played golf and I had fun.

It is not a nice day and it is winter.

$\Rightarrow n' . w \Rightarrow d$ (I go to class)

\Rightarrow I learn something.

Therefore, we can conclude that I went to class and learned something.

It is a nice day and it is winter.

$\Rightarrow n . w \Rightarrow b$ (I go to the ski resort)

=> I go skiing

=> I have fun.

Therefore, we can conclude that I went to the ski resort, I went skiing and I had fun.

It is not a nice day and it is summer

=> n' . s => c (I go to work)

=> I make money.

Therefore, we can conclude that I went to work and I made money.

B) So, the **first clause** is n (it is a nice day), it can be either true and false.

The **second clause** weather(w), it can be something other than summer or winter

but as the number of propositions do not have any other type, we can keep it as 2 only.

Also, winter and summer cannot be at the same time.

Now, the **total number of combinations = product of number of choices for each clause**

$$=== > 2 * 2 = 4$$

That means **No other combinations are valid.**

C) If "learn something" is the consequent, its antecedent is "I go to class" (from the statement "If I go to class, then I learn something.")

Now for "I go to class", we can say "it is not a nice day" and "it is winter" (from the statement "If it is not a nice day and it is winter, then I go to class.")

=> 3 things happen = **It is a not a nice day, it is winter and I go to class**

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