K.G.C.E.
Karjat - Raigad

Assignement 1B

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Sem :- VII

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Part B

Q.1 PEAS descriptors for WUMPUS World

=> ① Performance measure
- +100 for garbbing the gold and coming back to the starting position.
- -200 if the player (agent) is killed.
- -1 per action,
- -10 for using the arrow.

② Environment
- Empty Rooms.
- Room with WUMPUS.
- Rooms neighbouring to WUMPUS which are smell
- Rooms with bottomless pits.
- Rooms neighbouring to bottomless pits which are breezy.
- Room with gold which is glittery.
- Arrow to shoot the WUMPUS.

③ Sensors (assuming a robotic agent)
- Camera to get the view
- Odour sensor to smell the stench
- Audio sensor to listen to the scream & bump.

④ Effectors (assuming a robotic agent)
- Motor to move left, righ
- Robot arm to grab the gold
- Robot mechanism to shoot the arrow

* The WUMPUS world agent has following characteristics

1. Fully observable
2. Deterministic
3. Episodic
4. static
5. Discrete
6. single agent.

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Q.2 Various elements of Congnitive System

=> ① Congnite computing is new type of computing with goal of more accurate models of how human brain / mind senses, reasons, and responds to stimulus

② Generally term Congnitive computing is used to refer to new hardware and / or software that mimic following Functioning of human brain thereby improving human decision making Congnitive computing applications links data Analysis of Adoptive page i.e. Adaptive user interfaces to adjust content for particular type of Audience

- Following are elements of cognitive System

a) Interactive :-

- They may interact easily with users so that those users can define their needs comfortably. They may also interact with other processors devices of cloud services as well as with people

b) Adaptive :-

- They may be engineered to feed on dynamic data in real time. they may learn as information, changes and as goals of requirements evolve.

- They may resolve ambisity and tolerate unpredictability behaviours.

c) Contexual :-
- They may understand, identify or extract contexual elements such as meaning syntax, location, appropriate ~~synta~~ domain etc.

d) Iterative
- They may used indefining a problem by asking questions or Finding additional source input if problem statement is incomplete.

Q.3 Language Models

=> - The goal of a language model is to compute a probability of a token. (e.g. a sentence or a sequence of words) and are useful in many different Natural Language Processing applications.
- Language Model (LM) actually a grammer of a language as it gives the probability of world that will follow.
- For Example, they have been used in Twitter Bots for 'robot' accounts to form their own sentences.

* Language Model Definition :
- In case of Probabilistic language modeling the probability of a sentence as sequence of words is calculated :

$$P(W) = P(w_1, w_2, w_3, \ldots w_n)$$

- It can also be used to find the probability of the next world in the sentence:

$$P(w_5 \mid w_1, w_2, w_3, w_4)$$

- A model that computes either of these is called a Language Model.
- There are various Language models in available in practice.

Q.4 Machine Translation

=> - Machine translation is the classic test of language understanding. It consist of both alang. analysis and lang. generation.
- Many machine translation systems have huge commercial use. Following are the examples:-
  - Google Translate goes through 100 billion words per day.
  - eBay uses Machine Translation techniques to enable cross-border trade and correct buyers and sellers around the world.
  - Facebook uses machine translation to translate text in posts and comments automatically, in order to break language barriers and allow people around the world to communicate with each other.
- In a traditional Machine Translation system, parallel corpus a collection of texts is used each of which is translated into one or more other languages then the original.
- For example, given the source language. e.g. French and target language, a translation model p(f|e) trained on the parallel corpus and a language model p(e) trained on the English-only corpus.
- This approach skips hundreds of important details, requires a lot of human feature engineering, consists of many different and independent machine learning problems and overall is a very complex system.

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Q.5 Phonology

=> -Phonology examines the sounds that are combined to form language.
- This branch of linguistics is important for computerized speech recognition and generation.

=> Morphology
- Morphology is concerned with the components (morphemes) that make up words.
- These include the rules governing the formation of words, such as the effect of prefixes (un-, non-, anti-, etc) and suffixes (-ing, -ly, etc) that modify the meaning of root words.
- Morphological analysis is important in determining the role of a word in a sentence, including its tense, number and part of speech.

=> Lexical Analysis
- Lexicon is the words and phrases in language, Lexicon analysis deals with the recognition and identification of structure of the sentences.
- It divides the paragraphs in sentences, phrases and words.

=> Syntactic analysis

- In Syntactic analysis the sentences are parsed as noun, verbs, adjectives and other parts of sentences.
- In this phase the grammar of the sentence is analyzed in order to get the relation-ships among different words in the sentence.
- For example, "mongo eats me" will be rejected by syntactic analyzer.

=> Word sense disambiguation

- While using words that have more than one meaning; we have to select the meaning which makes the most sense in context.
- For this problem, we are typically given a list of words and associated word senses.
- e.g. from a dictionary or from an online resource such as word Net.