Assignment No:- 18

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Subject :- A.I

DOA	DOP	Remark	Sign.

Q1) Explain PEAS descriptions for wumpus world

→ i) performance measure

- +100 for grabbing the goal and coming back to start
- -200 if the player is killed
- -1 per action
- -10 for using the arrow

ii) Enviornment

- Empty Rooms
- Room with WUMPUS
- Rooms neighbouring to WUMPUS which are smelly
- Room with gold which is glitery
- Arrow to shoot the WUMPUS

iii) Sensors (assuming a robotic agent)

- camera to get the view
- odour sensor to smell the stench
- Avoid sensor to listen to scream and bump.

iv) Effectors (assuming robotic agent)

- Motor to move left right
- Robot arm to grab the gold
- Robot mechanism to shoot the arrow.

The wumpus world agent following characteristics

a) fully observable b) Deterministic c) Episodic

d) static e) discrete f) single agent

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Q2) Explain various elements of cognitive system

Cognitive computing is a new type of computing with the goal of more accurate models of how the human brain / mind senses, reasons, and responds to stimulus Generally, the term 'cognitive computing' is used to refer to new hardware and/or software that mimic the following functioning of human brain thereby improving human decision making cognitive computing applications links data analysis and adaptive page diplo i.e. Adaptive user interfaces to adjust content for a particular type of audience.

- following are elements of cognitive system :-

a) Interactive :- They may interact easily with users so at those users can define their needs comfortably. They may also interact with other processors, devices and 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 and requirement evolve. They may resolve ambiguity and tolerate unpredictability behaviours.

c) Contexual :- They may understand, identify and extract contexcual elements such meaning syntax location, appropriate domain, etc :

d) Iterative and Stateflow :- They may aid in defining a problem by asking questions or finding additional source input if a problem statement is incomplete

Q3) Write note on language Model.

- The goal of a language model is to compute a probability of a token (e.g a sentences or sequence of words) and are useful in many different NPC application.
- language model (LM) acutally a grammar of a language as it gives the probability of word that will follow.
- In case of (LM) the probability of a sentences as sequence of word is :- $P(w) = P(w_1, w_2, w_3, \ldots w_n)$
- It can also be used to find the probability of the next word in sentence : $P(w_5 | w_1, w_2, w_3, w_4)$
- A model that compute either of these is language Model
- There are various language Model available. a few are

a) Methods using markov Assumption :-

- A process which is stochatic in nature is said to have the markov property, if the conditional probability of future states depends upon present state.

b) N- gram models :-

- from the markov Assumptions we can formally define models where $k = n-1$ as following :-

$$P(w_i | w_1 w_2 \cdots w_{i-1})$$

c) Unigram Model ($k=1$) :-

$$P(w_1, w_2 \cdots w_n) = \prod_i P(w_i)$$

d) Bigram Model (k = 2):

$$P(w_i | w_1 w_2 \cdots w_{i-1}) \quad P(w_i | w_{i-1})$$

$$(w_i | w_{i-1}) = \frac{\text{count}(w_{i-1} \cdots w)}{\text{count}(w_{i-1})}$$

Q4) Write a note on Machine translation:

- Machine translation is classic test of language understand. It consist of both language analysis and generation. many machine translation system have huge commercial use. following are few of examples:

- Google translate goes through two billion word per day
- eBay uses machine translation techniques to enable cross border trade and connect buyers/ sellers around globe.
- facebook uses (MT) to translate text in post and comments automatically in order to break language barriers.
- System become the first software provider to launch a Neural Machine translation engine in more than 30 languages in 2016.
- Microsoft brings AI-powered translation to end users and developers on android, ios, and amazon fire. whether or not they have access to Internet.
- In a traditional machine translation system, parallel corpus a collection of texts is used to each of width is translated into one or more

other language than the original. for example, given the source language eg. french and the target language e.g. English multiple statical models needs to be build. including a probabilistic formulation using the Bayesian rule a translation model p(f|e) trained on parallel corpus. and a language model p(e) trained on english corpus
- It is obious that, this approach skips hundreds of important details. require a lot human feature engineering and is overall a complex system.

Q 5) Explain the following terms :-

a) Phonology :-
- It is study of organizing sounds systematically in an NLP (natural language processing) system

b) Morphology :-
- It is a study of construction of words form primitive meaningful units.

c) Lexical Analysis :-
Lexicon is the words and phrases in language lexical analysis deals with recognition and identification of structure phrases and words.

d) Syntatic Analysis :-
- In Syntatic Analysis the Sentences are parsed as noun verbs adjective and other parts of Sentences. In this phase the grammer of the Sentences is analysed in order to get relationship among different words in Sentences example. "Mango eachme" will be rejected

by analyzer

e) word sense disambiguation:-

-while using words at have more than one meaning we have to select the meaning which makes the most sense in context. for example. we are typically given a list of words associated words senses eg from a dictionary or from an online resource such as word net.