Assignment No. 1.B

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Q.1) Explain PEAS descriptors For WUMPUS world.

→ i) ~~Performance measure~~ -

PEAs represent Performance Measures, Environment, Actuators and sensor.

The PEAs description helps in grouping the agents.

1) Performance measure :-

+100 For grabbing the gold and coming back to starting position.

-200 if the player is killed.

- 1 per action

- 10 For using the arrow.

2) Environment :- i) Empty Rooms

ii) Rooms with WUMPUS

iii) Room neighbouring to WUMPUS which are smelly.

iv) Rooms with bottomless Pits

v) Rooms neighbouring bottomless pits which are breezy.

vi) Room with gold which gilttery.

vii) Arrow to shots the WUMPUS.

3) Sensor (assuming a robotic agent) :-

i) camera to get the view

ii) ~~Odour~~ odour sensor to smell the stench.

iii) Audio Sensor to listen to the scream and bump.

~~Cyber Attacks~~

4) Effectors (assuming a robotic agent) :-

i) Motor to Move left, Right

ii) Robot arm to grab the gold.

iii) Robot mechanism to shoot the arrow.

Wumpus world characterization :-

i) parilally observable :- know only the local perceptions

ii) Deterministic :- outcome is precisely specified.

iii) Sequential :- Subsequent level of action performed

iv) Static :- Wumpus, pit are immobile.

v) Discrete :- discrete environment.

vi) Single-agent :- The knowledge-based is the only agent where as the wumpus is considered as the environment's feature.

Q.2 Explain various element of congnitive System.

→ Congnitive system :- Congnitive computing system can synthesize data from various Information Sources, while weighing context and conflicting evidence to suggest the possible answer It is an abstract identify consisting of the set of equation determining the time evolution of the internal dynamic variables.

A category of technologies that use congnitive computing natural language processing and machine learning to enable people and machines to interact more naturally to extend to magnify human expertise and congnition.

To achive those capabilities congnitive computing system must have five key attributes are listed by the cognitive computing core.

i) Adaptive :- congnitive system must be flexible enough to learn as information changes and as goals evolve. The system must be able to digest dynamic data in real time and make adjustments as the data environment change.

ii) Interactive :- They may interact easily with user

so that users can define their needs comfortably They may also interact with other processor device and cloud services as well as with people

ii is contexual :- Understanding context is critical in thought process and ~~cogn~~ cognilive must also understand identiry and mine contextual data. They may understand, identiry and extract contexual elements such a meaning ~~system~~ syntax, location, appropriate domain, etc.

3) Write note on language Model

→ i) The goal of a language model is compute a probabilit of token and are useful in many different Natural Language processing application.

ii) Language Model actually a grammar of language as it gives the probability of word ~~bri~~ that will Follow.

iii) for example :- They have been used in Twitter Boots for 'robot' account to from their own Sentences.

iv) In case of probabilistic language modelling the probability of sentence as sequence of words is calculated:

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

i) It can also be used to Find the Probability of next world of in the sentence:

$$P(w_5 | w_1, w_2, w_3, w_4)$$

iii) A model that computer either of these is called a Language mode.

iv) Language modelling is one of the most important part of modern, natural languge processing. There are many sorts of application modeling like spel correctio speech Recognition, machine Translation, Question. Answering, summarization, sentiment analysis et.

There are ~~vario~~. All these tasks require use of language model. language model reprsent text a form understanable From the machine point of view.

Moreover, language modelling must also consider ordering of tokens. As every language is based on some grammar where order has a lot of influence on the meaning of text.

Methods using the Markov assumption:-

A process which is stochastic in nature is said to have the markov property if the conditional probability distribution of future states of process depends only upon the present state, don not on the sequence of event that happend in the past. A process with property called a Markov process.

- Following is the genral equation for Markover Assumption $k = i$:

$$P(W_i | W_i W_2 \cdots W_{i-1}) = P(W_i | W_{i-k} \cdots W_{i-1})$$

2) N-gram model

$$P(W_i | W_i W_2 \cdots W_{i-1}) = P(W_i | W_{i-(a-1)} \cdots W_{i-1})$$

3) Unigram model ($k=1$)

$$P(W_1 W_2 \cdots W_n) = \prod_j P(W_i)$$

4) Bigram model ($k=2$):-

$$P(W_i | W_i W_2 \cdots W_{i-1}) = P(W_i | W_{i-1})$$

4) Write a note on Machine Transaction : Translation :-

i) Maching Transfaction is the process of using artifical intelligence to automatically transaction content From one language to another without any human input

ii) Machine Translation is the classic test of language understanding. It consist of both language analysis and language genration.

iii) Many machine translation system have huge commerica use.

Following are Few example.

a) Google Translate goes through 100 billion word per day.

b) eBay uses Machine Translation Technique to enable cross-boreder trade and connect buyer and seller around the world.

c) Facebook uses machine Translation to Translate text in posts and comments automatically, in order to break language baustiers and allow people around the world to communicate to each other.

d) System became the First Software provider to launch a Neural Machine Translation engine in more than 30 language back in 2016.

e) Microsoft bring AI-powered translation to end users and developers on Android, IOS and Amazon Fire, whether or not they have to acess internet.

iv) In a tradition machine translation system parallel corpus a collection text is used

each of which is translated into one or more other language than the original.
e.g French and target language.

v) It is obvious that this approach skips hundreds of important details, requires a lot of human feature engineering consist of many different and independent machine learning problem and overall is a very complex system.

1) Neural Machine Translation (NMT) :-
It is an approach to machine Translation that uses an artificial neural network to predict the likehood of sequence of words, typically modelling entire sentence in a single integrated model

2) Long short-Term Memory (LSTM) :- It is an artificial recurrent netural network architecture used in the field of deep learning.

5) Explain the Following term

a) Phonology :- It is study of organizing sound Systematically. The moving diagram visualize the mouth in its efforts to articulate sounds and their cluster in languages golbally. It is the study of the way sounds function in languages, including, syllable structure, and which sounds are distinctive units within a language the way sound ~~and~~ function within a given language.

b) morphology :- It is the studey of word structure the way words are formed and the way their form interact with other aspects of grammer such as phonology and syntax. It is a study of construction of word from primitive meaningful units. It is important for phonic in bothe reading and spelling as well as in vocabulary comphernsive.

c) Lexical analysis :- It involves identifying and analyzing the structure words. Lexicon of a language means the collection of words and phrases in a language. Lexical analysis is dividing the whole chunk of txt into pragraphs, sentence and word.

d) Syntatic analysis :- It is also referred to as Syntax analysis or parsing.

It is the process of analyzing natural language with the rules of a Formal grammar.

Syntatic analysis basically assign a sematic structure to text.

syntax analysis checks the text for meaningfulness comparing to the rules of Formal grammar.

In this syntatic analysis may be defined as the process of analyzing the string of symbols in natural language conforming to the rules of Formal grammer.

e) Word Sense Disambiguation :- It is natural language processing may be defined as the ability to determing which meaning of word is activated by the use of word in a particular context. Resolving semantic ambiguity is harder than resolving syntatic ambiguity.

part-of speech taggers with high level of accuracy can solve word syntatic ambiguity.

On the other hand, the problem of resolving semantic ambiguity is called WSD.

Evaluation of WSD

i) A Dictionary

ii) Test corpus.