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Sem :- VII/BE   Batch :- I-3

Subject :- AT

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K.G.C.E.
Karjat - Raigad

Page No. :
Date :

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Q1. Explain PEAs descriptors for WUMPUS world

i) Performance Measure
- +100 for grabbing the goal & coming back to start.
- -200 if the player is killed.
- -1 per action
- -10 for using the arrow.

ii) Environment.
- Empty rooms
- Room with WUMPUS.
- Rooms neighbouring to wumpus which are smelly
- Rooms with bottomless pits.
- Rooms neighbouring with bottomless pits which are breez.
- Room with gold which is glitery.
- Arrow to shout the Wumpus.

iii) Sensors (assuming a robatic agent)
- Camera to get the view.
- Odour sensor to smell the starch
- Audio sensor to listen to the screen & bump.

iv) E Rectors (assuming a robotic agent)
- motor to move left right.
- Robot arm to grab the gold.
- Robot mechanism to shoot the arrow

The WUMPUS world agent has following characters:

a) Fully observable   d) static
b) Determistics   e) Disrete
c) Episodic   f) Single agent.

Q2. Explain various elements of congnitive system

→ Congnitive computing is a new type of computing with the goal of more accurate models of how the human brain/mind senses, reasons & responds to stimulus. Generally, the term lognitive computing is used to refer to new hardware and /or software that minic the following functioing of the human brain thereby improving human decision making cognitive computing applications links data analysis and 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 that those users can define their needs comfortably. They may also interact with other processors, devices & cloud services as well as with people.

b) Adaptive :- They may be engineered to Fixed an dynamic data in real time. They may learn as information changes & as goals & requirements evolve. They may resolve ambiguity & tolerate unpredicctability behaviours.

c) Contexual : They may be understand, identify & extract contexual elements such as meaning syntax, location, appropriate domain etc

d) Interactive & stateful :- They may beid in defining a problem by asking questions or finding addtional source input if a problem statement is incomplete

Q3 Write note on language Model.

→ The goal of language model is to compute a probability of taken (eg. a sentence or sequence of words) and are useful in many different NPE applications.

- language model (cm) actually a grammar. of a language as it gives the probability of word that will follow.

- In case of (cm) the probability of a sentence as sequence of words is $P(w) = P(w_1, w_2, w_2, ---, w_n)$

- 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 computes either of these is language model.

- There are various language model available, a few are :-

a) Methods using mark or assumption :-

- A process which is stochastic 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.

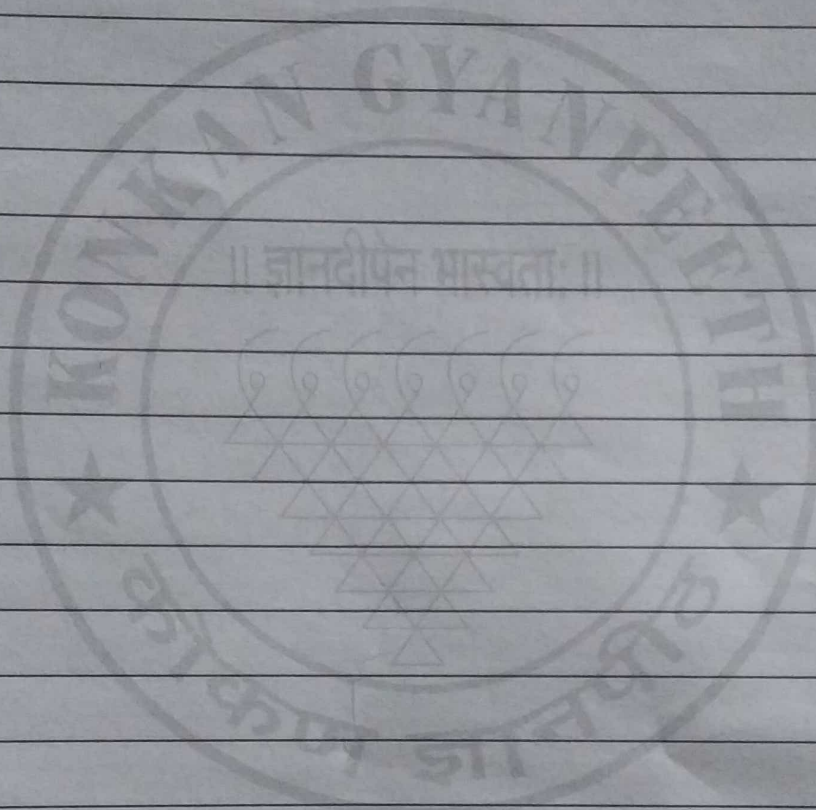$$P(w_1 / w_2 w_2 --- w_{i-1})$$

c) Unigram model $(k=1)$. :-

$$P(w_1, w_2, --- w_n) = \amalg P(w_i)$$

d) Bigram model $(k=2)$

d) Bigram model (k=2) :-

$$P(W_1 | W_1, W_2 \ldots w_i-i) = P(w_i | w_{i-1})$$

$$(w_i | w_{i-1}) = \frac{Count(w_{i-1} \ldots w)}{Count(w_{i-1})}$$

Q4. Write a note on machine Translation :—

→ Machine Translation is classic test of language understand It consists of both language analysis and generation many machine translation system, have huge commerical use. Following are few of the examples :—

- Google Translate goes through 100 billion words per day.

- Facebook uses translate text in post and comments automatically in order to break language barriers

- System become the First software provides to launch a neural machine translation engine in more than 30 languges in 2010.

- Microsoft brigs AI-Powered translation to end users and developers an Android, ios and Amazon fire, whether or not they have access to the Internet

- In a traditional machine translation system, parallel corpus a collection of its used to each of this translated into one or more other language than the orignal. For example given the source language eg. French and the target language eg English multiple stastical model needs to be build inciulding a probablistic formulation using the Rayesian rule, a translation model p(f)e trained on parallel corpus and language model p(e) trained on the english corpus

- It is obious that this approuch skips hundreads - of important details requires a lot of human feature engineering & is overall complex system.

R.G.C.E.
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Page No. :
Date :

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Q5. Explain the following terms :-

a) Phonology :-

- It is the study of organizing sounds systematically in a NCP (natural language processing) system.

b) Morphology :-

- It is a study of construction of words from primitive meaningful units.

c) Lexical Analysis :-

- lexicon is the words & pharases in language. Lexical analysis deals with recognition & identification of structure of sentences. It divides the paragraphs in sentences, pharase & words.

d) Syntatic Analysis :-

- In Syntatic analysis the sentences are parsed as noun, verbs, adjective & other parts of sentences. In this phase the grammar of the sentence is analyzed in order to get relationship among different words in sentences for example "Mango eat me" will rejected by analyzer.

e) Word sense disombigution :-

→ While using words that 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 sensors eg from a dictionary or from an online resource such as word net.