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DOP	DOA	Remark	Sign

1) Explain PEAS descriptors for WUMPS world.

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

2.) Environment =
- Empty rooms
- Rooms with WUMPUS.
- Rooms neighbouring to WUMPUS which are smelly
- Rooms with bottomless pits.
- Rooms neighbouring to bottomless pits which are breezy.
- Rooms with gold which are glittery.
- Arrows to shoot the WUMPUS.

3.) Sensors -
- Camera to get the view
- Odour sensor to smell the stench
- Audio sensor to listen to the scream and bump.

4.) Effectors =
- Motor to move left, right.

- Robot arm to grab the gold
- Robot mechanism to shoot the arrow.

- The WUMPUS world agent has following characteristics.
  - Fully observable
  - Deterministic
  - Episodic
  - Static
  - Discrete
  - Single agent.

Q. 2. Explain various element of cognitive system.

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- Cognitive computing is a new type of computing with the goal of more accurate model of how the human brain / mind senses, reasons, and responds to stimulate. Genually the term cognitive computing is used to refer to new hardware and or software that mimic the following functioning of the human brain thereby improving human decision making cognitive computing applicat? links data analysis and adaptive page i.e adaptive uses interface to adjust content for a particular type of audience.

- Following are elements of cognitive system:

1.) Interactive :

They are it may interact easily with uses so that those users can define

their needs comfortably. They may also interact with other processors devices and cloud services as well as with people.

2) Adaptive =

They may be engineered to feed on dynamic data in real time, they may learn as informat? data in real time. They may learn as informat? changes and as goalls and requirements evolve. They may resolve ambiguity and tolerate unpredictability behaviours.

3) Contextual =

They may understand, identify and extract contextual elements such as meaning syntax, load?, appropriate domain, etc

4) Iterative and stateffors =

They may aid in defining a problem by asking questions or finding additional source input if a problem statement is incomplete.

Q. 3. Write note on language Model.

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- The goal of a language model is to compute a probability of a token. Eg: a sentence a sequence of words and are useful in many different NPL applied?.

- Language model (LM) actually a grammer of a language as it gives the probability of words that will follow.

- In case of (LM) the probability of a sentence as sequence of words is : $P(W) = P(W_5 | W_1, W_2, W_3, W_4)$.

- A model that computes either of these is language model. There are various language model available, a few are:

1) Methods using markov assumpt° =

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

2) N-gram model =

From the markov assumpt°, we can formally define models where $k = n-1$ as following:

$P(W_i | W_1, W_2 \cdots W_{i-1})$

3) Unigram model ($k=1$) =

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

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

$$P(w_i / w_1 w_2 \dots w_{i-1}) = P(w_i / w_{i-1})$$

$$\therefore P(w_i / w_{i-1}) = \frac{count + (w_i - 1 \dots w_i)}{count + (w_{i-1})}$$

Q. 4. Write a note on Machine Translat?

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Machine Translat? is classic task of language understand. It consists of both language analysis and generat? Many machine translat? system have huge commercial use. Following are few eg:

- Google Translate goes through 100 billion words per day.
- E bay uses machine translat? techniques to enable cross-border trade and connect buyers / sellers around globe.
- Facebook uses (MT) to translate text in posts and comments automatically in order to break language barriers.
- Systran became the first software provider to launch a Neural Machine Translat? engine in more than 30 language in 2016.
- Microsoft brings AI-powered translat? to end users and developers on android, iOS and Amazon fire, whether or not they have acces to the Internet.

- In a traditional machine Translat? to end users and developers on Android, iOS

parallel corpus a collect of texts is used to each of width, is translated into one or more other languages than the original. For eg, given the source language Eg: French and the target language Eg English multiple statistical models needs to be build including a probability model p(f)e trained on parallel corpus and a language model p(e) trained on the English corpus.

- This approach skips hundreds of important details requires a lot of human resource and feature engineering, and is overall a complex system.

Q. 5. Explain following terms :

1.) Phonology =

It is the study of organizing sounds systematically in an NCP (Natural language processing) system.

2.) Morphology =

It is a study of constitution of words from primitive meaningful units.

3.) Lexical analysis =

Lexicon is the words and phrases in language, lexical analysis deals

with the recognit? and identifiat? of structure of sentences. It divides the paragraphs in sentences, phrases and words

4) Syntatic Analysis =

In syntatic analysis the sentences are parts of sentences. In this phase the grammer of the sentence is analysed in order to get membership among word in a sentences.

5) Word sense disambiguation =

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