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DOP DOA Marks Sign

Q.1 Explain PEAS descriptors for WUMPUS world

→ i) Performance Measure
- +1 for grabbing gold and coming back to start.
- 200 if player is killed
- -1 per action
- -10 for using arrow.

ii) Environment
- Empty Rooms
- Room with WUMPUS
- Rooms neighboring to WUMPUS which are smelly.
- Rooms with bottomless pits
- Rooms neighboring with bottomless pits which are breezy.
- Room with gold which is glittery
- Arrow to shoot WUMPUS

iii) Sensors (Assuming Robotic Agent)
- Camera to get the view
- Odour sensor to smell

iv) Effectors (assuming robotic agent):
- Motor to move left Right.
- Robot arm to grab
- Robot Mechanism to shoot arrow.

WUMPUS world agent has following characters

a) Fully observable
b) Deterministics
c) Static
d) Discrete
e) Single Agent

Q.2 Explain Various elements of Cognitive System

->i) Cognitive Computing is new type of Computing with goal of more accurate models of how human brain/mind senses, reason, & responds to stimulus.

ii) Generally, term Cognitive Computing is used to refer to new hardware and / or software that mimic following functioning of human brain thereby improving human decision making. Cognitive Computing applications link data Analysis or Adaptive page in Adaptive user interface to adjust content for particular type of Audience.

- Following are elements of Cognitive System

a) Interactive may interact easily with user so that those users can define their needs comfortably they may also interact with other processor devices or cloud services.

as well as the people.

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

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

d) Iterative
- They may used in identifying a problem by asking questions or finding additional source input if problem statement is incomplete

Q.3 Write note on Language Model.

→ i) Goal of language model is to compute probability of token (e.g sentence or sequence of words) & are useful in many different NPL Applications.

ii) Language model actually gramer of a language as it gives probability of word that will follow.

iii) In case of (LM) probability of a sentence as sequence of words is $P(w)$ $= P(w_1, w_2, w_3 \ldots w_n)$

iv) It can also be used to find probability of next word in sentence $P(w_5 / w_1, w_2, w_3, w_4)$

v) A model that computes either of these is language Model.

* There are various language Model available a few are:

a) Methods using Markov assumption.

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

b) N-Gram models

- From Markov assumptions we can formally define models where $k = n-1$ as following

$$P(w_i / w_1, w_2 \ldots w_{i-1})$$

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

$$P(w_1, w_2 \ldots w_n) = \prod p(w_i)$$

d) Bigram model $(k = 2)$ of:-

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

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

Q.4 Write a note on Machine Translation?

->i) 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 100 billion words per day.
- eBay uses Machine Translation techniques to enable cross-border trade & connect buyers seller around globe.
- Facebook uses Machine Translation to Translate to text in posts and comments automatically in order to break language barriers.
- Systran became 1st software provider to launch a Machine Translation engine in more than 30 language in 2016.
- Microsoft brings AI-powered translation to end users and developers on Android, IOS, and Amazon. Five whether or not they have access to Internet.
- In traditional Machine Translation system parallel corpus, a collection of trees is used to each of width is translated into one or more other language the original.

For eg: Given source language eg French and target language eg English multiple statical models need to be build including a probabilistic formulation using translation model $p(s)$ obtained on parallel corpus and language model $p(e)$ trained on english corpus

- It is obvious that this approach skips hundred of important details required a lot of human feature engineering and is overall a complex System

Q.5 Explain

a) Phonology
- It is study of organizing sounds systematically in an NLP (Natural language Processing) System.

b) Morphology
- It is study of construction of words from primitive meaningful units.

c) Lexical Analysis:
- Lexicon is words and phrases in language. Lexical Analysis deals with recognition & identification of studies of sentence. It divides paragraphs in sentences, phrases & words

d) Syntatic Analysis
- In this sentence are parsed as noun, verb, adjective and other parts of sentences. In this phase grammer of sentence is analyzed in order to get relationship among different words in sentences.
- e.g Mango eats me will be rejected by analyzer.

e) Word sense disambiation.
- While using words that have more than one meaning we have to select meaning which makes most sense in context.
For e.g we are typically given list of words associated words senses. e.g from dictionary or from an online Resource such as word net.