Assignment no:- 1B

Name : Ketan Vijay Choudhari

Roll no : 12

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Subject AI

Q1) Explain PEAS descriptor for WUMPUS world

→ i) Performance Measure :-

- +100 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
- Room neighbouring to WUMPUS which are Smelly
- Rooms with bottomless pits
- Rooms neighbouring with bottomless pits which are breezy
- Room with gold which is glittery
- Arrow to shoot WUMPUS

iii) Sensor (assuming Robotic agent)

- Camera to get the view
- Odour Sensor to smell
- Audio Sensor to listen to scream bump

iv) Effector (assuming robotic agent)

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

WUMPUS world agent has following characteristics:-

a) fully observable
b) Deterministic
c) Static
d) Discrete
e) Single agent

Q2) Explain various elements of Cognitive System

⇒ 1) Cognitive Computing is new type of Computing with goal of more accurate Models of how human brain / mind senses reasons and responds to stimulus.

2) 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 links data Analysis of adaptive page i.e. Adaptive user interface to adjust Content for perticular type of Audience

- following are elements of Cognitive System.

a) Interactive:
- They may interact easily with user So. those users can desire their needs comfortably
- They may also interact with others processors devices of 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 requirements evolve.

c) Contextual :-

- They may understand identify or extract contextual elements such as Meaning Syntax, location appropriate domain etc.

d) Interactive of State

- They may used in defining a problem by asking questions or finding additional source input if problems statement is incomplete

(Q3) Write a note on language Model

→ 1) Goal of language model is to compute probability of token (eg. Sentence or Sequence of words are useful in many different NPL application

2) language Model actually a grammar of a language as it gives probability of word that will follow

3) In case of (LM) Probability of a Sentence as Sequence of words is

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

4) It can also be used to find probability of next word in Sentence $P(w_5 | w_1, w_2, w_3, w_4)$

5) A Model that Computes either of these is Language Model

There are various Language Model available afew are :-

a) Methods Using Markov Assumption :-

- A process which is Stochastic in nature is said to have Markov property if Conditional probability of future State depends upon present State

b) N-Gram Models :-

- From Markov Assumption we can formally define Models where K : N-1 as Follows

$$P(w_i | w_0, w_2 \ldots w_{i-1})$$

c) Unigram Model (K-1)

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

d) Bigram model (K=2):-

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

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

(Q4) 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 eg:-

- Google Translate Goes through 100 billion Word Per day
- eBay uses Machine translation techniques to enable Cross-border trade & Connect buyers / Sellers around Globe
- facebook User Machine Translation to translate text into Posts and Comments automatically in Order to break language barriers
- System because lot Software providers to launch a 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 whether or not they have access to internet

- In traditional Machine Translation System Parallel Corpus a collection of three is used to each or with is translated into One or more Other language than original eg:- Given Source language eg: Retrieve to the language eg English.

(Q5) Explain following terms :-

-> a) Phonology :-

- It is study of organizing sounds systems critically in an NLP (Natural language processing) System

b) Morphology :-

It is study of construction of words from primitive meaningful units

c) Lexical Analysis :-

- Lexical analysis is words and phrase in language Lexical Analysis deals with recognition and identification of structure of sentences It divides program in sentence phrase and words

d) Syntatic Analysis :-

- In this sentences are parsed as noun verbs adjective and other parts of sentences In this phase grammer of sentence is analysis In order to set relationship among different words in sentences

eg:- Mango eats me. will be register by analyser

e) Word Sense disambiguation

- While using words that have more than one meaning we have to select meaning which makes most sense in context

For eg :- We are typically given list of words sense eg. from dictionary or from an online resource such as word net.