

Assignment No. 1 - 1B

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Roll No.:- 56

Batch :- I.

Sem :- VII / T.T.

Subject :- A.T.

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1	2	3	4
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97	98	99	100

(Q.1) Explain PEs descriptors for Wumpus world

i) Performance measure

- +100 for grabbing the goal & coming back fast
- -200 if the player is killed
- -1 per action
- -10 for using the arrow.

ii) Environment

Empty Rooms

Rooms with WUMPUS

Rooms neighbouring to WUMPUS which are smelly

Rooms with bottomless pits

Rooms Arrow to start the WUMPUS.

iii) Sensors Consuming a robotic agent

Camera to get the view

odour sensor to smell the stench

Audio sensor to listen to the screen & bump

iv) Effectors Consuming 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 (b) Deterministic (c) Episodic
- (d) Static (e) Discrete (f) Single agent

(Q.2)

Explain various elements of cognitive system?

Cognitive 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 cognitive computing is used to refer to new hardware & software that mimic the following functioning of the human brain thereby improving human decision making. Cognitive computing applications links data analysis & adaptive page display.

i.e. 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.
- (b) Adaptive :- They may be engineered to feed on dynamic data in real time.
- (c) Contextual :- They may understand, identify & extract contextual elements such as meaning, syntax, location, appropriate domain, etc.
- (d) ~~Iterative & stateful~~ :- They may aid in defining a problem by asking questions or binding additional source input if a problem statement is incomplete.

Q.3)

Write note on Language Model.

The goal of a language model is to compute a probability of a token (e.g. a sentence or sequence of words) & are useful in many different NLP applications.

In case of (cm) the probability of sentence as sequence of words is:- $P(w) = P(w_1, w_2, w_3, \dots)$

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 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:-

$$P(w_1, w_2, w_3, \dots, w_{n-1})$$

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

$$P(w_1, w_2, \dots, w_n) = \prod_i P(w_i)$$

(d) Bigram Model ($k=2$):-

$$P(w_1, w_2, w_3, \dots, w_{n-1}) = P(w_1 | w_0) P(w_2 | w_1) \dots P(w_{n-1} | w_{n-2})$$

$$P(w_1 | w_0) = \frac{\text{Count}(w_0, w_1)}{\text{Count}(w_0)}$$

Q.4]

Write a note on Machine Translation.

- Machine Translation is classic test of language understand. It consists of both language analysis & generation.
- Google Translate goes through 100 billion words per day.
- eBay uses machine translation technique to enable cross-border trade & connect buyers/sellers around globe.
- Microsoft brings AI-powered translation to end users & developers on Android, iOS & Amazon Fire, whether or not they have access to the Internet.
- In a traditional machine translation system parallel corpus (a collection of documents) used to each other, is translated into one or more other language than original.
- It is obvious that, this approach skips hundreds of important details, require a lot of human feature engineering, & is overall a complex system.

Q5] Explain the following terms:-

(a) phonology

It's study of organizing sounds systematically in an NLP (natural language processing) system.

(b) Morphology

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

(c) Cexical Analysis :-

Cexical is words & phrases in language.

Cexical analysis deals with recognizing & identification of structure of sentences.

Individes the paragraphs in Sentences, phrases & words.

(d) Syntactic Analysis :-

In syntactic Analysis the sentences are prased as noun, verbs, objective & other parts of sentences. In this phase the grammar of sentence is analysed in order to get

relationship along different words in sentences for example, "Mango each me" will be rejected by analyzer.

(e) Word Sense disambiguation :-

While using words to qt 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 senses (e.g. From a dictionary or from an online resource such as wordnet).