

# Assignment No. :- 18

Page No.	
Date	

> Name :- Tejas Balasa Jadhav.

> Roll No. :- 24

> Batch :- I-1

> Sem :- VII / I.T.

> Subject :- A.I.

D.O.A. D.O.P. Remark Sign.

Q.1 Explain PEAS descriptors for Wumpus world

- Ans:-
- i) Performance measure :-
    - \* 100 for grabbing the goal & coming back to start.
    - 200 if 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 breezy
    - > Room with gold which is glitery.
    - > Arrow to start the wumpus.
  - iii) Sensors (assuming a robotic agent)
    - > Camera to get the view.
    - > Odour sensor to smell the stench
    - > Audio sensor to listen to the screen & bump.
  - iv) Effectors (assuming a robotic agent)
    - > Motor to move left right.
    - > Robot arm to grab the gold.
    - > Robot arm to grab the gold.
    - > Robot mechanism to shoot the arrow
- The Wumpus world agent has following characters:
- a) Fully observable    b) Deterministic



- a] Episodic    d] Static    e] Discrete  
f] Single agent

Q. 2 Explain various elements of cognitive system.

- Ans:-
- > 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 stimuli.
  - > Generally, 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 applications links data analysis & adaptive page digit display i.e. Adaptive user interfaces, to adjust context 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 processes, devices & 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 & as goals & as reqs. evolve. They may resolve ambiguity & tolerate unpredictability behaviours.
- c) Contextual: They may understand, identify & extract contextual elements such as meaning, syntax, location, appropriate domain, etc.
- d) Interactive & Stateflow: They may work 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.

- The goal of a language model is to compute a probability of a token e.g. a sentence NPC applications.
- language model (LM) actually a grammar of a language as it gives the probability of word that will follow.
- In case of P (LM) the probability of a sentence or sequence of words is:-  

$$P(w) = P(w_1, w_2, w_3, \dots, w_n)$$
- It can also be used to find the probability of the next word in sentence  

$$P(w_{s+1} | w_1, w_2, w_3, w_4)$$



→ A model that computes either or these is language model

→ There are various language models 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 assumption, we can formally define models where  $k = n-1$  as following.

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

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

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

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

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

$$P(w_i | w_{i-1}) = \frac{\text{count}(w_{i-1} \dots w_i)}{\text{count}(w_{i-1})}$$

Q. 4 Write a note on Machine Translation.

Ans → Machine Translation is classic test of language understanding. It consists of both language analysis & generation. Many machine translation systems 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/sellers around globe.
- Facebook uses (MT) to translate text in posts & comments automatically in order to break language barriers.
- Sysran became the first software provider to launch a Neural Machine Translation engine in more than 30 languages in 2016.
- Microsoft brings AI-powered translation to end-users & developers on Android, iOS, & Amazon to the Internet.
- In a traditional Machine Translation system, Parallel corpus a collection of traces is used to each of width, is translated into one or more other languages than the original. For example given the source languages eg. French & the target language. eg.



English, multiple statistical models needs to be build, including a probability model  $p(P|e)$  trained on parallel corpus & a language model  $p(e)$  trained on the English corpus

→ It is obvious that, this approach skips hundreds of important details requires a lot of human features engineering, & is overall a complex system.

Q 5 Explain the following terms:-

Ans:- a] Phonology:-

→ It is the 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] Lexical Analysis:-

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

d] Syntactic Analysis:-

→ In Syntactic Analysis the sentences are parsed as noun, verbs, adjective & other parts of sentences. In this phase the grammar of the sentence is



analysed in order to get relationship among different words in sentences. get relationship among different words in sentences. For example, "Mango eat me" will be rejected by analyzer.

a) Words sense disambiguation:-

→ 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 with word senses (eg from a dictionary or from an online resource such as wordnet).