

Assignment :- 1B

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Subject:- A.I

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Q1 Explain PEAS description for Wumpus world

→ 1) Performance measure

- +100 for grabbing goal and coming back to start
- -200 if player is killed
- -1 per Action
- -10 for using arrow

2) Environment

- Empty Rooms
- Room with Wumpus
- Room neighbouring to Wumpus which are Smelly
- Room with bottomless point pits
- Room neighbouring with bottomless pits which are breezy
- Room with gold which is glitzy
- Arrow to shoot Wumpus

3) Effectors (Assuming Robotic agent)

- motor to move left to Right
- Robot arm to grab
- Robot mechanism to shoot arrow

4) Sensors (Assuming Robotic Agent)

- Camera to get view
- Odour Sensor to smell

wumpus world agent has following character

- a) fully observable
- b) Deterministic
- c) static
- d) Discrete
- e) Single Agent

Q2 Explain various element of cognitive system



- Cognitive computing is new type of computing with goal of more accurate model of how human brain/mind sense, reason and respond to stimulus.
- Generally term Cognitive Computing is used to refer to new hardware and software that mimic following function of human brain thereby improving human brain decision making. Many Cognitive Computing application links Data Analysis or Adaptive page i.e. Adaptive user interfaces to adjust content for particular type of Audience.
- following are element of Cognitive System.

### 1) Interactive

- They may interact easily with users so that those user can define their need comfortable. They may also interact with other processor device or cloud service as well as with people.

### 2) Adaptive

- They may be engineered to feed on dynamic data in real time. They may learn information change and as goal or requirement evolve. They may resolve ambiguity and unpredictability behaviors.

### 3) Contextual

- They may understand identify or extract contextual element such as meaning, syntax, location, appropriate domain etc.

### 4) Iterative

- They may used in defining a problem by asking question or finding additional sources input if problem statement is incomplete.

Q3 write Note on Language model



- Goal of language model is to compute probability of token (eg Sentence or Sequence of words) are useful in many different NLP Application.
- Language model actually grammar of a language as it gives probability of word that will follow.
- In Case of (LM) probability of a sentence as sequence of word is  $p(w) = p(w_1, w_2, w_3, \dots, w_n)$
- It can also be used to find probability of next word in Sentence  $p(w_s | w_1, w_2, w_3, \dots, w_n)$
- A model that computes either of these is Language model
- \* There are various language model available a few are
  - 1) method using markov assumption
  - A process which is stochastic in nature is said to have markov property if condition probability of future state depends upon present state.

2) N-Gram model

- from markov assumption we can formally define model where  $k=n-1$  as following

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

3) Unigram model ( $k=1$ )

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

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

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

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

Qh write a note on Machine Translation

→

- Machine Translation is classic test of language understand IT consist of both language analysis and generation many machine translating system have huge commercial use following are few of example.
- google Translate goes through 1000 billion word per day.
- ebay uses machine translation to translate text in posts and comment automatically in order to break language barriers.
- system became 1<sup>st</sup> software provide to launch a machine Translation Engine in more than 30 language in 2016.
- Microsoft bring AI powered translation to end user and developer on android Ios, and Amazon fire, whether or not they have access to Internet.
- In traditional machine Translate system parallel Corpus a collection of texts is used to each of which is translation into one or more other language than original.  
for eg given source language eg french and target language english, multiple statistic model need to be build including a probabilistic formulation using translate model  $p(f)$  & trained on parallel Corpus & language model  $p(e)$

• It is obvious that this approach skip hundred of important detail requires a lot of human feature engineering and is overall a complex system.

as Explain following term



1) phonology:-

- It is study of organizing sound systematically in an NLP (natural language processing) system.

2) morphology

- It is study of construction of word from primitive meaningful units.

3) lexical Analysis

- Lexical is word & phrases in language. Lexical analysis deal with recognition & identification of structure of sentence. It divides paragraph in sentence, phrase & word.

4) Syntactic Analysis

- In this sentence are parsed as noun, verbs, adjective and other part of sentence. In this phase grammar of sentence is analysis in order to get relationship among different word in sentence.

e.g. "mango eats me" will be rejected by ~~analysis~~ analyzer

### 3) word sense disambiguation

- while using word 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 word associated word sense eg. from dictionary or from an online resource such as word net.