

Assignment 1 B

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Subject: AI IIS LAB

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Q.7 Explain PEAS descriptions for WUMPUS world.



i) performance measure

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

ii) Environment

① Empty Rooms

- Rooms neighbouring to WUMPUS which are smells.
- Rooms with bottomless pits
- Rooms neighbouring with bottomless pits which are breeze.
- Room with gold which is glinty.
- Arrow to shoot WUMPS.

iii) Sensors (assuming Robotic Agent)

- Camera to get the view.
- Odour sensor to smell.
- Audio sensor to listen to screen & bump.

iv) Effectors (assuming robotic agent)

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

WUMPUS world agent has following character:

i) fully observable

ii) Deterministic

iii) Static

iv) Discrete

v) Single Agent.

Q.2)

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 software that mimic functioning of human brain thereby improving human decision making (cognitive Computing applications like data analysis or adaptive page ie Adaptive user interfaces to adjust content for 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 processors, devices or 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 or requirements evolve.

They may resolve ambiguity and tolerate unpredictability of behaviours.

c) Contextual:

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

d) Interactive: (opposite to implicit method)

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

Q. 3)

Write 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 NLP 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.

$$P(w) = \text{SP}(w_1, w_2, w_3, \dots, w_n)$$

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

A model that computes either of these is language model.

⑤ There are various language model available a few:

a) Methods using Markov assumption in nature is said to have mark 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:

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

c) Uni-gram model ($k=1$) :-

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

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

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

$$(w_i | w_{i-1}) = \frac{\text{Count}(w_i - 1, \dots, w_1)}{\text{Count}(w_{i-1})}$$

- Q. 4) write a note on Machine Translation?
- ① Machine Translation is classic test of language-understanding and it consists of both language analysis and 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 OR connect buyer/sellers around globe.
 - Facebook uses machine translation to translate text in posts and comments automatically in order to break language barriers.
 - System became 1st software provider to launch a machine translation engine in more than 30 languages in 2016.
 - Microsoft brings AI-powered translation to end Android, iOS, and Amazon. Fire whether or not they have access to Internet.
 - In traditional machine translation system, parallel corpus a collection of texts is used so each of which is translated into one or more other languages than original. for eg. given source language e.g. French and target language e.g. English multiple statistical models need to be built including a probabilistic formulation using translation model PCF) & trained

on parallel corpus and language model (P(e)) trained on english corpus.

It is obvious that this approach skips hundreds of important details requires a lot of human feature engineering and is overall a complex system.

- [Q. 5] Explain following terms:
- 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 recognitions or identification of structure of sentences. It divides paragraphs in sentences, phrases and words.
 - d) Syntactic Analysis
- In this sentences are parsed as noun, verbs, adjective and other parts of sentence. In this phase grammar of sentence is analyzed in order to get relationship.
Eg. 'mango eats me' will be rejected by analyzer.
 - e) Inword sense disambiguation -
- while using words that have more than one meaning we have to select meaning which makes most sense in context.
- Eg. ~~From~~ all we are typically given list of words.

associated word sense e.g. from dictionary or
from an online resource such as word net.

After reading the definitions for both words, the student must determine which word is more appropriate for the sentence.

After reading the definitions from the dictionary, the student must determine which word is more appropriate. After reading the definitions, the student must determine which word is more appropriate. Then, the student must determine which word is more appropriate.

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