Assignment NO:- 1B

Name :- Kunal G. Bachute

Roll No:- 02

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DoP	DoA	Marks	Sign.

Q1. Explain PEAS descriptors for klompox World.

→ i) Performance Measure:
- +100 for grabbing goal and coming back to start.
- -200 if player is killed
- -1 per action.
- -10 for using 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 shoot WUMPUS

iii) Sensors (assuming Robotic Agent)
- Camera to get the view.
- odour sensor to smell.
- Audio Sensor to listen to scree of 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 characters.

a) fully observable.
b) Deterministics.
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, terms 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 & adaptive page. i.e Adaptive user interface to adjust content for particular type of Audience.

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 & 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 of requirements evolve. They may resolve ambiguity and tolerate unpredictability behaviours.

c) Contexual :-

- They may understand, identify & extract Contexual elements such as meaning Syntax, location, appropriate domain etc.

d) Iteractive :-

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

Q3. 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 NPI Applications.

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

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

⑤ A model that computes either of these is language model.

* there are various language model available, a few 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-Grammodels :-
- from Markov assumptions, we can formally define models were $k = n-1$ as following.
$P(w_i / w_1 w_2 \dots w_{i-1})$

c) Unigram model ($k=1$) :-
$P(w_1, w_2 \dots w_n) = \prod_i P(w_i)$

d) Bigram model (K=2) :-

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

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

Q4. Write a note on Machine Translation?

→ ① machine translation is classic test of language understand It consists of both language analysis and generation Many machine translation System have huge commercial use following are few 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 Machine Translation to Translate text in posts and comments automatically in order to break language barriers.
- Systran becomes 1st software provider 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 fire, whether or not they have access to Internet.

- In traditional Machine Translation System, parallel corpus a collection of trees is used to each of width, is translated into one or more other languages than original. for eg, given source language e.g. french and target language eg. English, multiple Statical models needs to be build including a probabilistic formulation using translation model $p(f)$ 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.

Q5 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 meaning full units.

c) Lexical Analysis:-
- Lexical is words and phrases in language lexical Analysis deals with recognition of identification of structure of sentences. It divides paragraphs in sentences, phrases and words.

d) Syntatic Analysis:-
- In this, sentences are passed as noun, verbs, adjective and other parts of sentences. In this phase grammer of sentence is analyzed in order to get relationship among different words in sentences.
- Eg: "mango eats me" will be rejected by analyzer.

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 associated word senses - e.g from dictionary or from an online Resource such as word net.