Page No.:
Date:

Assignment NO-13

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Subject : AI

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Page No.:
Date:

Q1] Explain PEAS descriptor for WUMPUS World.

→ i) Performance Measure -
- +100 for grabbing goal & comming back to start
- -200 if player is killed
- -1 per action
- -10 for using arrow

ii) Environment
- Empty rooms
- Rooms with WUMPUS
- Rooms neighbouring to WUMPUS which are smelly
- Rooms neighbouring with bottomless pits which are breezy
- Room with gold which is glittery.
- Arrow to shoot WUMPUS

iii) Sensor (assuming Robotic agent)
- Camera to get the view
- odour sensor to smell
- Audio sensor to listen to screen bump

iv) Eractor (assuming robotic agent)
- Motor to move left right
- Robot auto grab
- Robert Mechanism to shoot arrow.

Page No.:
Date:

WUMPUS World agent has following Characters
a) fully observable
b) Deterministic
c) static
d) Discrete
e) single agent

Q2 Explain Various elements of cognitive systems
→ ① Cognitive computing is new type of computing with goal of more accurate Models of how human brain / mind senses, resons & responds to stimulus.
② Gemally, term congnitive computing is used to refer to new hardware & / or software that mimic following of human brain thereby improving human decision making Cognitive computing applications links data Analysis of adamptive page i.e. adaptive user interface to adjust content for particular type of audience
- following are the elements of congnitive System

a) Interactive:
- They may interact easily with user so those user can define their needs comfortably. They may also interact with other processors devices of cloud services as well as with people

b) Adaptive
- They may be engineered to feed on dynamics data is real time. They may learn as information changes & as goals & requirement evolve

c) contexual:
- They may understood, identify or extract contexual elements such as meaning syntax, location, appropriate domain etc

d) Interation of state
- They may used in defining a problem by asking question or finding additional source input if problems statement is incomplete.

Q3 Write a note on language Model
→ ① Goal of language model is compute probablity of token (eg: Sentence or sequence of words are useful is in many different NPI applications
② language Model actually a grammar of language as it gives probability of word that will follow
③ In case of (LM) probablity of word that will follow.
$P(w) : P(w_1, w_2, w_3, \ldots w_n)$
④ It can also be used to find probablity of next word in sentence
$P(w_5/w_1, w_2, w_3, w_4)$
⑤ A Model that computes either of these is language Model.

There are various language Model available a few are
a) ~~Heuristic~~ Methods using Markov assumption-
- A process which is statistic in nature is said to have marker property if conditional probability

Page No.:
Date:

of future state depends upon present state.

b) N-Gram Model -
- from Markov assumption. we can formally define models when k: n-1 as following

$$P(\omega_1/\omega_1\omega_2 \cdots \omega_{i-1})$$

c) Unigram Model (k-1)

$$P(\omega_1\omega_2 \cdots \omega_n) = \prod P(\omega_1)$$

d) Bigram model (k=2):

$$P(\omega_1/\omega_1\omega_2 \cdots \omega_{i-1}) = P(\omega_1/\omega_{i-1})$$

$$(\omega_1/\omega_{i-1}) = \frac{\text{count}(\omega_{i-1} \cdots \omega)}{\text{count}(\omega_{i-\omega})}$$

Page No.:
Date:

Q4 Write a note on Machine Translation

→ ① Machine Translation is classic test of language understand. It consist of both language analysis & generation. Many Machine translation systems have huge commercial use following are few of eg:-

- Google Translate goes through 100 billion words per day.
- ebay uses Machine translation techiniques to enable cross-border trade & connect buyers/sellers ground globe
- facebook uses Machine Translation to translate text into post & comments automatically inorder to break language barrier.
- ~~System~~ Systran became 1st software provider to launch machine Translation engine in more than 30 languages in 2016
- Microsoft brings AI-powered translation to end user & developers on Android, IOS & amazon 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 language than original

eg. Given source language eg: french & language eg: english.

Page No
Date

Q5] Explain following terms

→ a) Phonlogy :-

It is study of organizing sounds systematicaly. in an NLP (Natural language processing) system

b) Morphology

- It is study of construction of words from primitive meanigful units

c) lexical Analysis :-

- Lexical is words & phrases in language lexical Analysis deals with recognition & identification of structure of sentence. It divides progroms in sentences phrases. & coords

d) ~~Syn~~ Syntatic Analysis

- In this sentences are parsed as noun verbs adjective & other parts of sentences In this phase grammer of sentences is analyze in order to get relation ship among different words in sentences.

eg: Mango eats me will be register by ~~anal~~ 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 which makes most sense in context

eg:-

Page No.
Date

eg-

We are typically given list of words senses eg from dictionary or form an online resource, suchas wordnet