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Q. 1 Explain PFA's description for wumpus world.

\Rightarrow i) Performance measure

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

ii) Environment

- Empty Room
 - Rooms with ~~wm wampus~~ wampus
 - Rooms neighbouring to wampus which are smelly
 - Rooms with bottomless pit
 - Rooms neighbouring with bottomless pit which are breezy
 - Room with gold which is gliter

iii) Sensor consuming a robotic agent.

- Camera to get the view
 - Odour Sensor to smell the strength
 - Audio Sensor to listen to the screen and bump

iv) Erectors assuming a robotic agent

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

The Wampus word accent has following characteristic

a) fully observable

b) Deterministic

c) Pisodic

ds stan

Discrete

\Rightarrow single agent

- Q. 2) Explain Various elements of cognitive system

⇒ Cognitive computing is a new type of computing with the goal or more accurate models of how the human brain (mind) sensory, reasons, and responds to stimulus. 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 application links to data analysis and adaptive user interfaces, i.e. Adaptive User interface to adjust content for a particular type of audience.

Following are elements of cognitive system:

a) Interactive :-

They may interact easily with user so it at their user can define their needs completely. They may also interact with other processor, device and cloud services as well as with people

b) Adaptive ..

They may be engineered to feed on dynamil data in real time they may learn as information changes and goal and requirements evolve. They may resolve ambiguity and tolerate unpredictability behaviour

c) Contextual

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

3) Iterative & statut

They may help in defining a problem by asking questions or requesting 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 or a token e.g. a sentence or sequence or word and are useful in many different NLP applications
- Language model (LM) actually a grammar of a language as it gives the probability of words that will follow
- In case of LM the probability of a sentence or sequence or word 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 $P(w_j | w_1, w_2, w_3, w_4)$
- A model that computes either of these is language model
- There are various language models available a few
 - a) Markov Assumption

A process which is stochastic in nature is said to have the Markov Property i.e. the conditional probability of future states depends upon present state

b) N-gram models :

From the Markov Assumption, we can formally define model when $k=n-1$ as follows :-

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

c) Unigram model ($k=1$)

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

⇒ Bigram model ($k=2$) ...

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

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

- Q. 4) Write a note on machine Translation:-

⇒ - machine Translation is cluttered or language understand
It contains of both language analysis and generation many
machine translation system have huge commercial use
following are few of the example

 - Google Translate goes through 100 billion words per day
 - eBay uses machine translation technique to enable cross
border trade and connect buyers / sellers around globe
 - Facebook uses MT to translate text in post and comments
automatically in order to break language barrier
 - Systran became the first software provider to launch
a neural machine Translation engine in more than 30
languages in 2016
 - Microsoft knows AT - Powers translation to end user
and develops on Android, iOS, and Amazon fire ~~wherever~~
whether or not they have access to the Internet
 - In a traditional machine Translation system parallel
corpus a collection of texts is used to each of which is translated
into one or more other languages than the original
Example given the source language e.g. french and the target
language e.g. english, multiple statical models need to be
built, including a probabilistic formulation using the Rule or an
translation model $P(R)$ trained on for parallel corpus and
a language model $P(L)$ trained on the english corp
 - It is obvious that this approach skip hundreds of important
details, requiring a lot of human Rector engineering and it is
overall a complex system

Q. 5) Explain the following terms

a) Phonology

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

b) morphology:

It is a study or construction of words from primitive meaningful units

c) Lexical Analysis

Vocabulary is the words and phrases in language (lexical analysis)
Deals with the recognition and identification of structure
of sentence To divide the paragraph in sentence, phrase & words

d) Syntactic Analysis

In Syntactic Analysis the sentence are parsed as noun, verb,
adjective and other parts of sentence In this phase the
grammar of the sentence is analyzed in order to get
relationship among different words in sentence For example
"man eat m." will be rejected by analyzer
as words sense disambiguation

While using words which have more than one meaning we have
to select the meaning which make the most we have to
select the meaning sense in context For example we are
typically given a list of words called word sense from a
thesaurus or from an online resource such as
wordnet.