Natural Language Processing

Model Question Paper 01

Question 1.

(a) Answer the following questions.
   i. Briefly explain the general pipeline of Natural Language Processing.
   ii. "Most of the AI dreams are now become a reality" Are you agree with this statement. Briefly describe with a suitable example.
   iii. Representation of "Meaning" is the key challenge in NLP. Explain briefly

   [3 x 3 Marks]

(b) Identify which of the following statement(s) is/are true? In each case, justify your answer.
   i. Anaphora determine which phrases in a document refer to the same underlying entity.
   ii. "Diphones" are fragments of speech signal cutting across phoneme boundaries.
   iii. Pitch, length and loudness are used to indicate "stress".
   iv. Noisy Channel Model uses the acoustic model to give a set of likely phone sequences

   [2 x 4 Marks]

(c) Briefly explain the Architecture of TTS systems. Then briefly explain, what are the difficulties faced to build TTS system for Sinhala language?

   [8 Marks]

Question 2.

"Chatbot is a computer program designed to simulate conversation with human users, especially over the Internet."

(a) Answer the following questions.
   i. Compare and contrast conversational agents and chatbots.
   ii. Briefly explain the speech processing model of the “Cortana”.
   iii. In the system initiative method, System completely controls the conversation. Briefly explain.

   [3 x 3 Marks]
(b) Identify which of the following statement(s) is/are true? In each case, justify your answer.

i. ELIZA was implemented in the SLIP language.
ii. Alexa is a voice-controlled Amazon assistant.
iii. Google Assistant is working with DialogFlow.
iv. ALICE program uses an AIML

[2 x 4 Marks]

(c) Briefly explain the Architecture of the rule-based chatbot. Then explain how it answer the question “what is your name?”

[8 Marks]

**Question 3.**

Machine Translation system is computer software that translates text or speech from one natural language to another

(a) Answer the following questions.

i. Briefly explain Pyramid of the Machine Translation system
ii. Briefly describe three issues in Machine Translation
iii. Briefly describe three approaches to machine translation expects rule-based and dictionary-based

[3 x 3 Marks]

(b) Identify which of the following statement(s) is/are true? In each case, justify your answer.

i. In 1958, the first practical Russian to English MT system was implemented.
ii. ICENT - A Chinese-English MT system uses interlingua approach.
iii. Moses uses a statistical approach for machine translation.
iv. Human-assisted machine translation systems are also considered as a semi-automated machine translation system.

[2 x 4 Marks]

(c) Briefly explain the architecture of the rule-based machine translation system. With this architecture, explain, how morphologically and syntactically analyze the given input sentence.

[8 Marks]

**Question 4.**
In linguistics, “Morphology” is the study of words, how they are formed, and their relationship to other words in the same language

(a) Answer the following questions.
   i. Briefly explain Root, Stem and Affix in the morphology.
   ii. Compare and contract Inflectional and derivational morphology.
   iii. Briefly describe the relation in between syntax and the morphology.

[3 x 3 Marks]

(b) Identify which of the following statement(s) is/are true? In each case, justify your answer.
   i. Morphological parsing is to find the lexical form of a word from its surface form.
   ii. The surface level of a word represents the actual spelling of that word
   iii. FST can be used to transduce between surface and lexical levels
   iv. Stochastic taggers generally resolve tagging ambiguities by using a training corpus

[2 x 4 Marks]

(c) Use the given grammar in the above and explain a way to pass the sentence “Book that flight”

[8 Marks]

* END OF THE PAPER *-