CSSE 315 – Natural Language Processing
Rose-Hulman Institute of Technology

Quiz 04

Name (Print):_____   Date:_____

1. The speech chain is a conceptual model describing the process of speech communication. Which of the following sequences best represents the traditional speech chain

   (a) Thought → Muscle movements (articulation) → Airwave (sound signal) → Auditory perception

   (b) Auditory perception → Airwave (sound signal) → Muscle movements (articulation) → Thought

   (c) Airwave (sound signal) → Thought → Auditory perception → Muscle movements (articulation)

   (d) Muscle movements (articulation) → Thought → Airwave (sound signal) → Auditory perception

2. In a spectrogram of a speech signal, what does the **y-axis** typically represent?

   (a) Time

   (b) Amplitude

   (c) Frequency

   (d) Phase

3. The International Phonetic Alphabet (IPA) is used to:

   a) Represent the orthography of a language.

   b) Represent the sounds of spoken language.

   c) Transcribe written text into audio.

   d) Analyze the syntax of sentences.

4. Which of the following is a major challenge in ASR?

   a) Variations in accents and speaking styles.

   b) The limited vocabulary of spoken language.

   c) The availability of large training datasets.

   d) The transcribing tools.

5. Language models in ASR use probabilities to predict word sequences.

   a) True

   b) False

6. Provide an example of a linguistic challenge and an example of machine learning challenge when dealing with speech

    1.

    2.

7. Which of the following properties of sound waves were specifically mentioned in the provided material? (Select all that apply.)

    a) Superposition

    a) Diffraction

    a) Reflection

    a) Interference

8. In the context of a sound signal, **amplitude** primarily indicates:

    (a) The pitch of the sound

    (b) The loudness or intensity of the sound

    (c) The duration of the sound

    (d) The timbre of the sound

9. In the context of speech signals, **frequency** refers to:

    (a) The number of sound wave cycles per second

    (b) The variation in amplitude over time

    (c) The duration of a spoken utterance

    (d) The rate of information transmission

10. Given the IPA transcription **/kæt/**, which English word does it represent?

    (a) Cot

    (b) Cat

    (c) Cut

    (d) Cart

11. Given the IPA transcription **/spit/**, which English word does it represent?

    (a) Peach

    (b) Spit

    (c) Speech

    (d) Screech

12. When analyzing the waveform and spectrogram of a speech signal, which of the following best describes the typical energy patterns for vowels versus plosive consonants such as [p]?

(a) Vowels exhibit an irregular energy pattern, whereas consonants like [p] show a sustained and regular energy pattern

(b) Vowels exhibit a regular, periodic energy pattern, while consonants like [p] typically show a brief period of low or no energy (silence) followed by a sudden burst of energy.

(c) Both vowels and consonants display a similar regular energy pattern throughout

(d) Vowels exhibit a sudden burst of energy, while consonants like [p] display a consistent energy pattern

13. What are the three main components of the AI agents?

    1.

    2.

    3.

14. Foundational models are capable of accessing the external world information.

    a) True

    b) False

15. Describe one potential application of generative AI agents in a real-world scenario and explain how the agent's functions would be utilized.

16. What does CoT stand for in the context of prompting?

    a) Chain of Thought

    b) Cycle of Transformation

    c) Context of Training

    d) Code Optimization Technique

17. Which prompting method encourages the model to explore multiple reasoning paths?

    a) Chain of Thought (CoT)

    b) Tree of Thoughts (ToT)

    c) ReAct

    d) Standard Prompting

18. ReAct prompting combines:

    a) Reasoning and Acting

    b) Reading and Acting

    c) Reasoning and Analysis

    d) Reading and Analysis