COLLEGE OF ENGINEERING AND APPLIED SCIENCES

NHAI101- FUNDAMENTALS OF ARTIFICIAL INTELLIGENCE, DATA SCIENCE AND MACHINE LEARNING

END OF FIRST SEMESTER EXAMINATIONS

NOVEMBER 2024

LECTURER: MRS L. FUNDISI

DURATION: 3 HOURS

INSTRUCTIONS

Section A **compulsory**

Answer ANY 3 (three) Questions in **Section B**

All question carries equal marks (25)

Begin your answer to each question on a fresh page

Logical answering, smartness and use of examples will earns more marks

Section A (compulsory, answer all questions)

For each of the following activities, give a Performance Environment Actuator Sensor (PEAS) description of the task environments and characterize it in terms of the properties discussed in class.

i. taxi driver

ii. basketball player

iii. self-driven car

iv. vacuum cleaner

v. Green house [25]

Section B (answer any 3 questions)

Question Two

a) Explain the Alan Turing contribution to Artificial Intelligence [10]

a) With the aid of diagrams explain the following classification of agents
   Learning agent
   Model based agent
   Utility based agent [15]

Question Three

a. What is the difference between supervised learning, unsupervised learning, and reinforcement learning in the context of machine learning? Provide examples of tasks that fall under each category. [10]

b. Discuss the challenges of working with unbalanced datasets in machine learning. What techniques can be used to handle imbalanced class distributions in classification tasks?

[15]

Question Four

Use appropriate diagram to describe the fuzzy logic system architecture and show how this architecture can be used in an industrial application area of your choice. [25]

Question Five

a. With aid of a diagram explain the components of an expert system [10]
b. Using examples, explain how expert systems can be utilized in the Health Sector [15]

Question Six

a) Explain the libraries used in Natural Language Processing [10]
b) With aid of examples explain the application of Natural Language Processing. [15]

END OF EXAMINATION