

Revision Questions ACCA7026

Question 1

XYZ Company is in the process of developing autonomous systems based on reinforcement learning for autonomous vehicles that navigate urban streets and warehouse robots for automated pick-and-deliver tasks.

1.1 Compare and contrast the roles of agent, environment, reward and strategy in the context of AV navigating city traffics and warehouse robot performing pick and deliver tasks. **[8]**

1.2 Discuss the concepts of exploration and exploitation in reinforcement learning. How does the warehouse robot balance the trade-off between exploration and exploitation. **[4]**

1.3 Define the components of the PEAS (Performance Measure, Environment, Actuators, Sensors) framework and identify two key examples for each component in the context of an Autonomous Vehicle (AV) to perform its functions. **[8]**

Question 2

ABC-Tech company is developing a Natural Language Based chatbot to automate customer service for an online retail platform. The chatbot is designed to handle a wide range of customer queries, from order status inquiries to product information and return policies.

2.1 Analyse the following conversation and identify the intent, entities and dialogue management strategies used by the chatbot. Explain how these elements contribute to the overall effectiveness of the chatbot. **[6]**

Customer : "I want to check the order status of my recent order."

Chatbot : "Hello, I can help you with that, please provide the order number. "

Customer : "The order number for the bag is #345543. "

Chatbot : "Thank you. One moment please... Your order is currently out for delivery and should be in two days. "

Customer: "Thank you for the update. "

Chatbot: "Is there anything else I can assist with ? "

Customer: "No, that's all. "

Chatbot: "You are welcome. "

2.2 Explain text preprocessing, feature extraction, and modelling in Natural Language Processing (NLP) and provide the significance of these key stages. **[9]**

2.3 Explain how the Term Frequency-Inverse Document Frequency (TF-IDF) method helps in identifying important words in a document. Consider the following dialogue to calculate the Term frequency (TF) of the term, *order*. **[5]**

"I want to check the order status of my recent order"