MODULE J HARDWARE AND EMERGING TECH · J8

Machine learning

Original practice questions · 22 marks · ~25 minutes · Cambridge 0478 syllabus 6.3

Name _____ Date _____

Instructions. Answer all questions in the spaces provided. The marks for each part are shown in brackets [ ]. Where a question gives a scenario, link your answer to that scenario. Do not give brand names. The total for this worksheet is **22 marks**.

1

Total: 3 marks

(a) State what is meant by machine learning. **[2]**

(b) Machine learning gives an artificial intelligence (AI) system one of the main characteristics of AI. State this characteristic. **[1]**

2

Total: 4 marks

Tick (✓) **one** box in each row to show whether each statement describes a feature of an expert system or a feature of machine learning. **[4]**

Statement	Expert system (✓)	Machine learning (✓)
Its facts are gathered from human experts in one specialist area and stored in a knowledge base		
The program automatically changes its own processes as it is given more data		
An inference engine applies a rule base to the facts to reach a conclusion		
The program finds patterns in the results of its past decisions and uses them to make better decisions next time		

3 **Total: 6 marks**

A nature charity fixes cameras to trees in a large forest. Each camera takes a photo when an animal walks past. Software looks at each photo and identifies the species of the animal. Each week, an adult volunteer checks some of the photos and corrects the software when it has identified a species wrongly. The software uses machine learning.

(a) Identify **two** items of data the software could use to learn. **[2]**

1

2

(b) Explain how machine learning allows the software to identify species more accurately over time. **[4]**

4 **Total: 6 marks**

A parcel depot uses an AI system to decide which delivery van each parcel is loaded onto. The system stores data about each van and each parcel. Each evening it records which parcels were delivered late.

Complete the table by identifying **three** characteristics of AI **and** describing how this system shows each characteristic. **[6]**

Characteristic of AI	How the parcel depot system shows this characteristic
1	
2	
3	

5 **Total: 3 marks**

An office building has a heating controller that uses machine learning. The controller has a temperature sensor and records the times that staff arrive at and leave the building each day. Nobody has entered fixed heating times into the controller.

Explain how the controller could use machine learning to decide when to switch the heating on. **[3]**

Total for this worksheet: 22 marks