Roll Number:

Thapar Institute of Engineering and Technology, Patiala

Department of Computer Science

BE: Auxiliary Exam **EST** **UCS411: Artificial Intelligence**

August 2024

Time: 3 Hours; M. Marks: *100* Faculty: Dr. Anu Bajaj

Note: All questions are compulsory

Q1	Draw diagrams of different types of Intelligent Agent architectures	(20)
Q2	Explain Genetic Algorithm with example.	(20)
Q3	Differentiate the Expert System from the conventional system and explain its architecture with example.	(20)
Q4	What are different types of Knowledge representations? Explain any two.	(20)
Q5	(i) Consider the following confusion matrix for some models on some dataset	(20)

	Predicted+	Predicted-
True+	200	10
True-	20	5

a) What is the macro precision of the model? Provide its formula and value.

b) What is the macro recall of the model? Provide its formula and value.

c) What is macro F1-score of the model? Provide its formula and value. (4+4+2=10)

(ii) Suppose we have the following training set of positive (+) and negative (-) instances and a single test instance (o). All instances are projected onto a vector space of two real-valued features (X and Y). Answer the following questions. Assume "unweighted" KNN (every nearest neighbor contributes equally to the final vote).

Distance between instances is measured using Euclidean distance.

a) What class would be assigned to this test instance for K=1?

b) What class would be assigned to this test instance for K=3?

c) What class would be assigned to this test instance for K=5?

d) Setting K to a large value seems like a good idea. We get more votes! Given this particular training set, would you recommend setting K = 11? Why or why not? (2+2+2+4)