

Indian Institute of Information technology, Allahabad

Sub: Introduction to Machine Learning

Semester- V

C-1 Test, 16-09-2021 (paper setter-G C N)

Full marks-100	Time -2 hrs
1. What is considered as fourth industrial revolution? From when it started? Draw the relationship among AI, ML and DL. What is Turing test? Who proposed it and when? Did any machine pass the test so far?	2+2+2+6+2+2=16
2. What is the name of complex code breaking technique proposed by Alan Turing? Can you explain how did it work? Who and when first coined the term Artificial Intelligence?	2+4+2=8
3. What is the full form of GPT-3? What is so special about this model?	2+2=4
4. With examples explain the ideas of top down and bottom up approaches For designing expert systems.	6
5. What are structured and unstructured data. Provide examples.	4
6. How AI can help in the health care industries?	6
7. Explain the differences between autonomous system and intelligent system. Name four different types of learning. Write down the steps for developing a ML model from data.	2+2+4=8
8. Suppose you have been given m samples $(X^{(i)}, Y^{(i)})$, $i=1,2, 3,...,m$ and you have decided to fit a hypothesis $h_w(X)=w_0X_0+w_1X_1$, obtain two parameters using normal equations.	10
9. Suppose based on some data, you have decided to fit a hypothesis $h_w(X)=w_0X_0+w_1X_1+w_2X_1^2$, X_0 being fictitious feature. Write down the normal equations, solution of which will give you the parameters.	6
10. For m samples, write down the equation of the parameters of a Linear regression based ML model in vector form.	10
11. What type of model Locally Weighted Regression(LWR) is? Write down an expression for the weighted function for LWR model. What is the role of bandwidth?	2+4+4=10
12. Discuss the issues of bias and variance for healthy ML model development. Write down the expression of objective function with regularizer. Differentiate the function with respect to the parameters. What effect regularizer has on parameter training.	4+2+2+4=12