

Mid-Term Exam

|  |  |
| --- | --- |
| **Course Identification** | |
|  |  |
| Name of programs – Codes: | COMPUTER SCIENCE TECHNOLOGY – ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING– LEA.DQ |
| Course title: | **machine learning & neural networks** |
| Course number: | 420-A16-AS |
| Group: | 7742 |
| Teacher’s name: | Kaveh Bakhtiyari |
| Duration: | EXTENDED |
| Semester: | Summer 2024 |
| **Student Identification** | |
| Name: YASHRITH CHITTOOR HARI KRISHNA Student number: 2330655\_  Date: **10 / 06 / 2024** Result: \_\_\_\_\_\_\_\_\_\_\_\_\_\_  I declare that this is an original work, and that I credited all content sources of which I am not the author (online and printed, images, graphics, films, etc.), in the required quotation and citation style for this work. | |
| **Standard of the Evaluated Competency** | |
|  | |

**Statement of the evaluated competency – Code**

Program Development – KP54

**Evaluated elements of the competency**

5. Evaluate the solution

6. Carryout the plan

|  |
| --- |
| **Instructions** |
|  |
| The teacher will not answer questions during the exam.You must not share the exam questions and answers during and after the exam.It is the teacher’s responsibility to identify language errors. If such errors are found, teachers may apply a penalty of up to 5% of the grade (IPEL – Article 5.7).Plagiarism, attempts at plagiarism or complicity in plagiarism during a summative evaluation results in a mark of zero (0). In the case of recidivism, in the same course or in another course, the student will be given a grade of '0' for the course in question.(IPEL – Article 5.16).Please write clearly. |
|  |
| **Mark Breakdown** |
|  |
| This evaluation is on 40 points, distributed as follows:  **TOTAL: 40 POINTS** |
|  |

**INSTRUCTION**

Answers must be provided in a Jupyer Notebook file, and all the related files should be compressed in a .zip file and attached together.

Make sure to use Markdown cells or comments in Jupyter Notebook to explain your code.

Each question must be answered clearly in that notebook.

**DATASET**

FILE: iris.csv

This dataset contains the features of the different flowers (Setosa, Versicolor, and Virginica)

**Question 1: (5 points)**

Scale the dataset using `MinMaxScaler` and save the scaler object.

**Questions 2: (5 points)**

Split the dataset into Train and Test dataframe with the ratio of 75% for Train and 25% for Test. Also report how many records exist in both train and test dataframes.

**Questions 3: (15 points)**

Design your Neural Network Classifier to identify the flower type with the following parameters:

* Set 15% of training as Validation dataset
* Set a **minimum of 2 hidden layers**.

Note: If you see fit, you can increase the number of hidden layers, and you decide the number of nodes within each layer.

* Define a proper number of iterations and discuss how did you choose that number.
* Discuss how many nodes do we have in the input and output layers.

**Questions 4: (5 points)**

Plot the loss curve of the Neural Network model over the iterations.

**Questions 5: (5 points)**

Visualize the confusion matrix of actual and predicted data, and mention “True Positive”, “True Negative”, “False Positive” and “False Negative” on the confusion matrix.

**Questions 6: (5 points)**

Report the following evaluation metrics:

* Prediction score on both training and test sets.
* F1 Score on Test dataset