**CS 658 Introduction to Machine Learning, Fall 2022, MS and Ph.D. Students**

**Student Learning Outcomes (SLO)**

SLO1: Develop an appreciation for capabilities and limitations of data mining techniques

SLO2: Understand the mathematical, statistical, and theoretical foundations of a wide variety of data mining algorithms

SLO3: Implement data mining algorithms to analyze data in multiple domains, especially in IoT area

SLO4: Evaluate the model performance

Topics relating to SLO 1,2,3, and 4:

Machine learning algorithms; Machine learning project; Machine learning applications

**A. Assessment Instrument:**

Homework 1-3, midterm exam, final exam, and the course project were used to assess SLO 1, SLO2, SLO3, and SLO4.

**B. Evaluation of Course Outcomes:**

Table 1 shows evaluation categories used in the assessment instrument:

|  |  |
| --- | --- |
| EE: Exceeds Expectation | >85 |
| S: Satisfactory | 65 to 84 |
| BE: Below Expectation | 45 to 64 |
| U: Unsatisfactory | < 45 |

Table 1: Categories

Referring to Table 2, a total of 100% achieved a level of EE or S; It is above the threshold of 70% set by the department.

**C. Suggested Improvements**

Most MS and Ph.D. students performed very well, although challenging homework assignments and a course project are given in this course.

|  |  |  |
| --- | --- | --- |
| MS and Ph.D. Students | Avg (HW1 + HW2 + HW3 + Midterm + Final + Project) | Category |
| Student 1 | 95 | EE |
| Student 2 | 96.6 | EE |
| Student 3 | 90 | EE |
| Student 4 | 95 | EE |
| Student 5 | 89 | EE |
| Student 6 | 91 | EE |
| Student 7 | 92 | EE |

Table 2: Results of Assessment Instrument for SLO1, SLO2, SLO3, and SLO4

**Result: 80% were Satisfactory or better**

All master and Ph.D. students successfully completed the course with outstanding performance.

**Questions used for assessment**

1. For the following vectors, x and y, calculate the indicated similarity or distance measures.
2. x=(1,-2,2,1), y = (2,2,2,2) Euclidean
3. x=(0,1,1,1), y = (1,0,-1,0) city block (manhattan) distance
4. For binary data, compute the simple matching (SMC) and Jaccard coefficients

x = 0101010111

y = 0100011000

3. Consider the training examples show in the below table for a binary classification problem

Compute the Gini index for the Customer ID attribute.

Table

Description automatically generated

Question 4: Using the below data, compute the silhouette coefficient for point P1

Table

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