This project will cover **30%** marks.

**Course Outcomes**

**CO2**: Construct an intelligence system prototype/module. (Psychomotor: **14%**) (60 Marks)

**CO3**: Demonstrate critical thinking ideas in artificial intelligence knowledge and problem-solving. (Psychomotor: **6%**) (20 Marks)

**CO4**: Initiate AI knowledge to the final year/capstone projects and future problems. (Affective: **10%**) (20 Marks)

**General Instructions**

1. Form a team of **THREE (3) person per group** from the same lecture class. Identify tasks to be performed by individuals and divide the task to each team member.
2. Even though it is a group project, marks will be given based on **individual assessment**.
3. This project consists of **TWO (2)** parts:

(a) Fuzzy Logic System Development

(b) Project Documentation

1. In this project, you and your team will develop a **FUZZY LOGIC SYSTEM** for classification and get the result.
2. The project must be **ONLY** developed using **Python** programming language. (Note that you are **NOT ALLOWED** to use **ANY** existing application/tools that have been developed).
3. **Record and compile** videos (maximum length: 15 minutes) to explain your coding and output.
4. Submit **Report** as **PDF** **file**, **python files** as well as **recording video** in **Google Form.** The submission link will be given later by your lecturer.(Note that the python files must be submitted in their original file source).
5. **Due date submission:** **6 JANUARY 2025 (MONDAY)**. Penalty deduct **CO2-5% marks** will be given for a late submission.

**Project Tasks**

a) Fuzzy Logic System Development

* Select **ONE (1)** dataset for your project. You can download the dataset from either <https://www.kaggle.com/datasets> (Kaggle Dataset) or <https://archive.ics.uci.edu/ml/index.php> (UCI Machine Learning Dataset). Note that you are **NOT ALLOWED** to change the dataset later. Therefore, choose your dataset wisely.
* Find **at least** **THREE (3)** journal papers for your project references to create the fuzzy logic framework, membership functions and fuzzy rules for your dataset. The journal papers years of published should be between **2018 ̶ 2024**.
* Find the **classification accuracy** between the original classification output and after applying the fuzzy logic. You need to propose the formula of classification accuracy.

b) Project documentation

* Report formats
  1. Font type: *Times New Roman*
  2. Font size: *12*
  3. Line spacing: *1.5*
  4. Alignment: *Justified*
  5. Page Number: *Bottom Right*
  6. Cover Page (see **Last Page**)
* Document contents
  1. **Dataset Information**
     1. Must describe the dataset in detail such as objective, attributes (input and output), total dataset, and give screenshot sample list of data (at least 30% data)
  2. **Methodology**
     1. Design a fuzzy logic framework for your project including the data pre-processing (if any) and describe in detail for each process.
     2. Design fuzzy logic membership functions (input and output)
     3. Construct fuzzy logic rules

*Eg:*

*Rule 1: IF the service is good or the food quality is good, THEN the tip is high.*

*Rule 2: IF the service is average, THEN the tip is medium.*

*Rule 3: IF the service is poor and the food quality is poor THEN the tip is low.*

* 1. **Results**

1. Add one column at the last column of dataset for your classification results.
2. Display the result of classification accuracy
   1. **Conclusion**
   2. **References**
3. Must follow APA format
   1. **Source code**

**Timeline suggestion:**

|  |  |
| --- | --- |
| **Date** | **Task** |
| 7/10/2024- 31/10/2024 | * Find team members * Select dataset * Find journal papers * Fill all information in google sheet (refer to Kalam) |
| 1/12/2024-10/12/2024 | * Design fuzzy logic framework * Design membership function * Construct fuzzy rules |
| 11/12/2024-20/12/2024 | * Develop Fuzzy logic system and get result |
| 21/12/2024-5/1/2025 | * Write report * Record video |
| 6/1/2025 | * Submit all required documents |

**RUBRIC**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Category** | **Descriptor** | **Level of Achievement** | | | | | | **Total mark** |
| **0** | **1** | **2** | **3** | **4** | **5** |
| **CO4**: Initiate AI knowledge to the final year/capstone projects and future problems. (Affective: 6**%**) (20 Marks) | | | | | | | | |
| 1. Dataset Information | Attributes (input and output), total dataset, and screenshot sample list of data (at least 30% data) | Not providing anything | Provide only attribute information | Provide only attribute information and total dataset | Provide little attribute information, total dataset, and sample datasets | Provide enough attribute information, total dataset, and sample datasets- acceptable | Provide detail attribute information, total dataset, and sample datasets- excellent | **5** |
| Change of dataset | Change at the last minute | - | - | - | - | Maintain the dataset | **5** |
| Journal paper | Not providing anything | - | - | Provide 1 or 2 journal papers | - | Provide at least 3 relevant papers | **5** |
| 1. Report Format |  | Not following report format | - | - | Follow some format | - | 100% follow report format | **5** |
|  | | | | | | | | |
| **Category** | **Descriptor** | **Level of Achievement** | | | | | | **Total mark** |
| **0** | **1** | **2** | **3** | **4** | **5** |
| **CO3**: Demonstrate critical thinking ideas in artificial intelligence knowledge and problem-solving. (Psychomotor: **6%**) (20 Marks) | | | | | | | | |
| 1. Results | Classification results | Not providing anything | 30% classification results | - | 50% classification results | - | 100% complete classification results | **10** |
| Classification accuracy | Not providing anything | Incorrect formulas / no explanation | - | Provide formula and incomplete explanation | - | Provide correct formula and briefly explain | **10** |
| **CO2**: Construct an intelligence system prototype/module. (Psychomotor: **18%**) (60 Marks) | | | | | | | | |
| 1. Methodology | Design a fuzzy logic framework for your project including the data pre-processing (if any) and describe in detail for each process. | Not providing anything | 30% framework development/ no description | - | 50% framework development/ incomplete description | - | 100% framework development & briefly explain | **10** |
| Design fuzzy logic membership functions (input and output) | Not providing anything | 30% membership function development | - | 50% membership function development | - | 100% membership function development | **10** |
| Construct fuzzy logic rules | Not providing anything | 30% rules development | - | 50% rules development | - | 100% rules development | **10** |
| 1. Source code | - | No source code is provided | Some source code is missing/ 70% some errors | - | Some source code is missing/ 30% some errors | - | Full source code is provided & no errors | **5** |
| 1. Video |  | No video is provided | - | - | video not briefly explain | - | detail video explanation | **5** |
| 1. Peer-Assessment | Refer to google form on Kalam | - | - | - | - | - | - | **20** |
| **Category** | **Descriptor** | **Level of Achievement** | **Total mark** |  |  |  |  | **60** |

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BCS2313

ARTIFICIAL INTELLIGENCE TECHNIQUES

(FUZZY LOGIC PROJECT)

**SEMESTER I SESSION 2024/2025**

**LECTURER’S NAME : Ts. Dr. Nur Shazwani Kamarudin**

**SECTION : 01**

**GROUP MEMBERS & MATRIC NO:**

**1.**

**2.**

**3.**

**4.**

**PROJECT TITLE:**

**DATASET NAME:**