MFML Project Guidelines-

Introduction

This project is designed to help students develop a deep understanding of real-world problem-solving using technology. Each team will select a problem statement, conduct a literature survey, identify gaps in existing research, and implement an already published solution from a research paper.

The objective is not to create a completely new solution but to understand, replicate, and analyze an existing method, find its limitations, and explore potential optimizations. Students must be prepared to justify their work, optimize their implementation, and answer questions on any aspect of their project.

Group Formation and Evaluation (Last week of March)

- Group Size: Each team must consist of exactly 4 members.

- Presentation Duration: Each team is allotted 15 minutes, divided as follows:

- First 5 minutes: Overview of the literature survey and problem statement.

- Next 5 minutes: Explanation of the implementation, identified gaps, and proposed optimizations.

- Final 3–4 minutes: Q&A session, where the evaluation panel will ask questions to assess individual understanding.

- Individual Accountability: Every team member must have a complete understanding of the project, including the literature survey, presentation, and implementation. Any student may be asked questions during the Q&A, and their performance will be individually graded.

Submission Requirements

1. **Project Presentation (PPT)**

- **Must comprehensively cover the literature survey, problem identification, methodology, implementation details, and optimizations.**

2. **Detailed Project Report**

- **Should include a clear introduction, literature survey, gap analysis, chosen research gap, and discussion of the implemented solution.**

- **All references must be cited in a standard format.**

3. **Code Submission**

- A fully functional implementation of an existing research paper's proposed solution.

4. Additional Documentation

- Any supplementary materials explaining optimizations and performance analysis.

Project Structure and Process

1. Introduction & Problem Statement

- Clearly define the problem statement. Should be from an A* , A or B* conference or journal.

- Explain the significance of the chosen topic.

- Objective: The problem statement should serve as a starting point to identify gaps rather than expecting a full solution. The focus is on replicating an existing research paper's solution and exploring its limitations.

2. Literature Survey & Paper Selection

- Conduct a thorough literature review, starting with survey papers and moving on to recent research.

- Select one research paper that presents a working solution to the problem.

- Analyze the paper to understand its approach, methodology, and assumptions.

- Document all references in a standard format.

3. Implementation of the Proposed Solution

- Task: Implement the exact solution described in the research paper.

- Objective: The goal is to replicate the results, understand the methodology, and evaluate its performance.

- Evaluation: Compare your results with those presented in the research paper and identify discrepancies, if any.

4. Identification of Existing Gaps

- **Task: Analyze the implemented solution and identify its limitations.**

- **Outcome: Summarize these gaps in a structured manner and discuss possible improvements.**

5. Optimizations & Performance Improvements

- **Task: Suggest and, if feasible, implement minor optimizations to the solution.**

- **Focus: The goal is to analyze and refine an existing approach rather than propose a completely new one.**

6. Presentation

- **5 Minutes: Literature survey and explanation of the research paper's methodology.**

- **5 Minutes: Implementation, identified gaps, and optimizations.**

- **5 Minutes: Q&A session, where students will be evaluated on their individual understanding.**

Evaluation Criteria

Each team member will be evaluated on four key aspects to ensure individual accountability:

1. **Literature Survey & Paper Analysis**

- **Selection of an appropriate research paper.**

- **Depth, clarity, and thoroughness of the survey.**

- **Ability to explain the relevance and limitations of the chosen paper.**

2. **Implementation & Code**

- **Accuracy in replicating the research paper's solution.**

- **Comparison of obtained results with those in the paper.**

- **Effectiveness of any identified optimizations.**

3. **Presentation Delivery**

- **Clarity, organization, and structure of the presentation.**

- **Individual contribution and preparedness.**

4. **Q&A Session**

- **Individual understanding of the literature survey, implementation, and overall project.**

- **Ability to answer critical questions with clarity and accuracy.**

Projects should be done within three weeks, with a focus on replicating an existing solution, identifying its limitations, and exploring potential improvements.

Existing Topics

1.   Development of an AI/ML-based solution for detecting Face Swap Deep Fake videos.

2.   Development of a fast and versatile algorithm for optimal aeroplane routing.

3.   AI-based traffic management with real-time monitoring and adaptive traffic light timings.

4.   Automated Bus Scheduling and Route Management System for Transport Corporation.

5.   Ethical AI in criminal justice with bias monitoring.

6.   Transformer Models for Crop Health and Yield Analysis from Satellite Image Data.

7.   Investigating the Expressive Power and Theoretical Constraints of Diffusion Models in Creative AI.

8.   Quantifying Hallucinations: Developing Metrics to Measure and Classify Misinformation in LLMs.

9.   Multimodal AI for Early Detection of Mental Health Disorders (Speech, Text, Facial Micro-Expressions).

10.   Real-time Social Media Sentiment Analysis using AI.

11.   AI-based Recommendation System for Local Businesses.

12.   IoT-Enabled Smart Parking System with Machine Learning.

13.   Automated Resume Screening and Candidate Ranking using NLP.

14.   Predictive Maintenance for Industrial Equipment using Machine Learning.

15.   Real-time Object Detection for Autonomous Vehicles in Urban Settings.

16.   Automated Essay Scoring System using NLP.

17.   Development of an Intelligent Chatbot for Customer Support.

18.   Energy Consumption Forecasting for Smart Grids using AI.

19.   AI-based Anomaly Detection in Cybersecurity for Small Businesses.

Remarks:

- **Time Constraints: The project must be completed within three weeks. The goal is to replicate, analyze, and optimize an existing solution rather than create a new research proposal.**

- **Preparation: Every student should have a complete understanding of the literature survey, implementation, and presentation content.**

- **Expectations: Be prepared to answer detailed questions about any aspect of your project during the evaluation.**