

Master Project Prompt

Act as an expert in Educational Data Mining and AI-driven Adaptive Learning Systems.

Project Title: AI-Driven Learning Style Prediction for Adaptive E-Learning Systems

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Project Overview:

We are building a system to automatically predict student learning styles in real-time using Least Mean Squares (LMS) log data, without relying on static, manual surveys.

1. The Problem:

- Static & Biased: Traditional identification uses manual questionnaires (like Felder-Silverman) which are lengthy and prone to bias.
- Scalability: Manual surveys are impossible to scale for MOOCs.
- Lack of Explainability: Existing ML models function as black boxes.

2. The Solution & Objectives:

- Develop an AI system that analyzes behavioral logs (video interactions, quiz attempts).
- Map these behaviors to the Felder-Silverman Learning Style Model (FSLSM).
- Use Semi-Supervised Learning to handle the scarcity of labeled data.
- Provide an Analytics Dashboard for faculty.

3. Proposed Methodology (Architecture):

- Input: Extract anonymized activity logs from Moodle/LMS.

- Preprocessing: SMOTE for class imbalance.
- Core Models: Hybrid Neural Networks, Graph Representation Learning + Fuzzy C-Means, Ensemble Boosting.
- Semi-Supervised Loop: Self-training with unlabeled data.

4. Technology Stack:

- Python, Scikit-learn, PyTorch/TensorFlow, LightGBM, CatBoost, SHAP.

5. Expected Outcomes:

- Achieve >85% prediction accuracy.
- Enable real-time adaptation of course content.