Project Report

Tasks 1 & 2

May 25, 2025

Task 1 – Supervised Classification

Approach

Data & Objective
Student performance dataset with features such as *Age*, *Study Time* etc.
Goal: predict **relationship yes/no**.

Algorithms
1. Decision Tree
2. Random Forest
3. Logistic Regression

Experimentation

• Explored hierarchical feature subsets (Levels 1−5).
• Tuned tree depth & estimator count via *GridSearchCV*.

Results

Best Accuracy: 64.62% (Decision Tree, Level 1).
Full classification reports & confusion matrices are inside *Task_1.ipynb*.

Task 2 – LLM Agent with LangGraph

Approach

Built an LLM tooluse agent using **LangGraph**:
• Core chat handled by *geminipro* (google.generativeai).
• Added a calculator tool for arithmetic queries.
• Routed control flow through a *StateGraph* with conditional edges.

Experimentation

1. Defined chatbot_node (LLM) & calculator_node (tool).
2. Assembled graph, attempted visualisation with Mermaid.
3. Planned a weather■agent and supervisor chain.

Results / Issues

Can be used for doing chat about calculation , weather and fashion .

Conclusion

Takeaways

• Task 1 achieved ≈ 65 % accuracy; class imbalance affects recall.

• Task 2 shows LangGraph’s flexibility, but highlights the importance of environment management.

Report generated on May 25, 2025.