# AI-Powered Career Guidance System for Sri Lankan Students

Group ID: 25-26J-336

# Project Team

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# System Overview (Video)

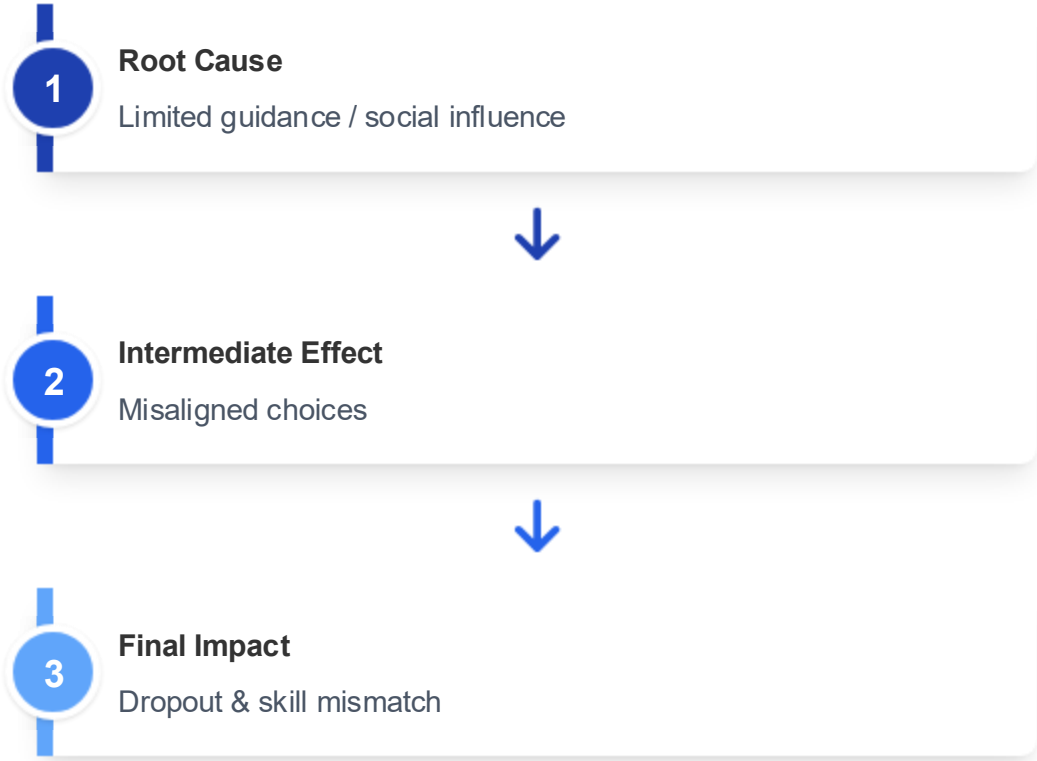
# Why Career Guidance Needs an Upgrade

## The Core Problem

Many Sri Lankan students choose A/L streams, university programs, or careers with limited guidance, often influenced by social/peer pressure rather than skills and interests.

## Key Issues (Impact Areas)

- Poor A/L stream & university selection
- Higher dropout risk in higher education
- Workforce skill mismatch
- Limited guidance for learners without traditional qualifications



# AI-Powered Career Guidance System

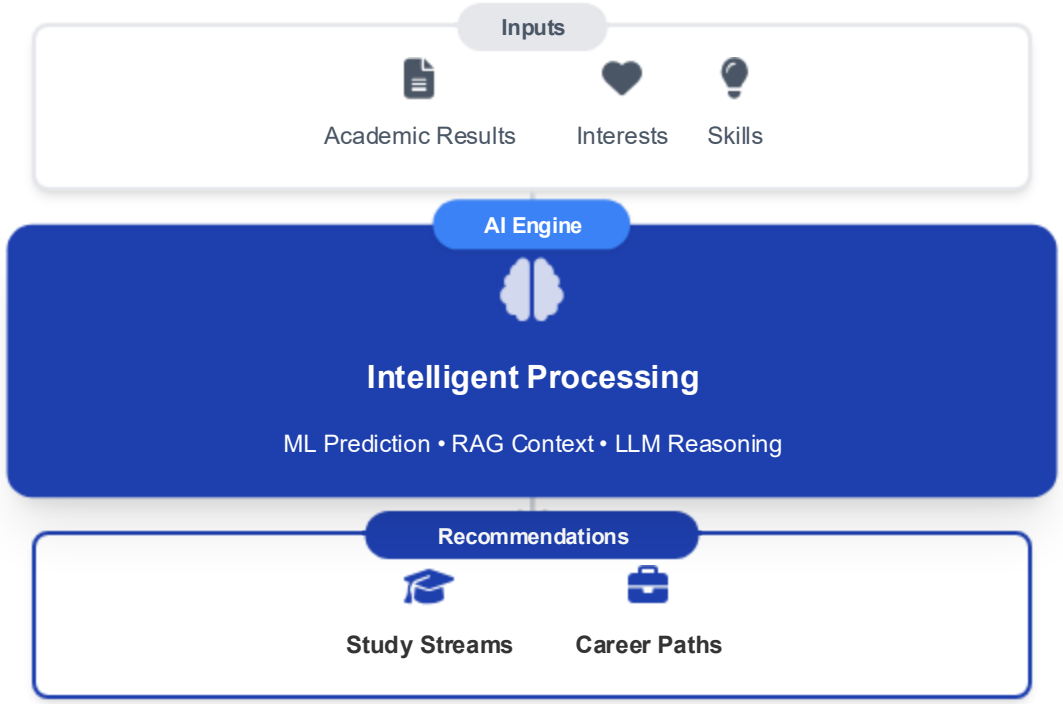
> ***"Personalized academic + career recommendations aligned with skills, interests, and available pathways."***

## Core Features

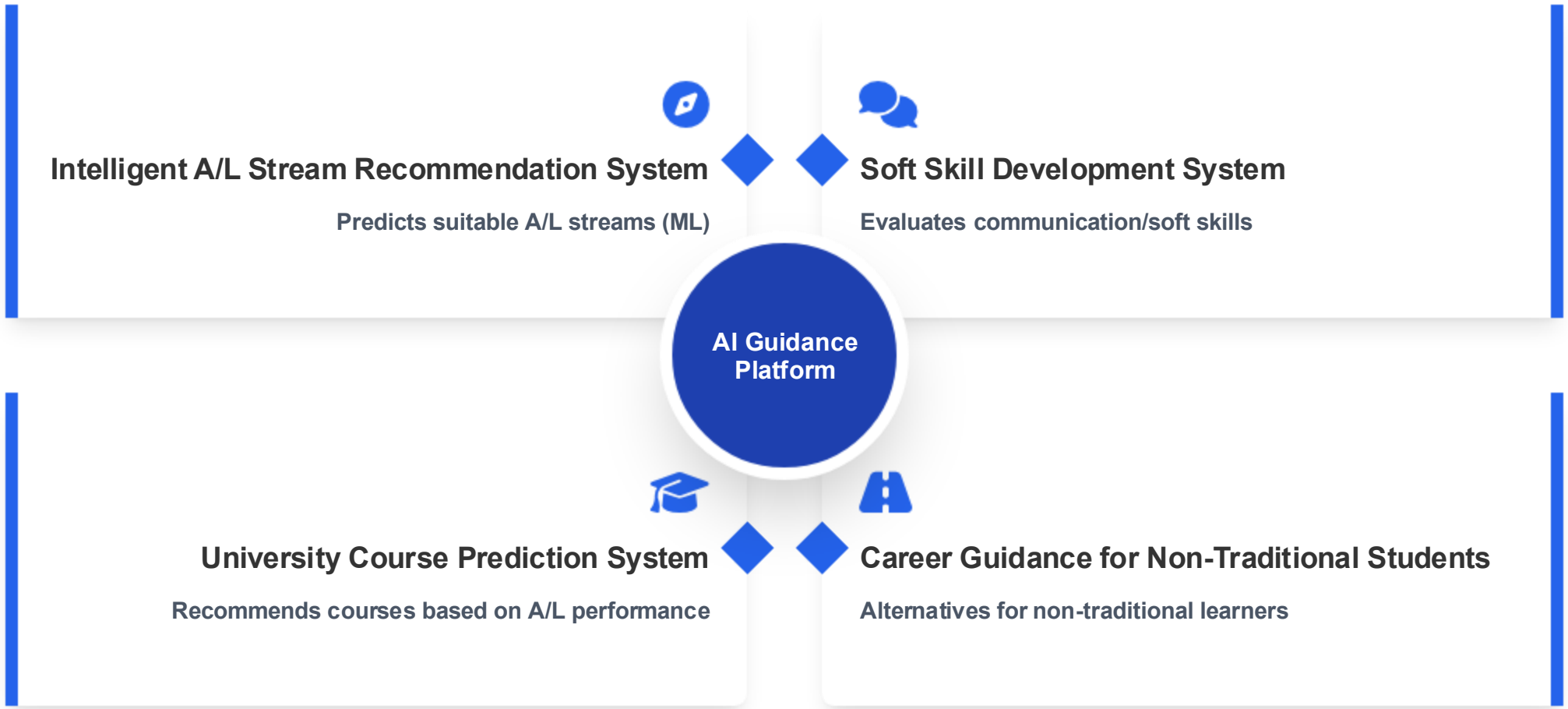
- Predict suitable A/L streams for O/L students
- Recommend university courses for A/L students
- Evaluate soft skills & communication abilities
- Provide learn-to-earn pathways for non-traditional learners

## Key Technologies

Machine Learning Models | RAG | LLMs



# Four Intelligent Modules



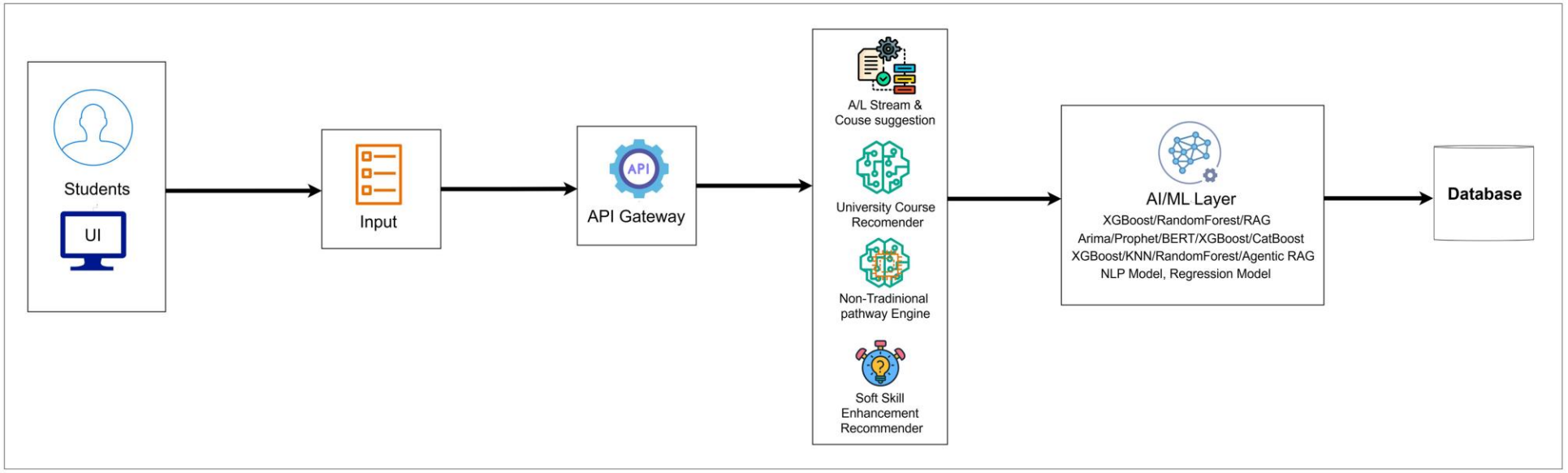
# Tech Stack and System Diagram

**Frontend**
Next.js

**Backend**
Node.js / FastAPI / Python

**AI Layer**
ML models + RAG + LLMs

**Database**
MongoDB



# System Models

*Intelligent Stream Guidance System for O/L Students*

| Model | Training Accuracy | Testing Accuracy | Overfit Gap |
|---|---|---|---|
| Random Forest | 77.43% | 77.32% | 0.11% |
| XGBoost | 96.38% | 86.89% | 9.49% |

# System Models

*Career Guidance for Non-Traditional Students*

| Model | Training Accuracy | Test Accuracy | Top-5 Accuracy | Top-10 Accuracy | Overfit Gap |
|---|---|---|---|---|---|
| Logistic Regression | 11.89% | 3.56% | ~8.5% | ~15% | 8.63% |
| Random Forest | 55.17% | 5.43% | 24.03% | 59.69% | 49.74% |
| KNN | 74.46% | 15.50% | 36.4% | 59.70% | 58.96% |
| XGBoost | 39.87% | 12.37% | 46.39% | 64.95% | 27.50% |
| Agentic RAG | N/A | ~85% | ~92% | ~95% | N/A |

# System Models

***University Course Prediction System***

| | Accuracy | Weighted_F1 |
|---|---|---|
| Hybrid_LightGBM | 0.953922 | 0.953885 |
| Prophet_LightGBM | 0.953922 | 0.953885 |
| Hybrid_CatBoost | 0.942157 | 0.935844 |
| Prophet_CatBoost | 0.942157 | 0.935844 |
| Hybrid_XGBoost | 0.939216 | 0.932821 |
| Prophet_XGBoost | 0.939216 | 0.932821 |
| ARIMA_LightGBM | 0.937255 | 0.928791 |
| ARIMA_XGBoost | 0.921569 | 0.911300 |
| ARIMA_CatBoost | 0.921569 | 0.911300 |

# System Models

***Soft Skill development Module***

## Problem Solving Model

🔹 CLASSIFICATION RESULTS

| | precision | recall | f1-score | support |
|---|---|---|---|---|
| High | 1.00 | 1.00 | 1.00 | 2 |
| Low | 1.00 | 1.00 | 1.00 | 2 |
| Medium | 1.00 | 1.00 | 1.00 | 2 |
| accuracy | | | 1.00 | 6 |
| macro avg | 1.00 | 1.00 | 1.00 | 6 |
| weighted avg | 1.00 | 1.00 | 1.00 | 6 |

## Communication Skill Model

Your XGBoost (after tuning) results:

| Skill | MAE | $R^2$ |
|---|---|---|
| Clarity | 0.663 | 0.471 |
| Vocabulary | 0.718 | 0.125 |
| Fluency | 0.779 | 0.240 |
| Structure | 1.129 | 0.152 |
| Confidence | 1.053 | 0.289 |

# Who the System Serves

| | Inputs | Assessment | Output |
|---|---|---|---|
| O/L Student | O/L results + interests | AI Analysis | Suggested A/L streams |
| A/L Student | A/L performance | Course Matching | University courses |
| Soft Skill Seeker | Current skill level | AI Evaluation | Development plan |
| Non-traditional Learner | Goals + skills | Gap Analysis | Learn-to-earn pathway |

# Go-to-Market and Value Proposition

## Target Market

### Primary Segments

- Sri Lankan O/L students
- A/L students applying for universities

### Secondary Segments

- Non-traditional learners
- Schools & career guidance centers

### Students

- Personalized guidance
- Better academic decisions

### Parents

- Clearer understanding of pathways

### Institutions

- Reduced counseling workload

### Government

- Reduced skill gaps in workforce

# Freemium + Institutional Subscriptions

## Freemium

For Students

- Basic guidance free for students

POPULAR

## Premium Services

Advanced Features

- Advanced analytics
- Career reports

## Institutional

Subscriptions

- Schools
- Universities

# Thank You

Questions?

**AI-Powered Career Guidance System Team**

Project Presentation