THE NATIONAL COLLEGE
BASAVANAGUDI
(AUTONOMOUS)
BASAVANAGUDI, BENGALURU - 560004

HACKATHON PROBLEM STATEMENT

In higher education, maintaining student engagement and academic consistency is one of the most persistent challenges.

Across colleges and universities in India, **nearly 25% of students face difficulties completing their degrees within the expected timeframe.**

Factors such as academic stress, low attendance, financial instability, and lack of personalized guidance often lead to declining performance and disengagement from studies.

Traditional college systems rely heavily on manual monitoring through attendance sheets, academic reports, and counselor feedback. However, these methods are reactive, identifying issues only after students' performance deteriorates significantly.

There is a growing need for an intelligent, data-driven approach that can detect these issues early and allow institutions to provide timely support.

💡 Problem Statement

Across higher education institutions in India, one out of every four students struggles to complete their degree on time due to a combination of factors such as academic pressure, poor attendance, financial instability, and lack of personalized support.

Studies show that colleges record a 22–28% yearly disengagement rate, where students gradually lose academic consistency before eventually discontinuing their studies.

Despite having attendance records, internal marks, and counseling data, most colleges lack an integrated analytics system to interpret these indicators early enough to take preventive action.

Traditional monitoring relies on manual reports or end-semester results, which identify issues only after performance has declined.

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🎯 Goal

The primary goal is to develop a Machine Learning Predictive Model capable of identifying students showing early signs of academic disengagement based on academic, behavioral, and socio-economic data.

Build and train a predictive ML model that estimates each student's engagement risk score

Provide data-driven insights to guide timely interventions and personalized mentoring

Reduce academic disengagement by predicting and preventing performance decline

Support institutional decision-making through predictive analytics and automated reporting

Ultimately, we seek to integrate artificial intelligence with academic management systems to ensure that every student receives the right help at the right time, empowering colleges to create a more responsive and supportive educational environment.

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Expected Deliverables

1 Cleaned dataset (CSV or XLSX).

2 Trained ML model (.pkl or .joblib).

3 Frontend dashboard (Streamlit or Flask).

4 README or brief documentation explaining workflow.

5 Optional: short presentation or summary of approach.

Bonus Features (Optional)

1 Feature importance visualization (using SHAP or sklearn).

2 CSV upload for batch predictions.

3 Interactive dropout analytics dashboard.

4 API integration for predictions (Flask/FastAPI).

5 Explainable AI integration (XAI).

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UI Core Components

Dashboard – Displays KPIs, statistics, and analytical charts.

Students Section – Searchable list of students with risk indicators.

Student Detail View – Shows profile data, prediction probability, and feature impact.

Simulation Panel – Allows users to modify data inputs to test different prediction outcomes.

Chatbot Widget **(Bonus)** – Conversational assistant integrated into the interface for personalized responses.

Shared Components – Navigation bar, sidebar, modal windows, and reusable chart modules.

Chatbot Backend **(Bonus point)**

- Suggests possible interventions or actions based on prediction results.
- Helps users navigate the platform and understand system outputs.
- Suggests academic resources, motivational guidance, or targeted management strategies to help students improve performance and prevent dropouts.