📘 EduPredict User Documentation

🎯 Project Overview

EduPredict is an AI-powered academic performance prediction system designed to identify students at
risk of dropout or underperformance. The system leverages machine learning algorithms to analyze
academic data and provide predictive insights through an interactive dashboard interface.

🎯Problem Statement

Educational institutions face significant challenges in identifying students who are at risk of academic
failure or dropout. Traditional methods of assessment often fail to provide early warning signs, leading to:
High dropout rates
Inefficient resource allocation
Limited intervention opportunities
Poor academic outcomes
Solution: EduPredict addresses these challenges by implementing a predictive analytics system that can
forecast student academic outcomes and identify at-risk students early in their academic journey.

👥 User Roles & Access

Role	Description	Access Rights
Counselor	Manages users, system configuration, and access controls.	Full access to all features.
Teacher	Monitors student progress, generates reports.	Limited to academic data of their own students.

Role	Description	Access Rights
Student	Views own performance analytics and alerts.	Access to personal academic and attendance data only.

🔐 System Login & Authentication

🔷 Login Process

1. Go to the EduPredict login page.
2. Enter your registered email and password.
3. Click **Login**.

📥 Data Ingestion

🔷 Supported Data Types

- Academic records (grades, assessments)
- Attendance data
- LMS logs (Moodle, Blackboard, etc.)
- Student demographics

🔷 Data Sources

- Historical Uploads: CSV, JSON, XML
- Real-time: API integrations, Kafka streams

🗃️ Data Storage & Management

- Uses **Hadoop Distributed File System (HDFS)**.
- Automatically partitions data by type, academic year, and institution.
- Redundant storage ensures fault tolerance.

🔷 Accessing Data (Analysts/Admins)

Use the **Data Explorer** interface to:

- Filter datasets
- Download subsets
- View ingestion history

⚙️ Data Processing

- Processes run on **MapReduce** and **Spark** for scalability.
- Handles missing data using imputation techniques.
- Detects:
  - Grade trends
  - Attendance patterns
  - Behavioral anomalies

⚡ Real-Time Processing

- Real-time data flows managed via **Apache Kafka**.
- LMS logs, live attendance systems, and feedback forms are processed instantly.
- Real-time processing feeds into dashboards and notification systems.

🧠 Predictive Analytics

🔷 Models Included:

- **Performance Prediction**: Predicts grades and academic success.
- **Dropout Risk Analysis**: Flags students at risk.
- **Course Demand Forecasting**: Assists curriculum planning.
- **Anomaly Detection**: Identifies outliers (e.g., sudden grade drop).

🔷 Updating Models

- Models are retrained automatically with each data refresh.

- Admins can manually trigger retraining via the **Model Manager**.

📊 Dashboards & Visualizations

🔷 Accessing Dashboards

- Go to the **Dashboard** tab on the main menu.
- Select filters (class, semester, course, etc.)

🔷 Key Visualizations

- Student performance graphs
- Attendance heatmaps
- Risk level indicators (Red-Yellow-Green)
- Predictive trend lines

🔷 Custom Views

- Save and share dashboards with others.
- Export charts in PDF/PNG/CSV formats.

🔔 Notifications & Alerts

- Alerts can be triggered for:
  - Low attendance
  - Declining performance
  - At-risk status
  - Unexpected behavior patterns