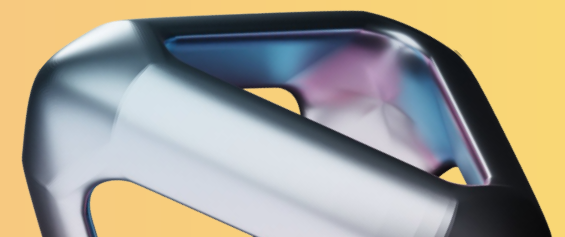


AI in Data Analytics

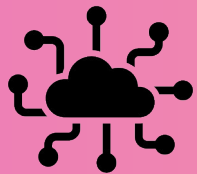


Project Topic:

Developed an AI-driven analytics dashboard for predicting student academic performance based on internal assessments, attendance, and past academic records



USE OF DATA ANALYTICS



Uncovers Hidden Patterns: Identifies trends in attendance, assessments, and past performance that affect student outcomes.



Enables Early Intervention: Detects at-risk students before they fail, allowing timely support.



Improves Accuracy: Uses statistical and machine learning models for more reliable predictions than guesswork.

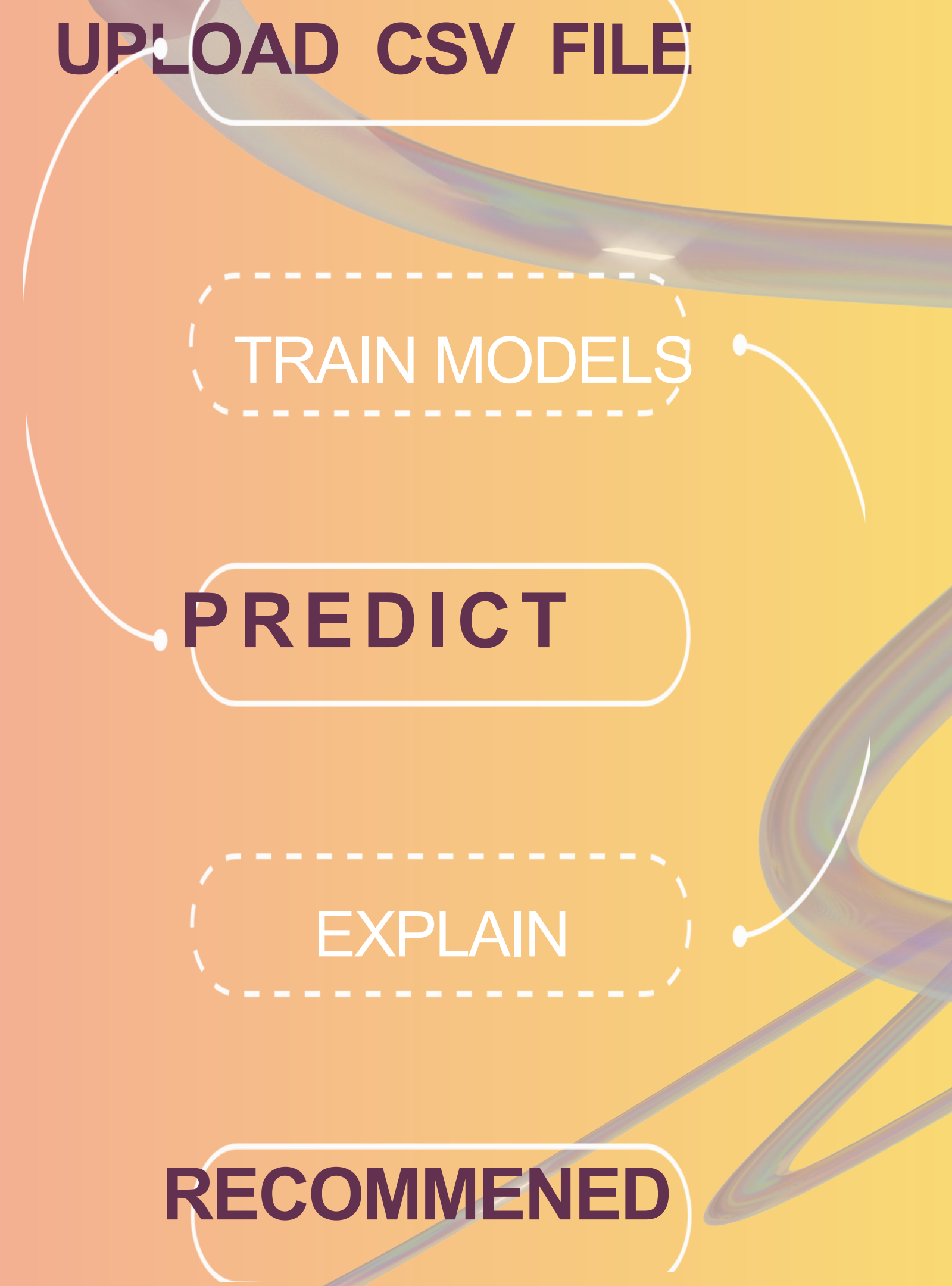


Supports Personalized Learning: Provides customized feedback and recommendations for each student.

System architecture

A structured framework that defines:-

The components, interactions, and design principles of a software or hardware system. It outlines how different modules work together to achieve overall functionality, scalability, and performance.



Research on Student Performance Prediction Based on Random FOREST

Due to the shift to online learning during COVID-19, student performance patterns changed significantly. This paper proposes a CGPA Predicting Model (CPM) that estimates a student's final CGPA based on their 2nd and 3rd-year progress. The model helps academic advisors identify and support students at risk of academic failure.

Parameters Used:

- Second-year course grades
- Third-year course grades
- Cumulative GPA from previous semesters
- Course credit hours
- Student progression status

KEY REASONS:

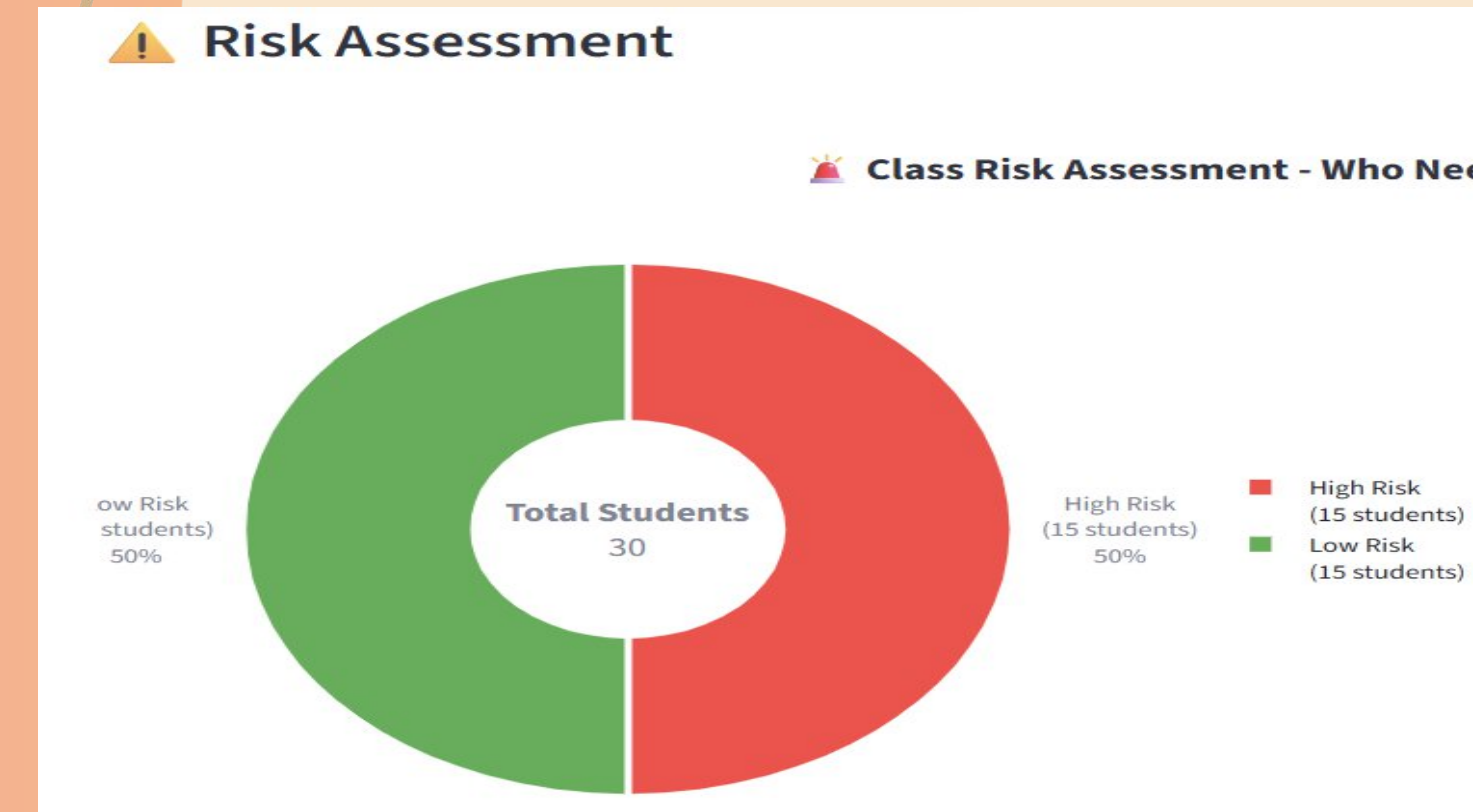
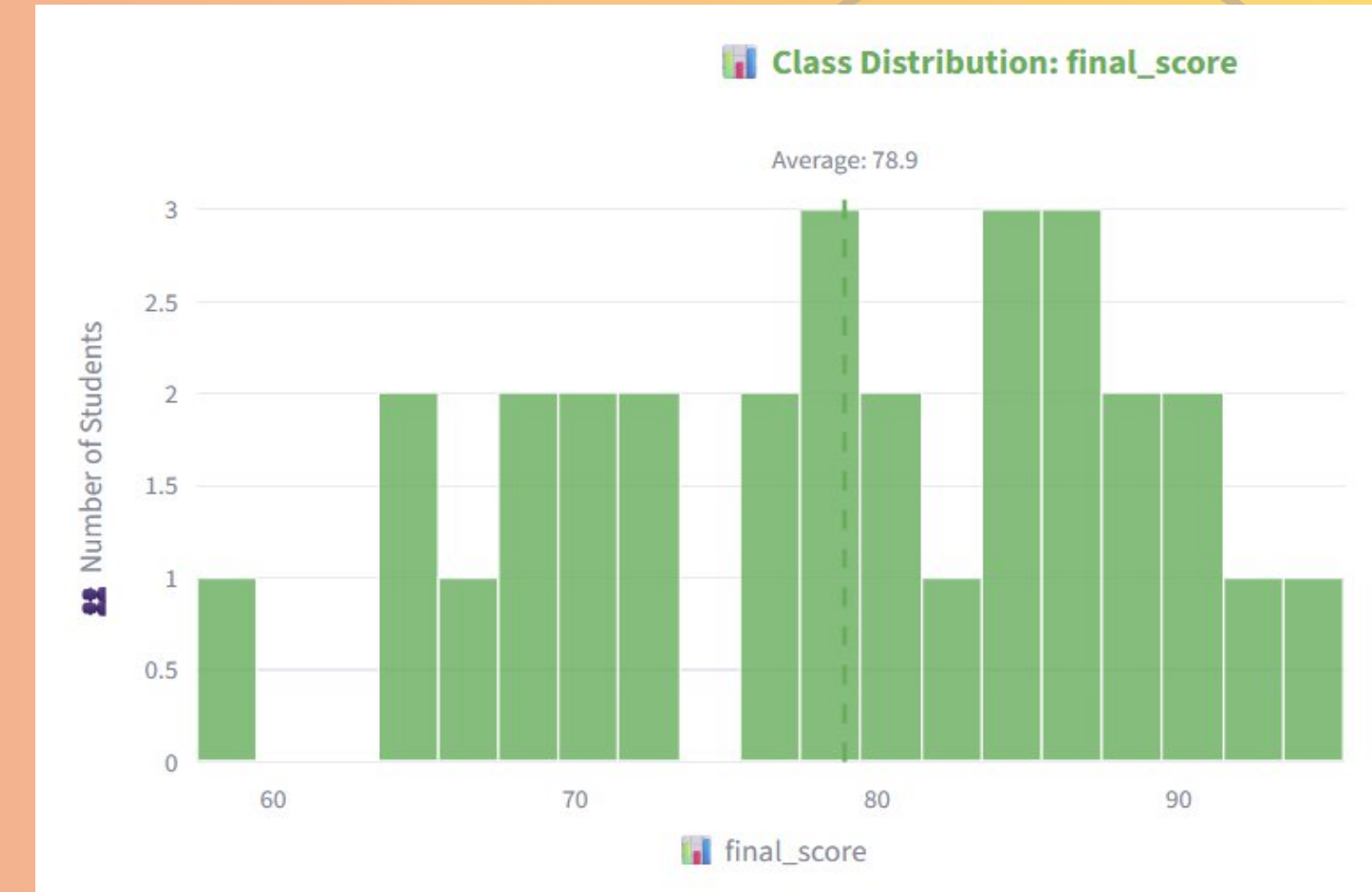
- High Prediction Accuracy
- Handles Complex & Nonlinear Relationships
- Works Well with Mixed Data Types

MODEL OVERVIEW

Our model uses the **Random Forest** algorithm to predict student performance and classify them into **risk categories** (High, Medium, Low).

It takes in academic and demographic data, then outputs a **predicted score** and **risk level**.

The model also provides **feature importance** and **SHAP-based explainability**, helping educators understand the reasons behind each prediction.



RANDOM FOREST IN ACTION :

—Dual-Task Pipeline:

—Regression → Predicts exact performance scores

—Classification → Categorizes students into:

Algorithm Used: Random Forest
Ensemble-based method combining multiple decision trees

- Handles non-linear relationships well
- Robust to overfitting due to averaging

Filter by risk level: ?


High Risk ▼

All Students


High Risk


Medium Risk


Low Risk


 **User Role**

Select your role:

 Teacher ▼


 Teacher

 Administrator

 Student



and identify those

TAILORED DASHBOARD VIEW


 **Dashboard**

Navigate through sections



Choose a section:

 Data Upl... 


Upload and preprocess student data


 **User Role**



Select your role:


 Teacher 


Welcome back!
Monitor your students' progress and identify those who need extra support.

Deploy 

 **Student Performance Prediction Dashboard**
AI-Powered Analytics for Educational Excellence

 **Quick Start Guide**
Ready to explore? Click 'Load Sample Data' to instantly see charts, analysis, and risk assessments! 

 **Data Upload & Processing**

 **Upload Student Performance Dataset**

Choose a CSV file

Drag and drop file here

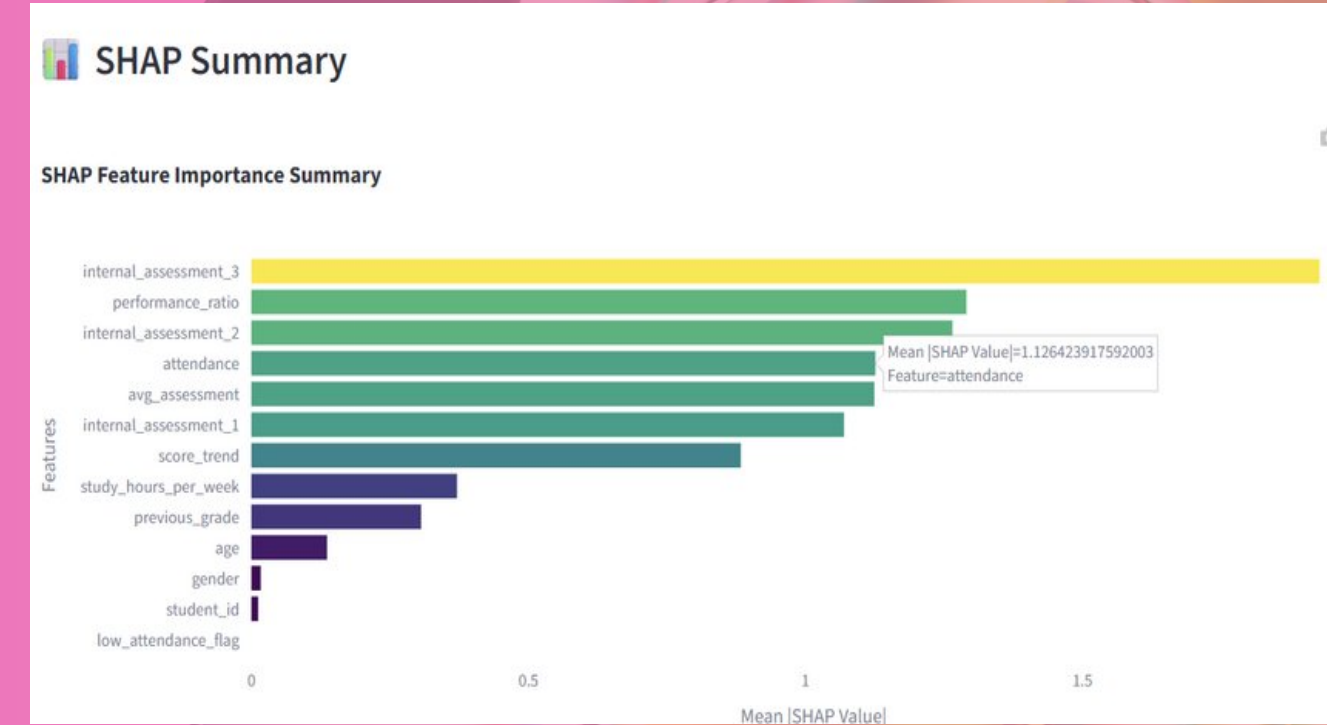
Limit 200MB per file • CSV

Browse files

sample_student_data.csv

1.1KB

✓ Data uploaded successfully! Shape: (30, 10)



Choose a section:

Data Upl...

Data Upload ...

Model Training...

Predictions ...

Model Explai...

Personalized...

✓ Models trained successfully!

Model Performance Metrics

Regression R² Score

0.998

Model accuracy (higher is better)

Regression RMSE

0.449

Prediction error (lower is better)

Classification Accuracy

1.000

Pass/Fail prediction accuracy

⚡ Training Time

0.38s

Model training duration

Intervention Strategies

Filter by risk level:

High Risk

View type:

Individual Students

Students in High Risk category: 15

Recommended Actions

Student 1 - High Risk Risk

Current Status:

Predicted Score: 78.55

Risk Level: High Risk

Recommendations:

- Immediate intervention required - meet with counselor
- Develop an intensive study plan
- Consider additional academic support resources
- Explore alternative learning methods that suit your style

Student 2 - High Risk Risk

Student Performance Predictions

Average Score

78.9

Predicted Performance

⚠ High Risk

15

Students needing intervention

★ High Performers

14

Excellent performance

⚠ Risk Assessment

Performance Levels

🚩 Class Risk Assessment - Who Nee

📊 Class Performance Distribution

Low Risk students) 50%

High Risk (15 students) 50%

Low Risk (15 students)

High Risk (15 students)

Total Students 30

Number of Students

Good 11

Fair 10

Excellent 9

Needs Improvement 0

Performance Level

Future Possibility

Integrate real-time data from school management systems for live predictions


Incorporate emotional/behavioral data for more holistic analysis

Add multilingual support to improve accessibility across regions

Deploy on mobile devices for teacher-friendly, on-the-go insights

Enable parent dashboards for collaborative interventions and tracking


VISUALIZING STUDENT RISK AND PERFORMANCE



Dashboard

Navigate through sections


Choose a section:

 Data Up...

Upload and preprocess student data

User Role

Select your role:

 Teacher

Welcome back!
Monitor your students' progress

Deploy

Supported format: CSV files

Expected columns:

- Student demographic data (age, gender, etc.)
- Academic indicators (internal assessments, attendance)
- Final grades or performance metrics

Choose a CSV file

Drag and drop file here
Limit 200MB per file • CSV

Browse files

Load Sample Data

sample_student_data.csv 1.1KB

Data uploaded successfully! Shape: (30, 10)

Data Preview

	student_id	age	gender	attendance	internal_assessment_1	internal_assessment_2	internal_assessment_3	study_hours_per_week	previous_grade	final_score
0	1	18	Male	85	75	80	78	15	B	79
1	2	19	Female	92	88	85	90	20	A	87
2	3	17	Male	78	65	70	68	12	C	69