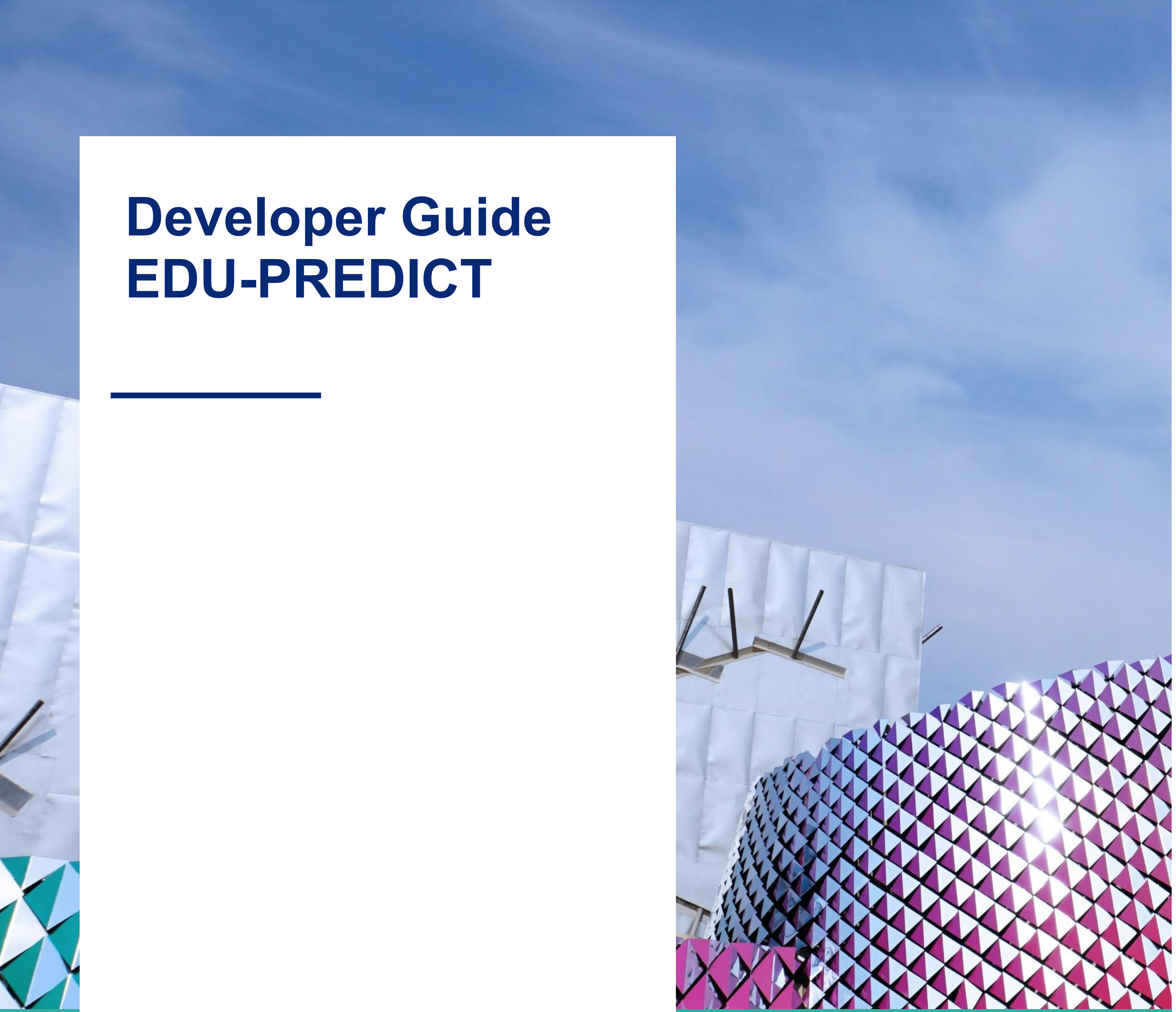

Developer Guide
EDU-PREDICT

EPROJECT

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Coordination: Miss Iqra Khan

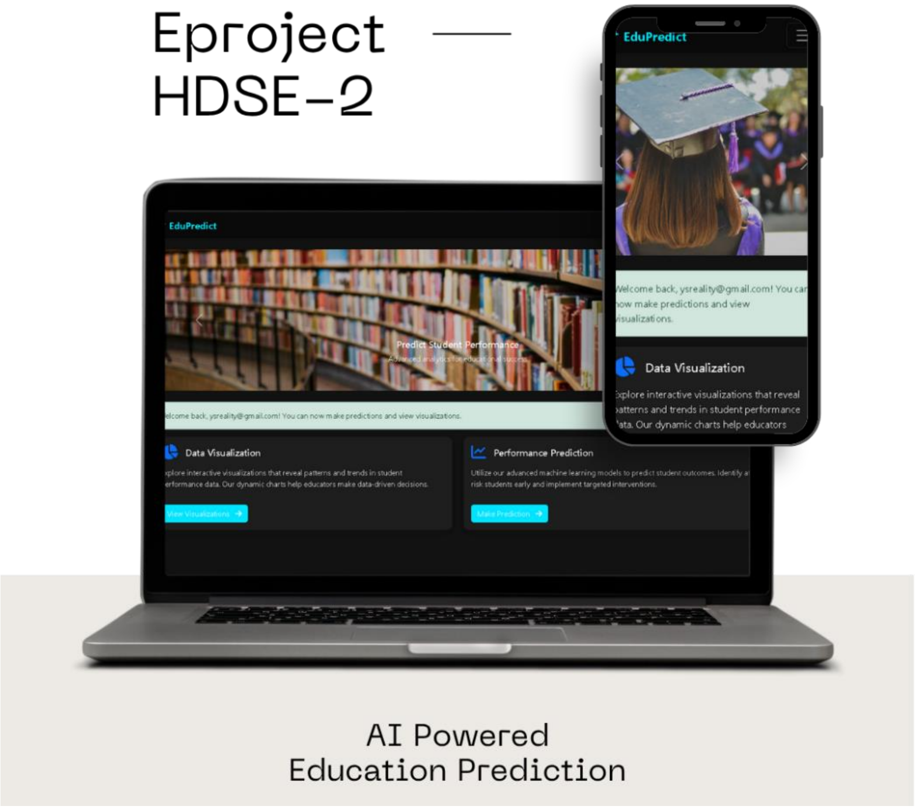
Aptech™
COMPUTER EDUCATION
Unleash your potential

Problem Statement

Background

Education institutions worldwide face numerous challenges, such as declining student retention rates, inefficient resource allocation, and the need to personalize learning experiences. At the same time, advancements in technology and data availability present significant opportunities to address these challenges through data-driven approaches.

By leveraging the capabilities of Hadoop and predictive analytics, EduPredict aims to overcome these challenges, capitalize on data-driven opportunities, and ultimately enhance the educational experience for the students.



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xplore interactive visualizations that reveal patterns and trends in student erformance data. Our dynamic charts help educators make data-driven decisions.

Utilize our advanced machine learning models to predict student outcomes. Identify a risk students early and implement targeted interventions.

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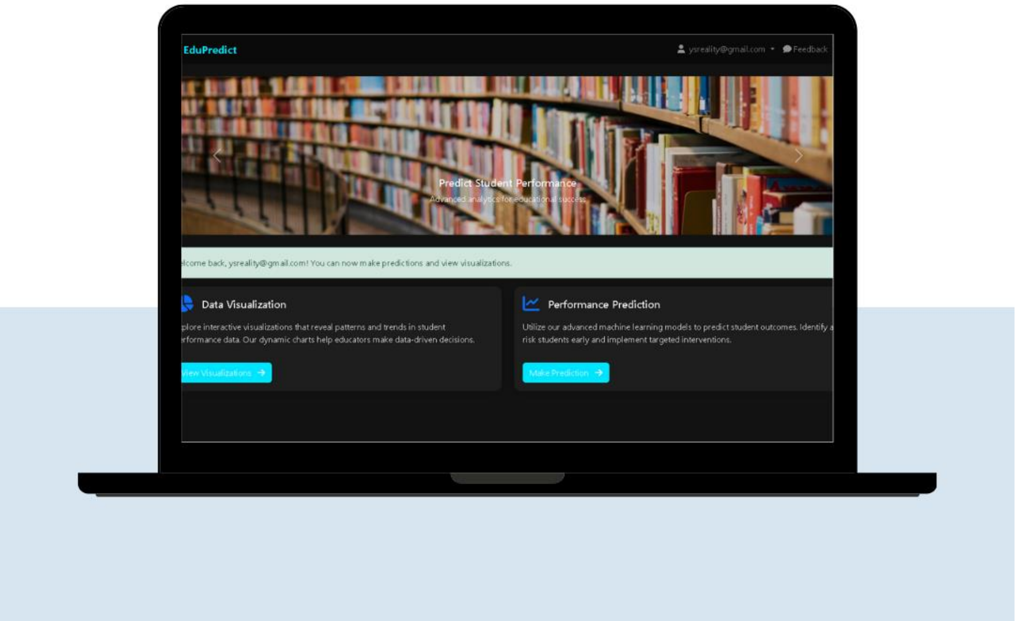
Technology Stack

Layer	Technology
Backend	Python, Flask
Database	MongoDB Atlas (via Flask-PyMongo)
Machine Learning	Scikit-learn (Random Forest)
Frontend	HTML, CSS, Bootstrap, Jinja2
Email	Flask-Mail (Gmail SMTP)
Visualizations	Matplotlib, Seaborn
PDF Reports	ReportLab



Predict Student Performance

Advanced analytics for educational success

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Data Visualization

plore interactive visualizations that reveal patterns and trends in student rformance data. Our dynamic charts help educators make data-driven decisions.

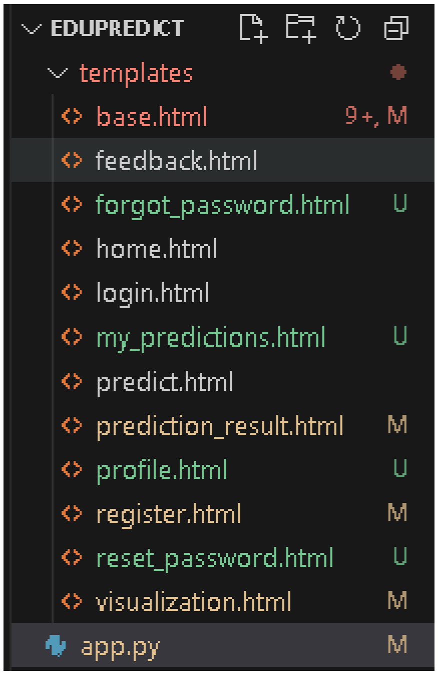
Performance Prediction

Utilize our advanced machine learning models to predict student outcomes. Identify a risk students early and implement targeted interventions.

User Registration & Login

2.1. Folder Structure

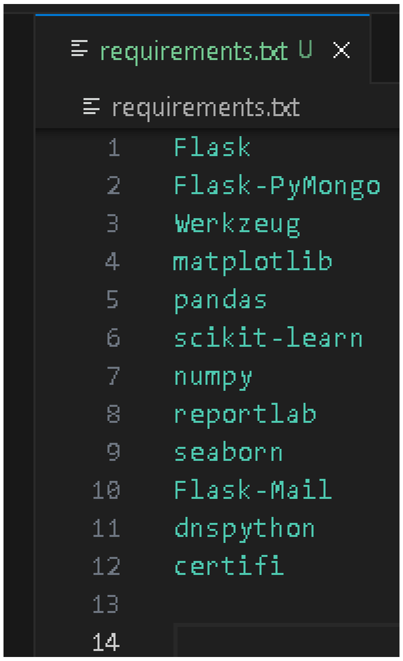
- App.py
- templates:
  - base.html
  - feedback.html
  - forgot_password.html
  - home.html
  - login.html
  - my_predictions.html
  - prediction_result.html
  - profile.html
  - register.html
  - reset_password.html
  - visualization.html



```
EDUPREDICT
  templates
    base.html                 9+, M
    feedback.html
    forgot_password.html      U
    home.html
    login.html
    my_predictions.html       U
    predict.html
    prediction_result.html    M
    profile.html              U
    register.html             M
    reset_password.html       U
    visualization.html        M
  app.py                      M
```

Dependencies

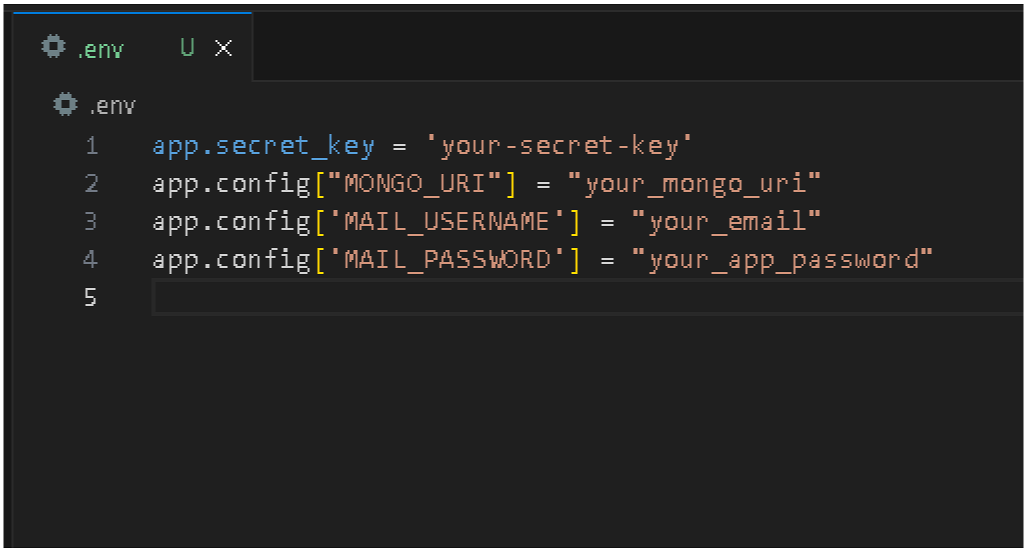
- **pip install -r requirements.txt**



```
Flask
Flask-PyMongo
Werkzeug
matplotlib
pandas
scikit-learn
numpy
reportlab
seaborn
Flask-Mail
dnspython
certifi
```

Environment Config

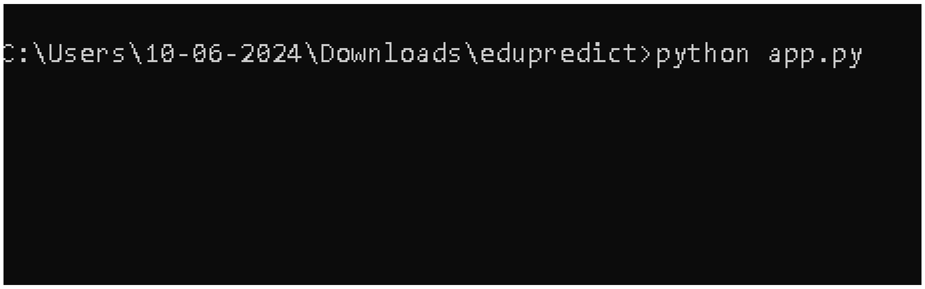
- Store secrets in .env and load using python-dotenv
- Or directly set in app.config[] in app.py



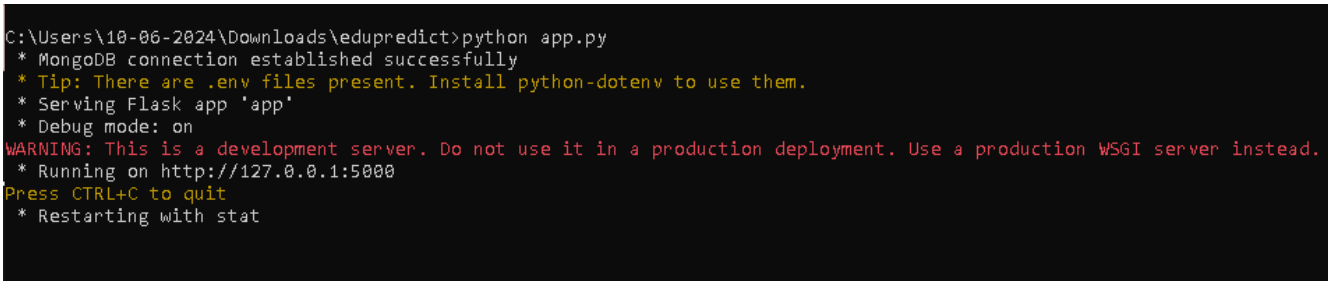
```
app.secret_key = 'your-secret-key'
app.config["MONGO_URI"] = "your_mongo_uri"
app.config['MAIL_USERNAME'] = "your_email"
app.config['MAIL_PASSWORD'] = "your_app_password"

```

Running the Application

- **Run** *python app.py* **On Terminal to access the application at** *http://127.0.0.1:5000*



```
C:\Users\10-06-2024\Downloads\edupredict>python app.py
```



```
C:\Users\10-06-2024\Downloads\edupredict>python app.py
 * MongoDB connection established successfully
 * Tip: There are .env files present. Install python-dotenv to use them.
 * Serving Flask app 'app'
 * Debug mode: on
WARNING: This is a development server. Do not use it in a production deployment. Use a production WSGI server instead.
 * Running on http://127.0.0.1:5000
Press CTRL+C to quit
 * Restarting with stat
```

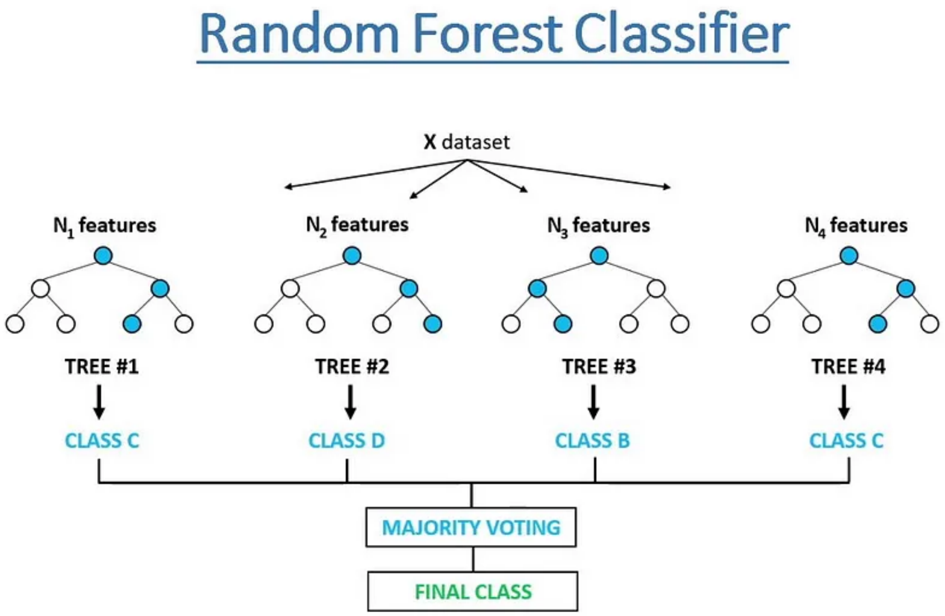
AI Model Used

6.1. Model Description

- A Random Forest Classifier is trained on educational attributes like test scores, attendance, absences, and study hours to make accurate dropout predictions.

6.2. Reason

- Random Forest Classifier is the Model to Predict any Kind of Categorical Values (e.g. “Dropout” OR “Continue Studies”)



Visualizations

7.1. Plotted with Matplotlib & Seaborn

- Saved to BytesIO() → Base64 → Embedded in HTML
- Located in /visualization route
- Example: Pie chart, heatmap, scatter, bar, violin plots

Report Generation

- **Uses ReportLab to generate:**
    1. Individual Prediction Reports *(/download_report/<roll_number>)*
    2. All Predictions Report *(/download_all_predictions)*

Email Integration (OTP)

- Flask-Mail setup for sending OTP to reset password
- HTML-styled email template
- Stored in MongoDB (*password_resets* collection)

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Authentication & Sessions

- Secure session management via Flask
- **Password hashing:** *werkzeug.security.generate_password_hash()*
- login_required decorator for protected routes

Thank You