SITE 2023
34th INTERNATIONAL CONFERENCE
SOCIETY FOR INFORMATION TECHNOLOGY AND TEACHER EDUCATION

SOUTHERN UNIVERSITY AND A&M COLLEGE
INCORPORATED 1880
RELOCATED 1914
BATON ROUGE, LA.

Cloud-based STEM Student academic success prediction Web application.

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Background-Emerging technologies

Artificial Intelligence(AI): *Building machines that can perform tasks such as perception, reasoning, learning, and problem-solving*

Cloud computing: *"cloud" is a network of remote servers to store and access files, programs, and other digital resources on the internet instead of on your computer or device.*

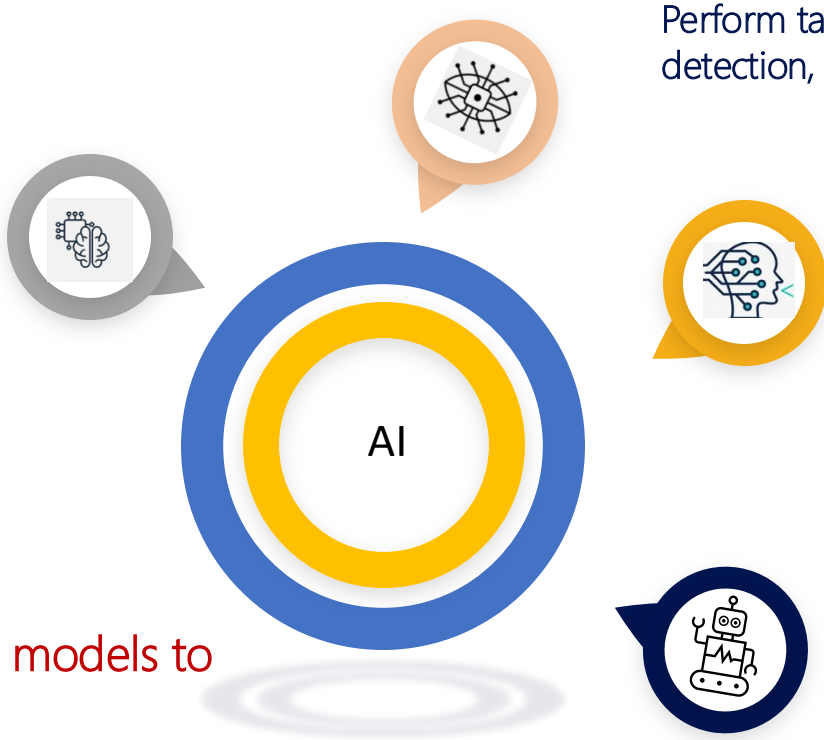
Machine Learning (ML)

Making machines able to learn from data, without being explicitly programmed. Using patterns in data to make predictions.

Supervised learning- Labeled data to train a machine learning model.

Unsupervised learning- Unlabeled data to train a machine learning model.

Deep Learning- Artificial neural networks to learn from large amounts of data



Computer Vision

Perform tasks such as image recognition, object detection, and facial recognition.

Natural Language Processing

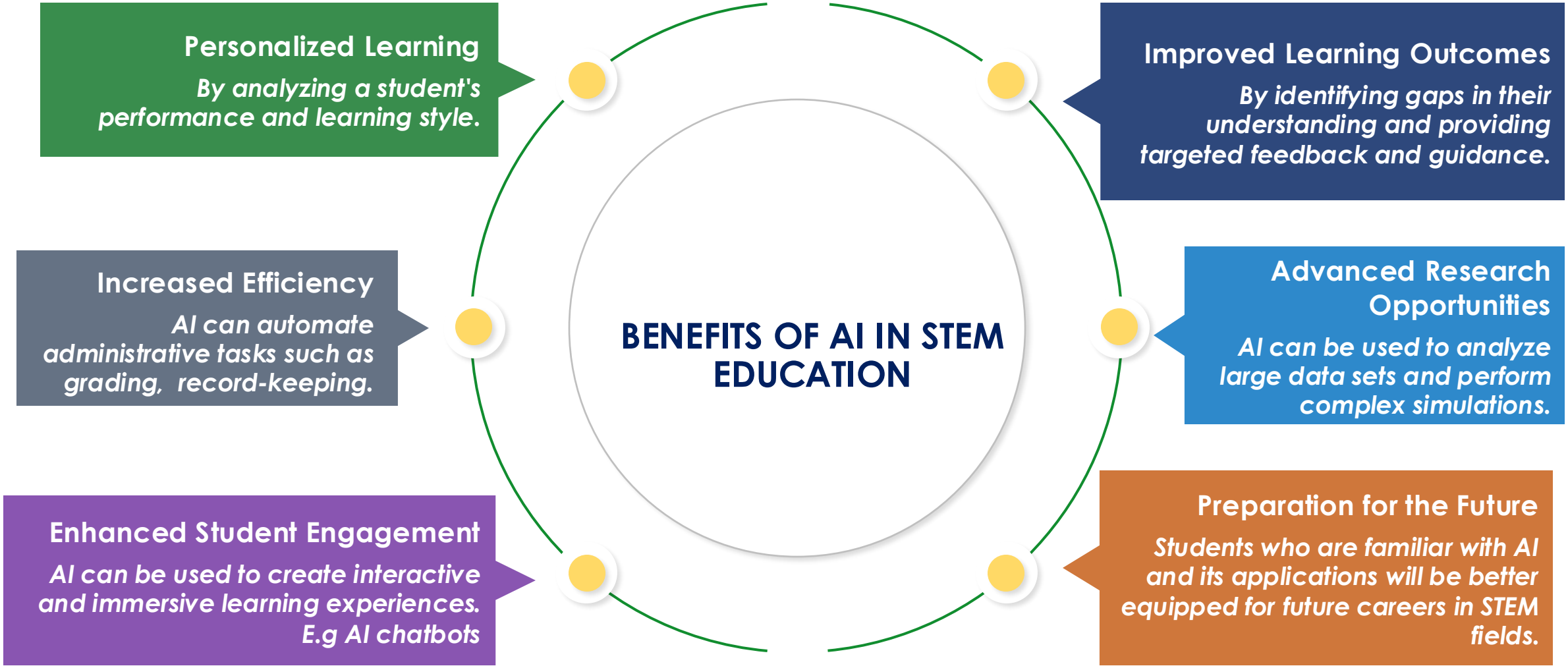
Analyze and generate text, translate languages, and extract information from unstructured data sources such as social media and email.

Robotics

Machines that can perform tasks autonomously.

Ensemble models combine two or more ML models to create more efficient and robust models.

Background / Literature overview



(Azmat et al., 2020; Tatar & Düştegör, 2020; Jayaprakash et al. 2020; Menon et al., 2022)

Problem Statement

There is little systematic research on building and deploying ML models for STEM education.

Barriers to AI in STEM education

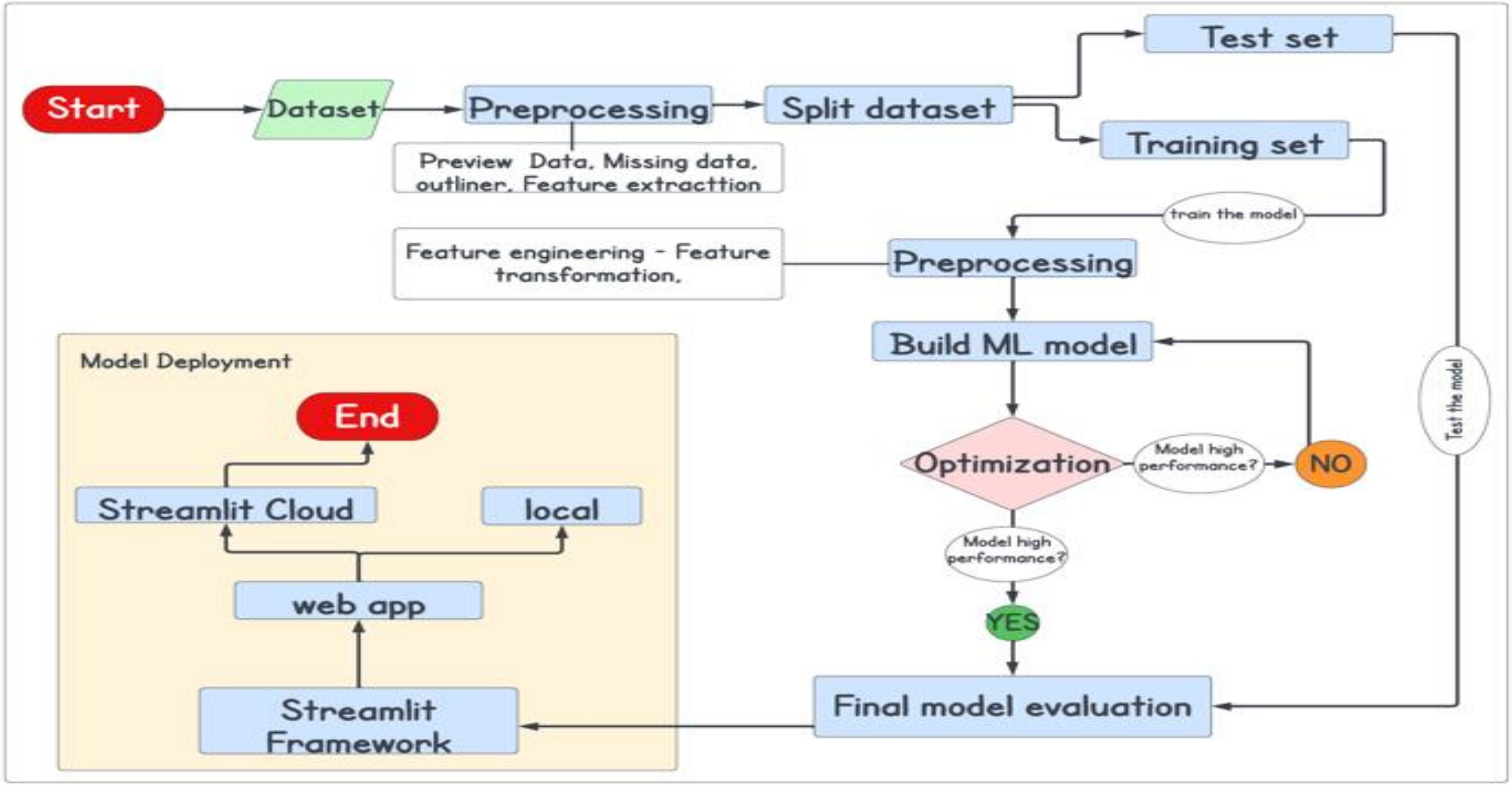
- Insufficient AI resources and support, insensitive policies,
- Teacher attitudes and beliefs.
- Insufficient technical skills.
- Ethics and privacy.
- Need for more expertise among educators regarding AI concepts.

(T. Wang & Cheng 2021; K. Zhang & Aslan 2021)

Statement of purpose

To develop and deploy cloud-based ML web applications for easy access for educators.

Proposed ML system



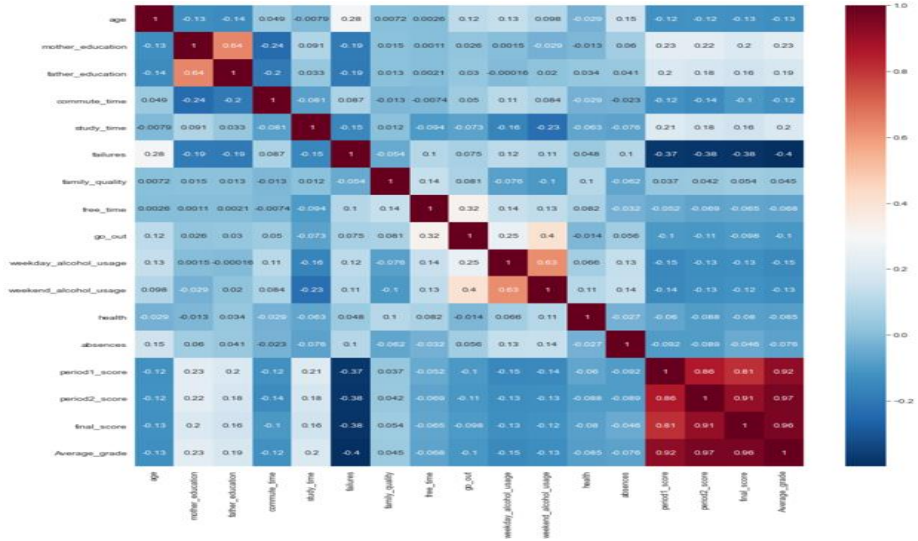
Implementation- Ensemble models

Dataset

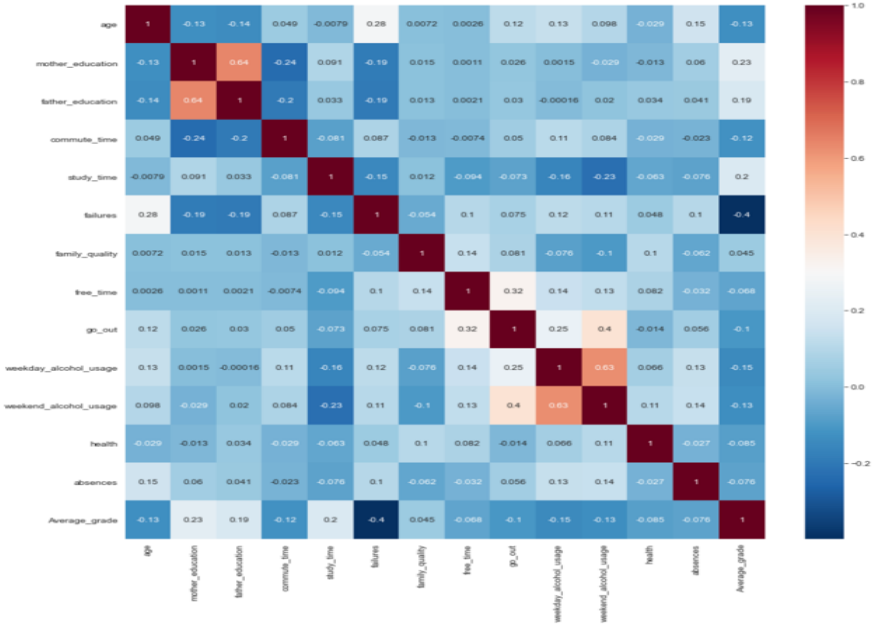
- From UC Irvine machine learning repository
- Students' academic performance at two high schools.
- 33 features and 1044 instances. The dataset contains
- Several non-numerical and categorical features.

Tools: *Python, Jupyter Notebook.*

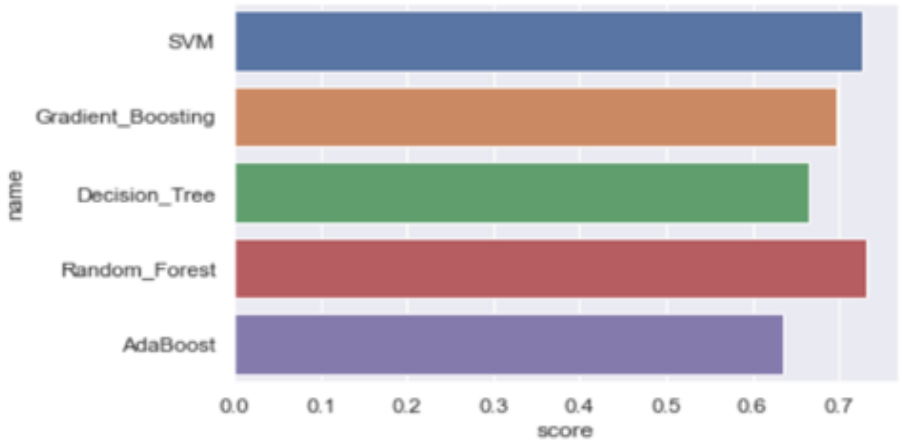
Data preprocessing



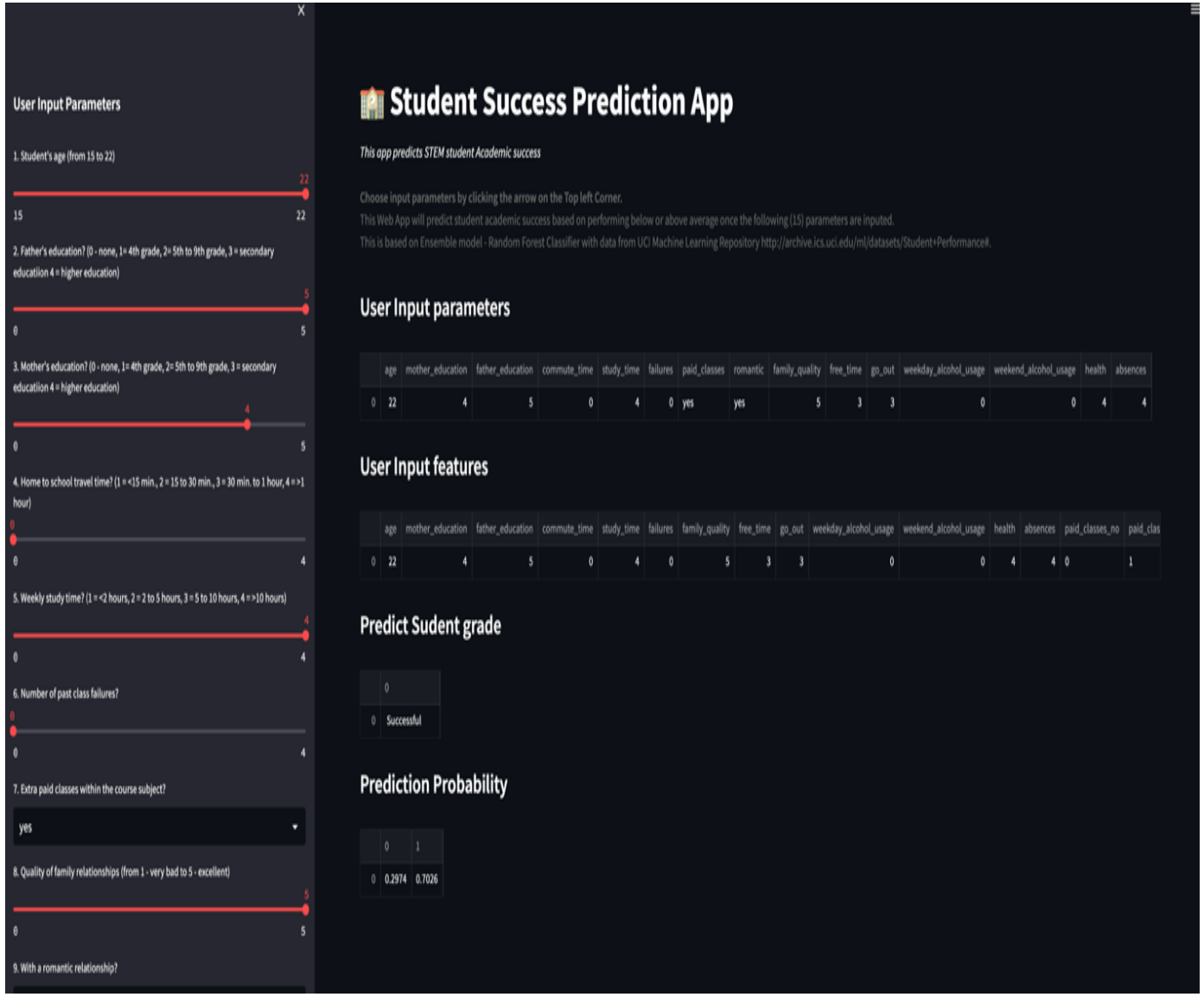
Feature engineering



Ensemble models



Implementation- ML model deployment

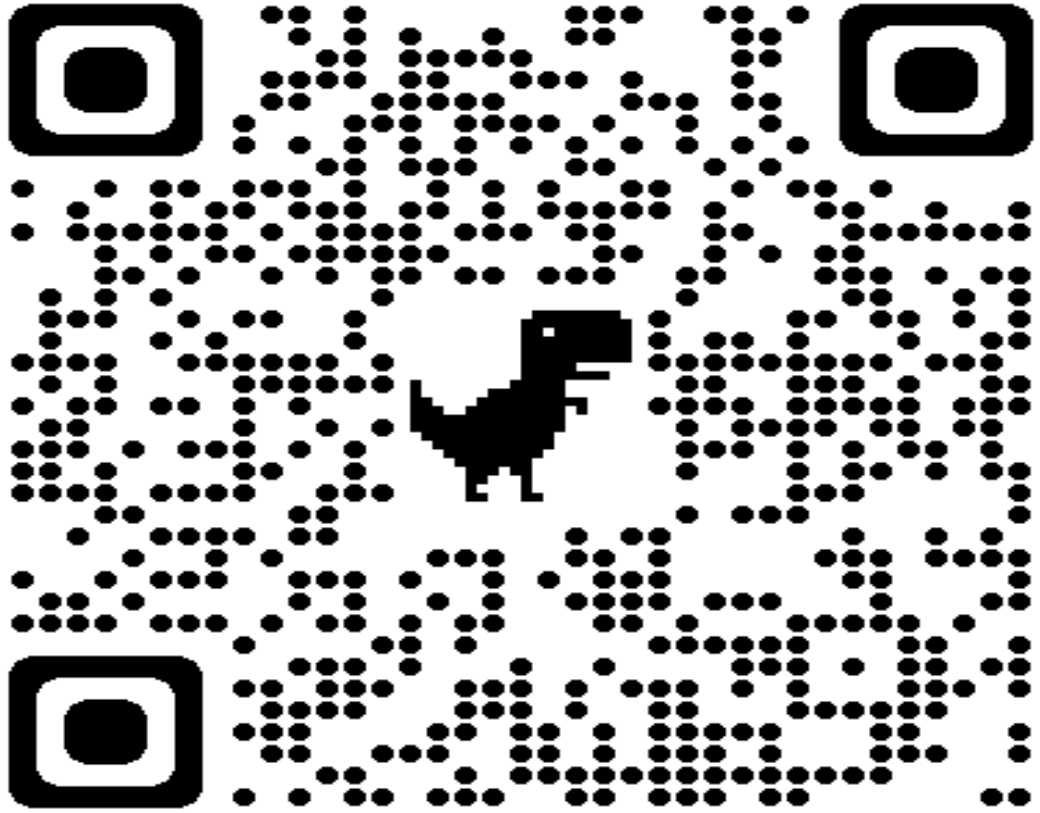


Streamlit is an open-source Python library web application framework

Deployment guide

- Top 15 features as inputs for the web application.
- A pickle file containing the ML model.
- Python file containing the streamlit framework that receives input from the user.
- A comma-separated values (CSV) file containing selected features.
- A text file containing the requirements for the ML library.

Live demo



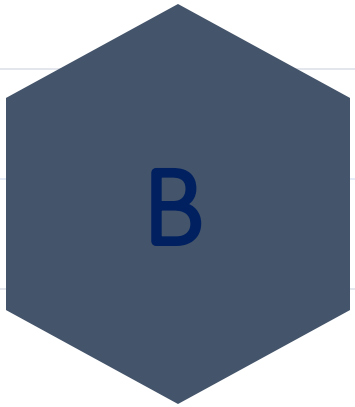
https://student-academic-success-prediction.streamlit.app/

For the best experience, use a personal computer.

Significance, contribution and conclusion

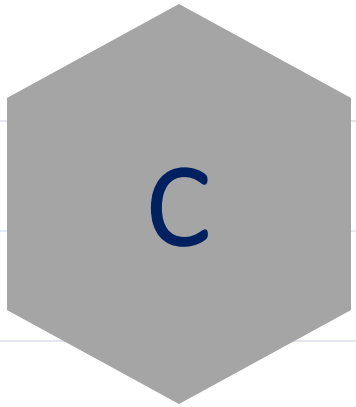
Learning experience

- Early identification of struggling students.
- Provide valuable insights into student performance and engagement.
- Personalized learning.



Data-driven decision making

- Can help increase retention and graduation rates for STEM students.
- Inform decision making around course design, teaching methods, and student support services.



Education technology policies

Improve practices and policies on AI in STEM education.

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THANK YOU

Contact: