Amartya Singh, Jaskaran Singh, Robert Leifke, Xuan Chau

github.com/AmartyaSingh/Saluseon

Overview

A platform that integrates a predictive model using machine learning to flag students at risk of dropping out of high school. Based on significant evidence supported by research, the model uses isolated inputs recognized as predictive markers for students dropping out and thus assigning a percentage of probability at which they are likely to drop out. More importantly, the platform provides a user-friendly interface that allows for the data to be easily visualized allowing for the school to identify students at risk of dropping out. The feature enables schools and parents to intervene prematurely to prevent such actions to occur.

Goals

1. Comprehensive analysis to determine the student dropouts rate.

2. To take preemptive action in order to prevent such happenings.

Specifications

-   There are very few to no applications that deal with preventing student dropouts.
-   Evidence heavily shows that intervention is the best way at preventing student dropouts.

- Therefore, we create a web application that is easy for school admin to adopt into their system, simply by inputting and updating data (possibly the teachers do this)
    - Personal factors such as family income would be provided by the student's parents if they are willing.
    - Academic factors that are subject to change would be dealt with by the teachers who know this, so things are updated.
- With the click of a button, administrators receive a list of students who are at low, medium, or high risk of dropping out.
- For medium or high-risk students, intervention is carried out as the school is able, and parents may be notified.
- The web application sports a simple python backend algorithm for determining risk, integrating machine learning to adjust thresholds for at-risk levels, in order to account for geographical differences.
- Elegant backend JS translates this data into elegant and simple data representation, which is displayed on the web page at the click of a button and can be downloaded/printed as PDF.

Results

The various machine learning algorithms used here give the respective accuracy.

Algorithm	Accuracy
Decision Trees	73%
K Nearest Neighbours	84.49%
Random Forest	85.2%
Extra Trees	82.4%

It is fair to note that the highest accuracy was observed for Random Forests.

Frequently Asked Questions

What inspired us to make this?

We recognized a need to reduce dropout rates in high schools as there was a recognizable correlation between the dropouts and there negative impact on society and their respective communities.

What does our project do?

An early intervention platform for potential high school dropouts.

How did we build it?

Using machine learning that incorporates the use of random forest algorithm coded in Python, as well as JavaScript for website building, and protocol design including API requests.

What challenges did we face?

The main challenge we faced was the absence of a data set that is required to be run through our predictive model. Another issue was protocol design, specifically getting the backend and frontend to communicate.

What accomplishments are we proud of?

To get around the obstacle of restricted data, we generated our own dataset to be used as a placeholder. Moreover, creating a web application with very limited pre-existing knowledge of JavaScript and it with our backend with very limited pre-existing knowledge in protocol design.

What did we learn while building this?

Understanding random forest decision trees within Machine Learning, python libraries, GitHub repositories, Google sheets API, protocol design, JSON object, HTML, and JavaScript.

What's next for our project?

There a couple of things we hope to work on! For one; retrieving the proper dataset by partnering with schools, adding messaging hubs, a better user interface and data visualization on our platform.

What did we build it with?

Python, JavaScript, HTML/CSS, Google Sheets and Forms, JSON, GitHub, git, and Machine Learning; Random Forest, Decision Trees, K-Nearest Neighbours , and Extra Tree Class.

References

Can Early Intervention Prevent High School Dropout?
Evidence from the Chicago Child-Parent Centers

Judy A. Temple, Arthur J. Reynolds, Wendy T. Miedel