Westmisnter College: A Retention Prediction Model

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Abstract. The abstract should briefly summarize the contents of the paper in

Keywords: higher education · retention · data analytics · data science

1 Introduction

At Westminster College, the Office of Institutional Effectiveness is responsible for compiling and analyzing data at our institution. This project will focus on the domain of higher education, and more specifically, we will be examining retention. The domain of higher education is being examined in this project as it can be utilized within our department in the future, and hopefully help provide more insight into retention factors at our college.

The data for this project will be sourced from Westminster College. We will be utilizing a couple of our databases from both our Enrollment Customer Relationship Management tool (CRM) Slate by Tehcnolutions, and our main SIS (Student Information System) which is provided by Jenzabar. All the student data used will be anonymized to ensure that there is no personal identifiable information used. The data will be compiled from the many tables into a useable dataset for this project. Data features that will be included in the dataset will be some biographical such as gender, commuter/resident, athlete. Some other data features will be items such as ACT score and high school GPA. This project will look to take those factors, create a multi-variable regression model to predict the likelihood that a student at Westminster College will be retained or not.

1.1 Defining the Problem

For this project, we want to see if retention can be predicted at Westminster College based on the selected data points and a machine learning model. There are multiple reasons why this is an important issue to look at and examine. First there appears to be a shrinking pool of high school graduates as we approach 2030. [5] This means that if there are fewer students in the graduating high school classes to recruit, there will be more competition between colleges and universities to enroll these students. If this leads to lower enrollment at an institution, that means that retention will become even more important to retain the students that you are able to enroll.

We can also see that enrollment has currently been dropping overall for the past several years. [4] The National Student Clearinghouse also illustrates this. We can see the enrollment declines among the different higher educations types, with a slight uptick actually showing in community colleges. [2] Since Westminster College has two prominent sources of revenue, donations and enrollment, it will be important to retain students at a higher percentage than before, if the enrollment of students continues to decline.

1.2 Goals of this Research and Methods to explore

This project will be looking to successfully predict if a student is at risk of being retained. We can use this data with our Student Success Center so that they can set up an intervention, or take the appropriate actions to ensure they can help the student persist. After gathering all the data to analyze, a model will be built and trained on train data, and then tested. After the model is completed, we can discuss the results and see how the model performed.

This project will be following the traditional Data Science Life Cycle. The steps are outlined below as:

1. Business Understanding - as seen above, this will be Predicting Retention at Westminster College.
2. Data Collecting - Data set to be produced from our CRM and SIS.
3. Data Cleaning - Missing data will be handled as well as mismatched data types.
4. Exploratory Data Analysis - Here will will begin to find trends and groups in the data.
5. Model Building - Here the model method will be selected, and then trained and tested.
6. Results - Visualizations will be created, conclusions will be formed and discussed.

The key components that will be focused on for this project will be data from previously enrolled students. We will be focusing only on students that attended Westminster College, and utilize the data that we have access to for each student. Some items may be missing such as ACT from recent years. Enrollment recently went to ACT optional, so there are more missing ACT scores than from the past, as more students are choosing not to submit those for consideration. We will look at including and not including ACT scores as another trend has been the decline in overall ACT scores across the country [3], and the state of Missouri [1] (19.5 and 19.8 respectively). This could be an interesting limitation, so we will try looking at retention with and without this feature.

2 About the Data

Data information in this section, an overview.

2.1 Data Sourcing

Where was the data collected from, a little about the data used.

2.2 Cleaning the Data

Steps taken to clean the data.

2.3 Exploring the Data

A section on expository data analysis to follow.

3 Model Building

3.1 Choosing the Model

Decide which model to use with our data.

3.2 Building the Model

Walk through the building of the chosen model.

3.3 Training and Testing the Model

Create a training and test data set to use with the model.

4 Results

4.1 Clear Summary of Results

What did we find out from our model?

4.2 Visualizations

Share some visuals from the results and show what the data says.

5 Discussion

5.1 Conclusion of Results

5.2 Limitations

5.3 Future Recommendations and Work

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