Examining patterns in student drop out rate to improve education system

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Introduction

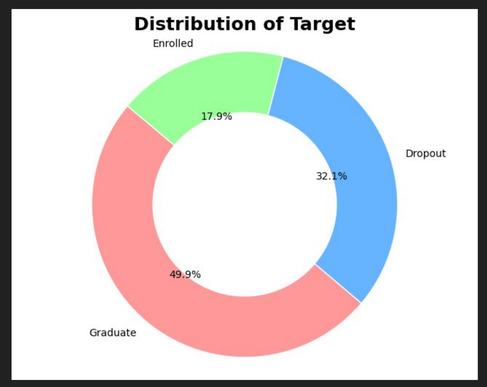
By graphically representing the dataset containing student records, we can identify patterns and trends that may indicate risk factors for student dropout, thereby enabling proactive measures to boost retention rates.

This exploration leverages visualization techniques to dissect the multifaceted influences of social and economic factors on student achievement. By employing graphs, charts, and maps, the study delves into the interconnectedness of variables like parent's qualification,parent's occupation,marital status, inflation rate, unemployment rate, etc . Analyzing data encompassing diverse demographics, educational contexts, and economic landscapes, the research aims to visually elucidate patterns and correlations.

The top reasons students drop

REASON FOR STOPPING SCHOOL	PERCENT OF TOTAL D
I was kicked out or expelled	0.6%
Pushed or pulled out of school	0.6%
Family issues or problems	0.8%
Lost a family member or friend	0.8%
Financial issues and work	1.2%
Teacher and school problems	1.2%
School environment	1.4%
Residential or school instability	2.0%
Mental health issues	2.1%
I was bullied	2.2%
Physical or other medical problems	2.7%
I was a member of a gang	3.5%
I got pregnant/gave birth	10.8%
I got into drugs	11.6%
I was held back	14.2%
No one cared if I attended	17.7%

Data and Motivation



32 % DROPOUT IS VERY HIGH!

Analysing this data to extract important patterns to find out potential causes to dropouts.

We aim to provide reasonable solutions to reduce this dropout rate

Detect flaws in the education system

Categorical Columns	Numerical Columns
Marital status	Application order
Course	Age at enrollment
Displaced	Unemployment rate
Debtor	Inflation rate
Gender	GDP
Attendance	Units 1st sem credit
Special needs	Units 1st sem enroll
Fees Paid	Units 1st sem approved
Scholarship	Units 1st sem grade
Target	Units 1st sem eval
	Units 1st sem without eval

This dataset offers a thorough perspective on students enrolled in diverse undergraduate programs provided by a higher education institution. It encompasses demographic details, socio-economic indicators, and academic achievement data, providing valuable insights into potential factors influencing student attrition and academic achievement.

Dashboard

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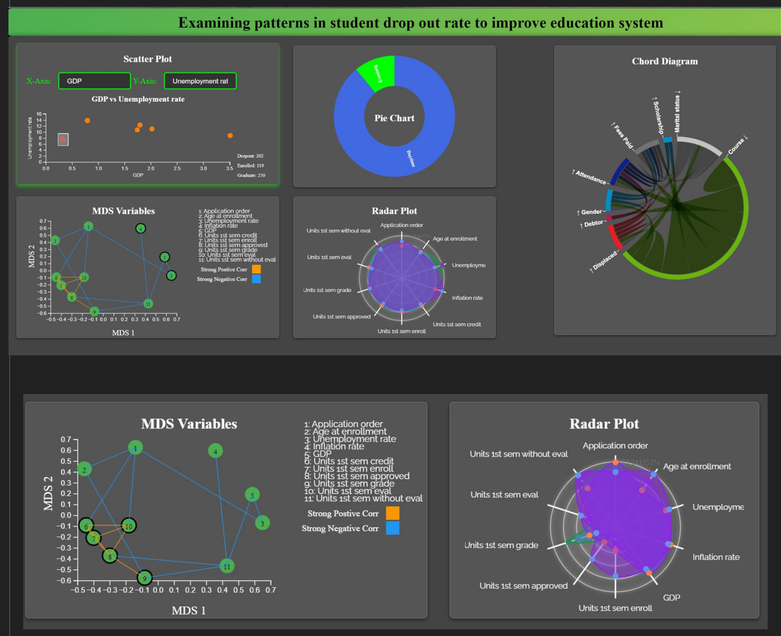
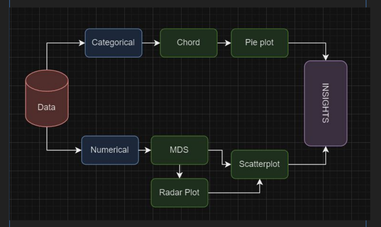


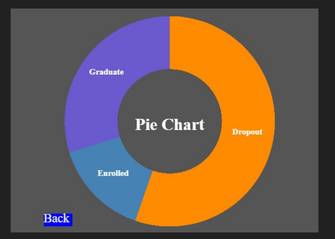
We analyze the cluster formed by the numerical variables as we see from the strong positive correlation amongst educational features of the dataset. In the next steps, we use them to evaluate the hypotheses we have formed about the data and come up with solutions to overcome the issue of high dropout percentages

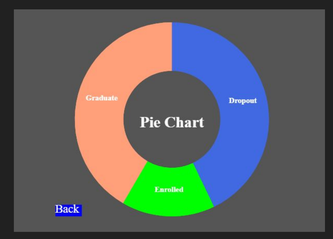
Methodology

1. Chord Diagram: Observe the Chord diagram to identify the flow of of information. It represents the categorical variables and we use it to see how one variable affects other. Click on the arcs to visualize
2. Pie Chart The distribution of various classes of a variable is shown. Further click on slices to see dropout proportion
3. MDS Variable: Visualize the numerical variables to observe strong and weak correlations. Click on a variable to display it's radar plot
4. Radar Plot :Examine multivariate patterns in the numeric data. This would help in examining the points on the scatterplot
5. Scatterplot: This plot gives the ultimate results. We examine for what values of a variable, the dropout rate increases. The X and Y axes are determined by the Radar Plot

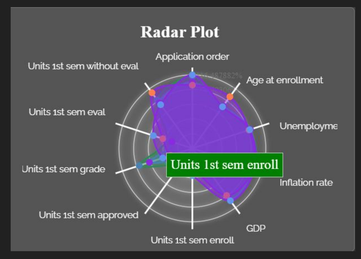


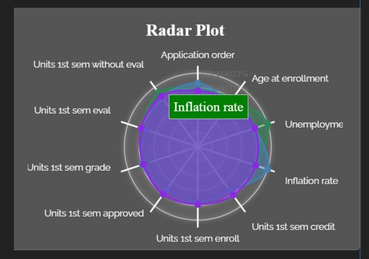
Results



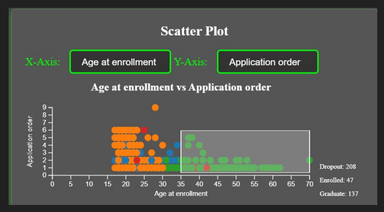


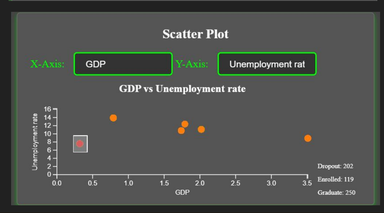
Very high dropout percentage for Cultural courses. High graduation rate for Nursing Courses





Forming clusters of educational factors and one of economic factors, this would be used in next step





Observations:

- People tend to drop out more if they are older than 35 yrs of age
- GDP is more influential than other economic factors
- Females have more scholarships compared to males
- Evening classes have low attendance and high dropout ratio
- Courses have no exams are more likely to be opted by people who want to graduate
- If the university has approved for more than 15 credits, less chance to drop out

Conclusion

1. Improvement in Education System
2. Provide more scholarship system
3. Reduced Course Load
4. Reforms in grading system
5. Drop certain courses that result in heavy dropouts

References

[1]GradNation.org for image 1 obtained from a survey
[2]https://www.kaggle.com/datasets/thedevastator/higher-education-predictors-of-student-retention