Minimizing Academic Failure in Higher Education

Crafting a Reliable Model for Early Intervention

Goal: Use Machine Learning to Identify At-Risk Students Early

"63.2% of US undergraduates complete their degrees within 6 years...

- Hanneh Bareham and Chelsea Wing (bankrate.com)

Method

Obtain the Data
Instituto Politécnico Dataset

1

Scrub the Data
Remove Placeholders, Remove Duplicates

2

Model
Ternary Classifier 80/20 split
Random Forest (yielded best results)

3

Evaluate
Score each model for Recall

4

Interpret the Data
Features of interest to multiple models:
Tuition Payments and had low number of Curricular units in 2nd sem

5

Share Insights about the Data
Students who miss tuition payments and enroll in low credit values second semester are at risk

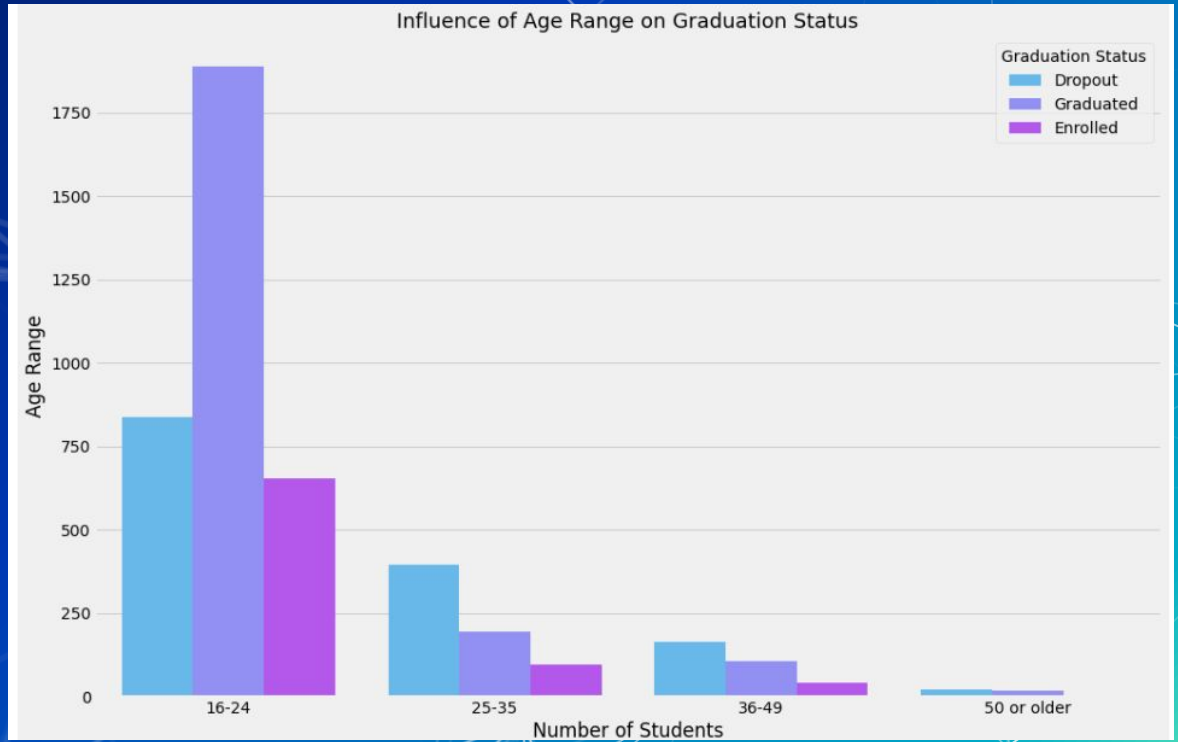
6

Reducing Dropout Rates in Higher Ed

Steps			Breakdown
1	Obtain Dataset	✓	▪ Reducing Academic Dropout & Failure supported by SATDAP Program, Portugal ▪ 4424 rows & 37 columns ▪ Three classes: **dropout, enrolled, graduate**
2	Train, Evaluate and Interpret Model Results	✓	▪ Three Classes of students : dropout, enrolled, graduate ▪ Train multiple models on 80% of the overall dataset ▪ Evaluate model performance on 20% of the overall dataset ▪ Identify key performance indicators
3	Make recommendations	✓	▪ Monitor tuition payments ▪ Provide extra academic support between 1st and 2nd semester ▪ Provide tools that simplify and incentivize early registration for the 1st and second semester of each term.

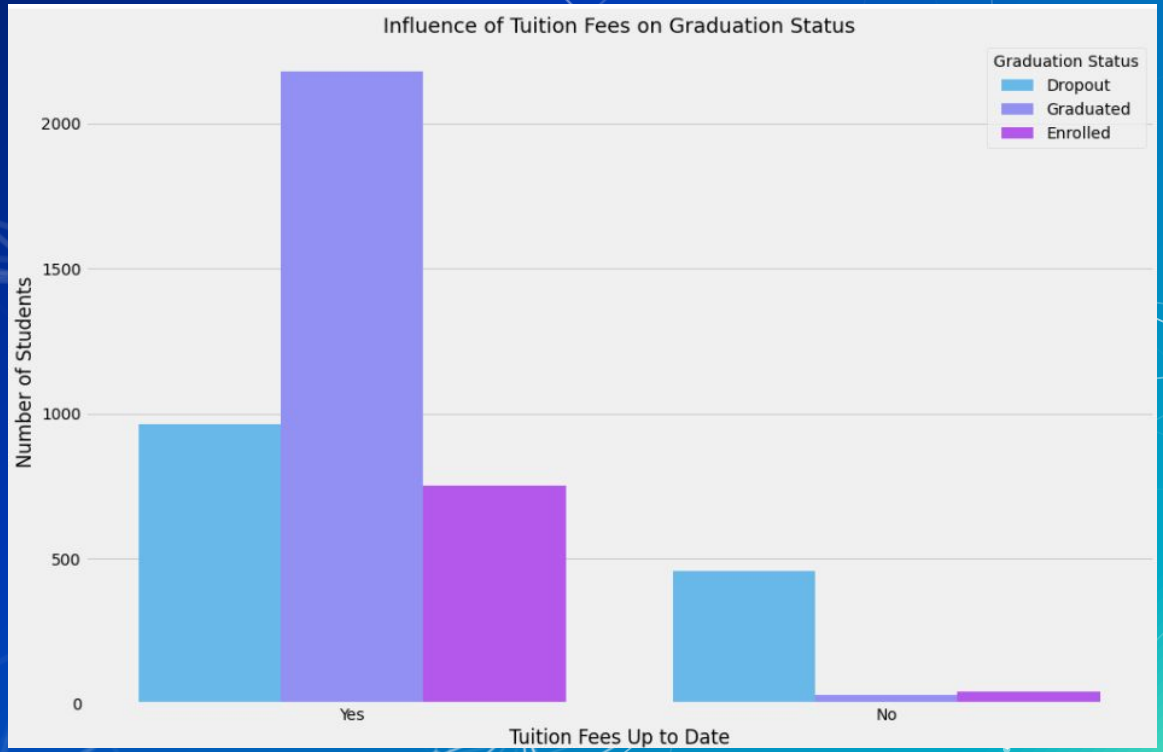
Age

Students in the age range of 25-35 tend to have higher enrollment and graduation rates compared to other age groups. On the other hand, students aged 50 or older have a higher dropout rate



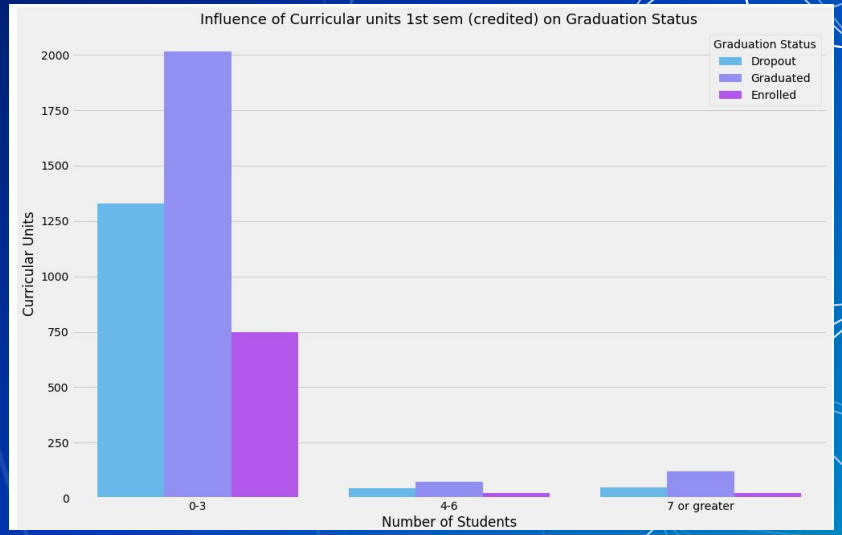
Tuition Fees

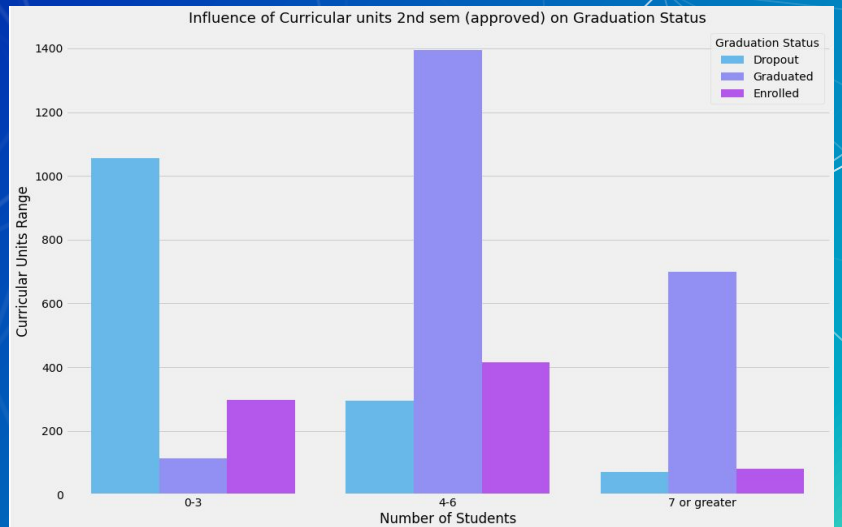
Students who have their tuition fees up to date have a significantly higher graduation rate compared to those with pending fees. Paying tuition fees on time seems to positively influence graduation outcomes.



Curricular Units

Students who earned more units 1st semester have a higher chance of academic success.
Students with more approved units in the 2nd semester have a higher chance of academic success.





Recommendations

Monitor Tuition Payment$
Make payment plans accessible to every student

Make early enrollment easy
And a lot of ways to enroll quicker, faster, easier

Provide academic support to older students > 24
Total success!

THANK YOU!

Any questions?

You can find me at

- Repo at: https://github.com/dataeducator/student_academic_success/
- tenicka.norwood@gmail.com
- Presentation template by SlidesCarnival
- Photographs by Unsplash