



DOAA CA1

# THE GPA GENIE

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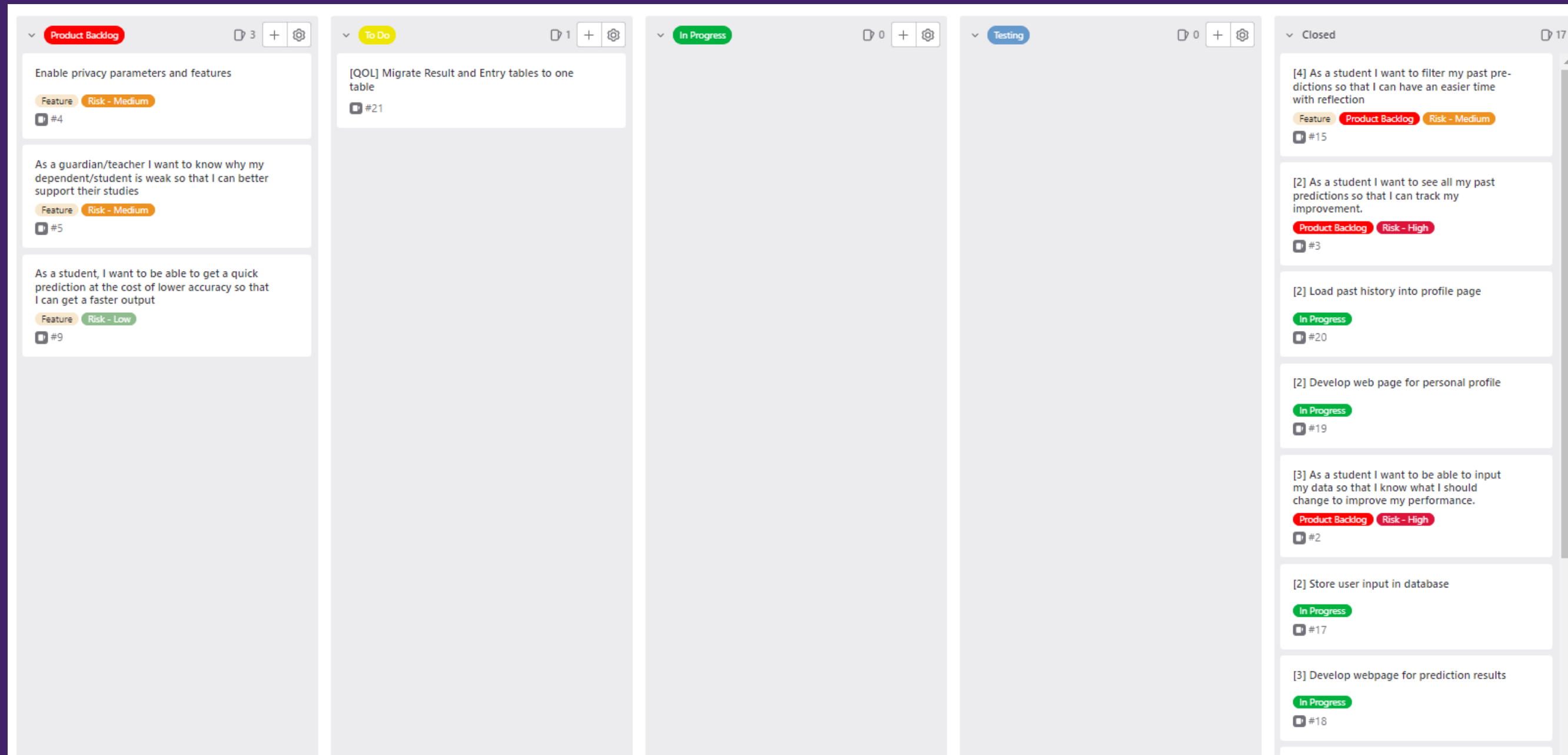


## Objective

**Using Machine Learning to  
predict the effects of health  
and alcohol on GPA**



# A look at the **Scrum Board**



Used  
**GitLab's**  
**milestones**  
for sprints



# General Information +



**Automatic Deployment** on  
render at:

<https://cal-the-gpa-genie.onrender.com>



**Authentication required**  
for non-public pages.

Bypassing the authentication  
by typing in direct link is  
addressed and is prevented.

*username: student*  
*password: student*



**Responsive + Animated**  
website design  
using  
**Tailwind CSS**  
and JS



Navbar to move to other pages



Landing page. Click on the lamp to begin the ritual!



## Unhealthy

Could be better

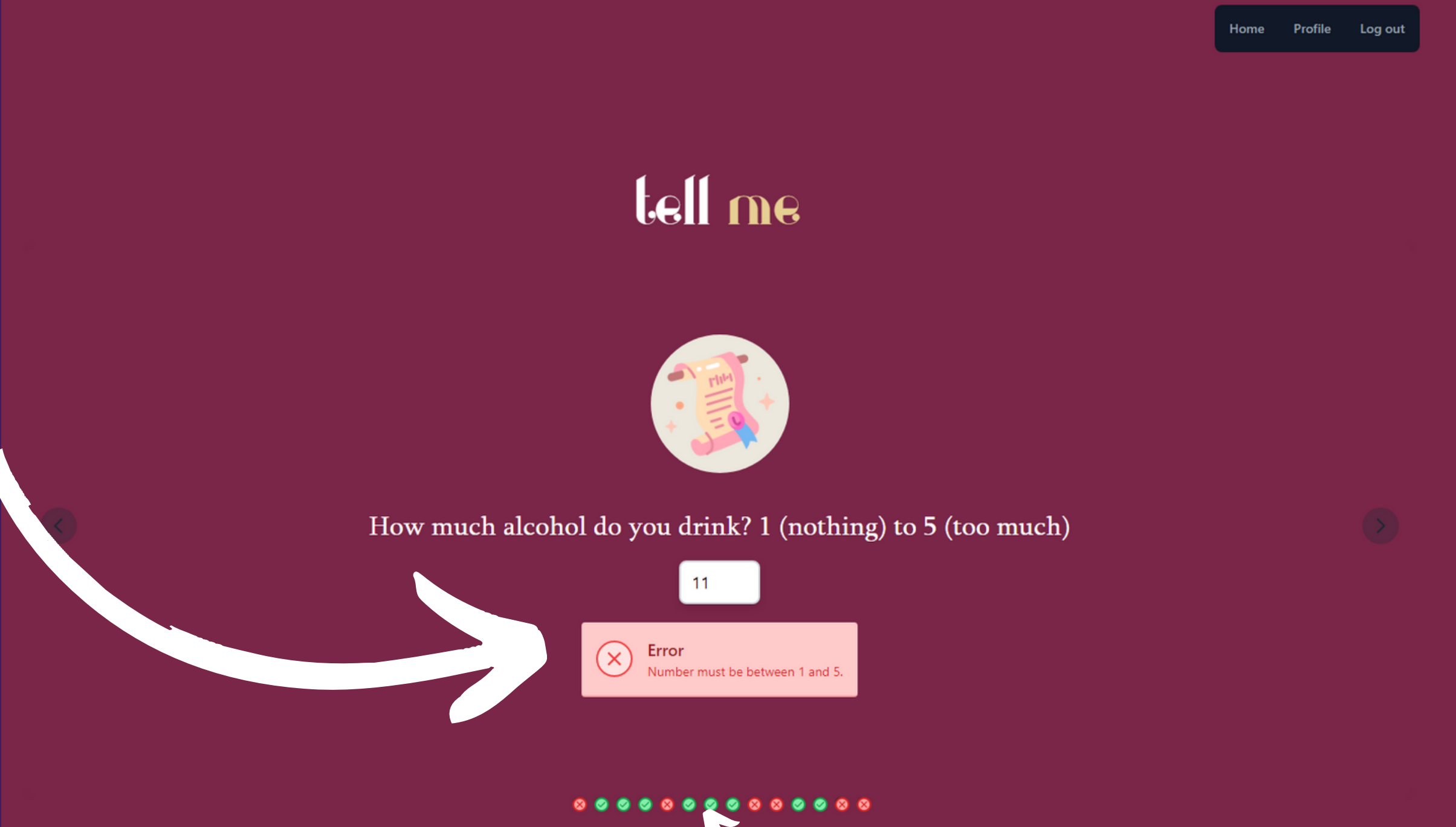
Alright

Well

Amazing

Click to choose and use the arrows to navigate!

Detailed errors  
are displayed  
using Flask's  
flash() function.



The screenshot shows a web form on a dark red background. At the top right, there are links for 'Home', 'Profile', and 'Log out'. The form title 'tell me' is in a stylized font. Below it is a circular icon of a scroll. The question 'How much alcohol do you drink? 1 (nothing) to 5 (too much)' is displayed. A text input field contains the number '11'. Below the input field, a red error message box says 'Error' and 'Number must be between 1 and 5.'. At the bottom of the form, there is a row of 15 small circular indicators, each containing a red 'x' or a green checkmark. A large white arrow points from the text on the left to the error message box. A smaller white arrow points from the text on the right to the row of indicators.

Indicators are also provided to show which  
questions are valid and which aren't!

Prediction results are  
displayed with a  
simple  
animation



i predict a  
2.32  
gpa

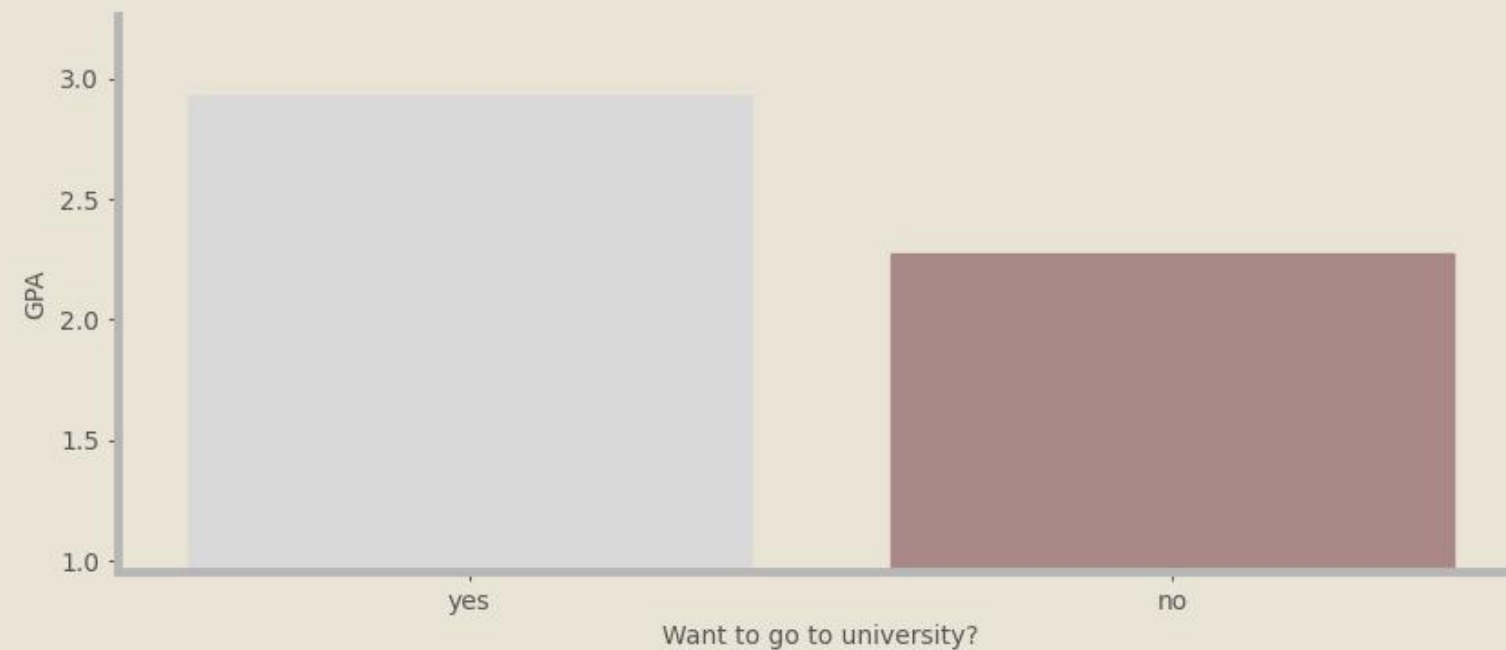
[back to home](#)



insights

dream big.

students that aim for university attain better results.



you should aim to improve here.

Scroll down to  
find input-  
specific insights,  
showing what  
went well and  
what didn't go  
well.

good to see you  
student



improvement  
based on our predictions  
your GPA has changed by  
**+0.08**



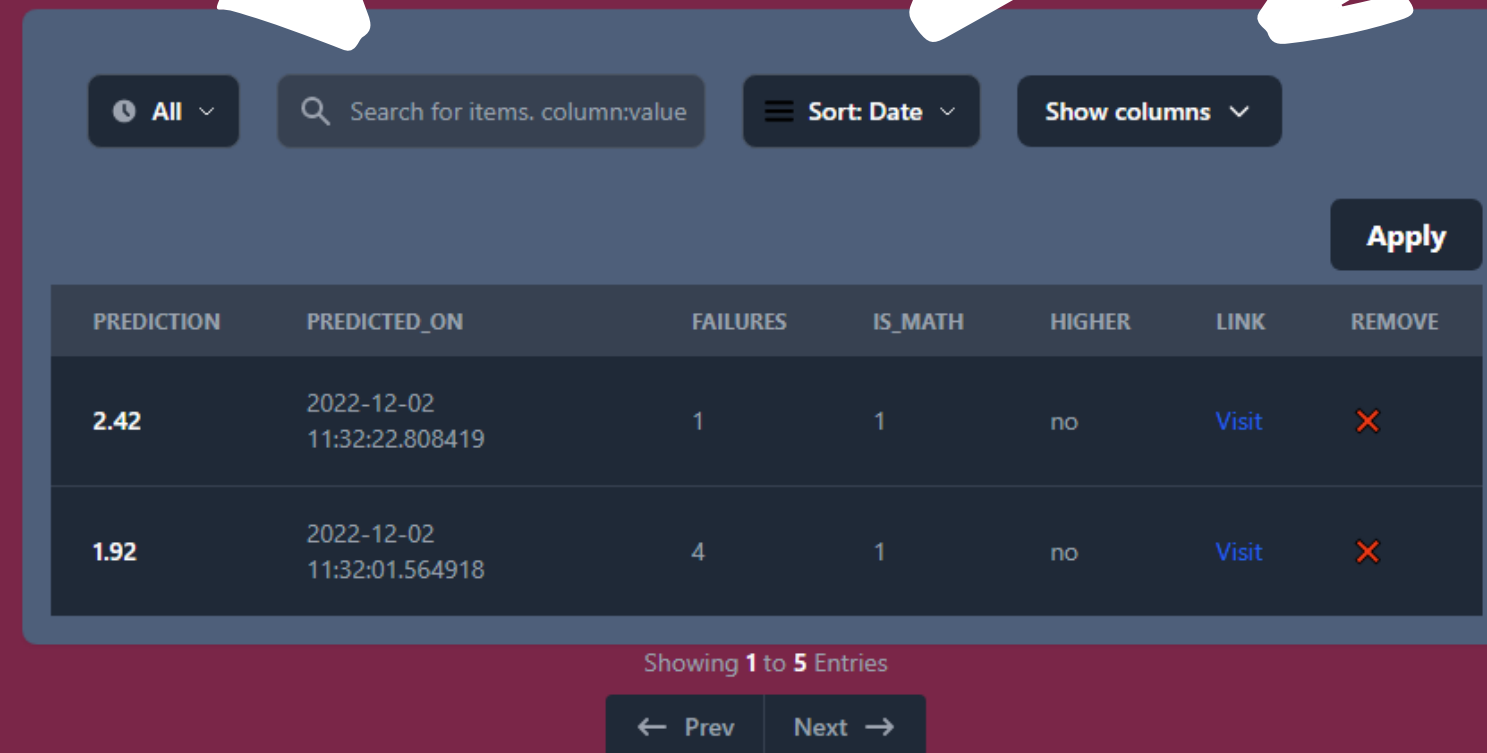
[Visit your profile](#) to see your progress!

Filter by the  
previous  
number  
of days

Search for  
keywords

Sort by GPA or  
Date

Choose  
columns to  
display



The screenshot shows a web application interface for 'past rituals'. At the top, there is a logo consisting of an orange hexagon with a white star and the text 'past rituals' in a stylized font. Below the logo is a dark blue header bar containing several controls: a filter dropdown set to 'All', a search bar with the placeholder text 'Search for items. column:value', a sort dropdown set to 'Sort: Date', and a 'Show columns' dropdown. An 'Apply' button is located to the right of these controls. Below the header is a table with the following columns: PREDICTION, PREDICTED\_ON, FAILURES, IS\_MATH, HIGHER, LINK, and REMOVE. The table contains two data rows. Below the table, it says 'Showing 1 to 5 Entries' and has 'Prev' and 'Next' pagination buttons. White arrows point from external text labels to these specific UI elements.

PREDICTION	PREDICTED_ON	FAILURES	IS_MATH	HIGHER	LINK	REMOVE
2.42	2022-12-02 11:32:22.808419	1	1	no	<a href="#">Visit</a>	✕
1.92	2022-12-02 11:32:01.564918	4	1	no	<a href="#">Visit</a>	✕

Showing 1 to 5 Entries

← Prev   Next →

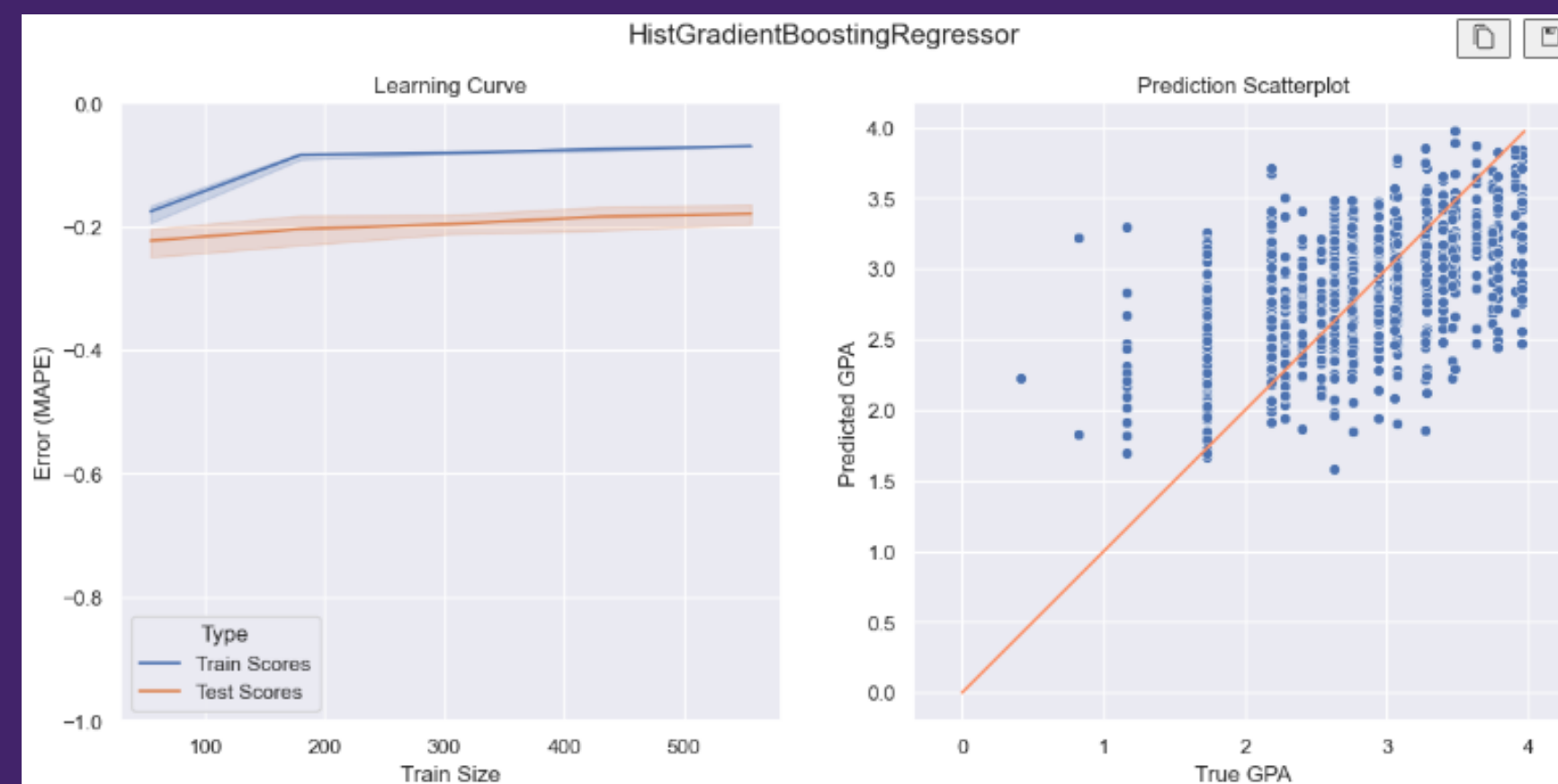
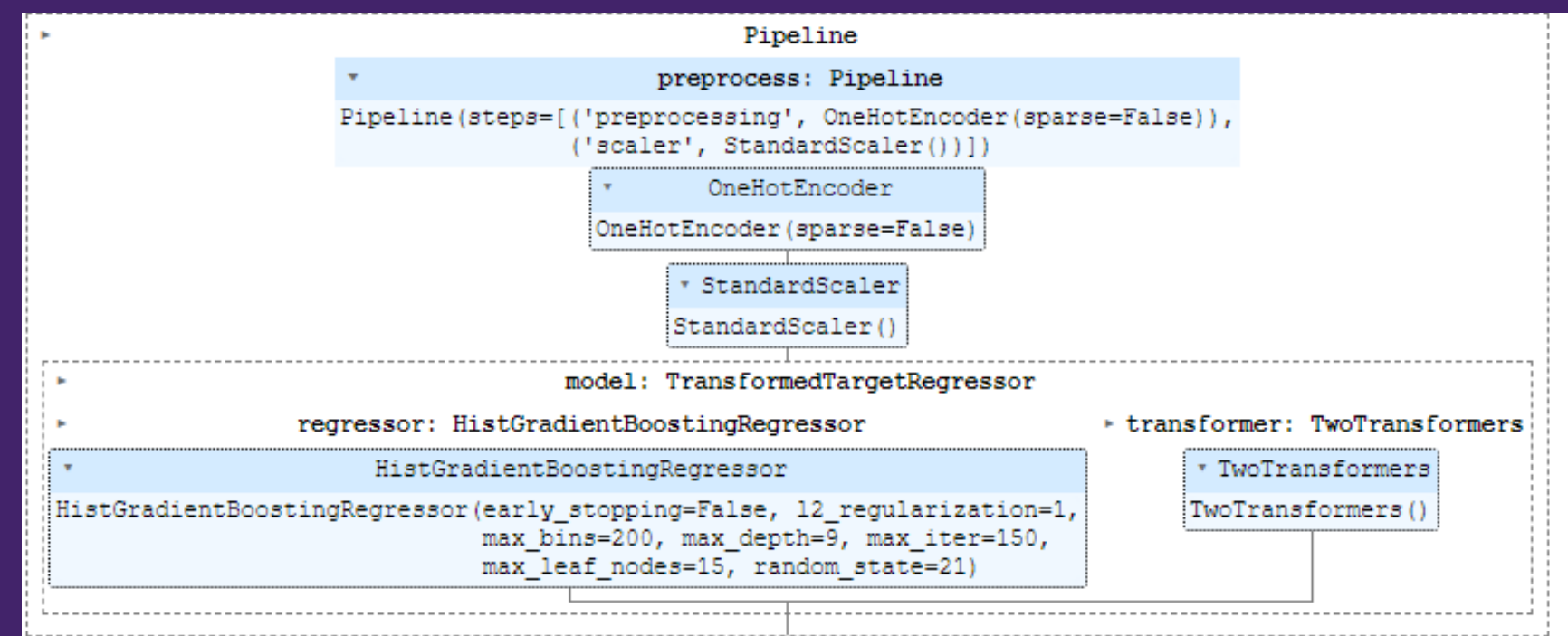
Pagination for easy viewing



# The Machine Learning Model

## Feature Engineering Performed:

- Used NUS Bell Curve statistics to transform the original dataset containing the exam marks of the Spanish system to a 4.0 GPA Singapore Polytechnic system.
- Standard Scaling
- Log Transform on GPA
- Total Alcohol = Weekday Alcohol x Weekend Alcohol



Achieved  
**Test MAPE: 0.165**



# Web APIs Developed

## **POST /api/predict**

API used to perform prediction and gain graphical insights. Token is needed.

## **GET /api/image/<filename>**

Retrieve the image given the filename. Token is needed if the image is considered sensitive.

## **DELETE /api/image/<filename>**

Delete the image given the filename. Token is needed.

## **GET /api/result/<entryid>**

Retrieve information of a specific result given the ID.

## **GET /api/history**

Retrieve all history of a user with advanced filters and sorting applied. Token is needed.

## **DELETE /api/history/<id>**

Given the ID of some history, delete it from the user. Token is needed.



# Testing with PyTest

**272 tests  
performed.**  
Totaling 5,000+  
checks

## Validity Testing

Tested on valid data to determine if ordinary data can be used. Referred to examples of data from the dataset.

## Range Testing

Negative values for columns such as time, rating and number of failures.

Tested out of bound limits for ratings (e.g. only accepts 1 - 5)

## Consistency Testing

Given identical inputs, checked if the prediction and output are the same.

## Expected Failure Testing

Tested XFAIL on:

- Invalid image names
- Non existent images
- Non existent data ids
- Invalid spellings
- Empty strings
- Null values
- Invalid image format



# THANK YOU