DOAA CA1

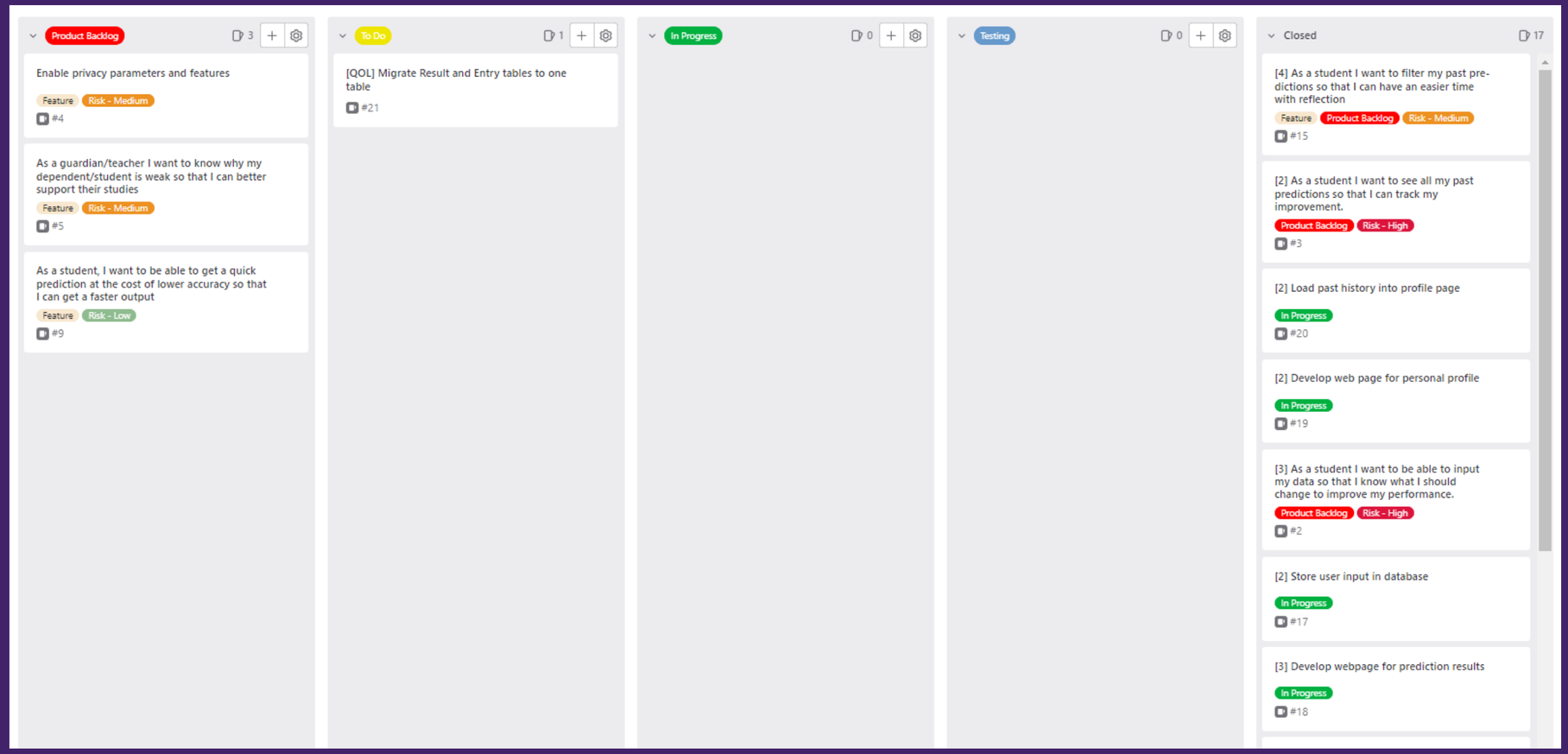
THE GPA GENIE

by Kenneth Chen (2100072)

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://ca1-the-gpa-genie.onrender.com

Authentication required for non-public pages.

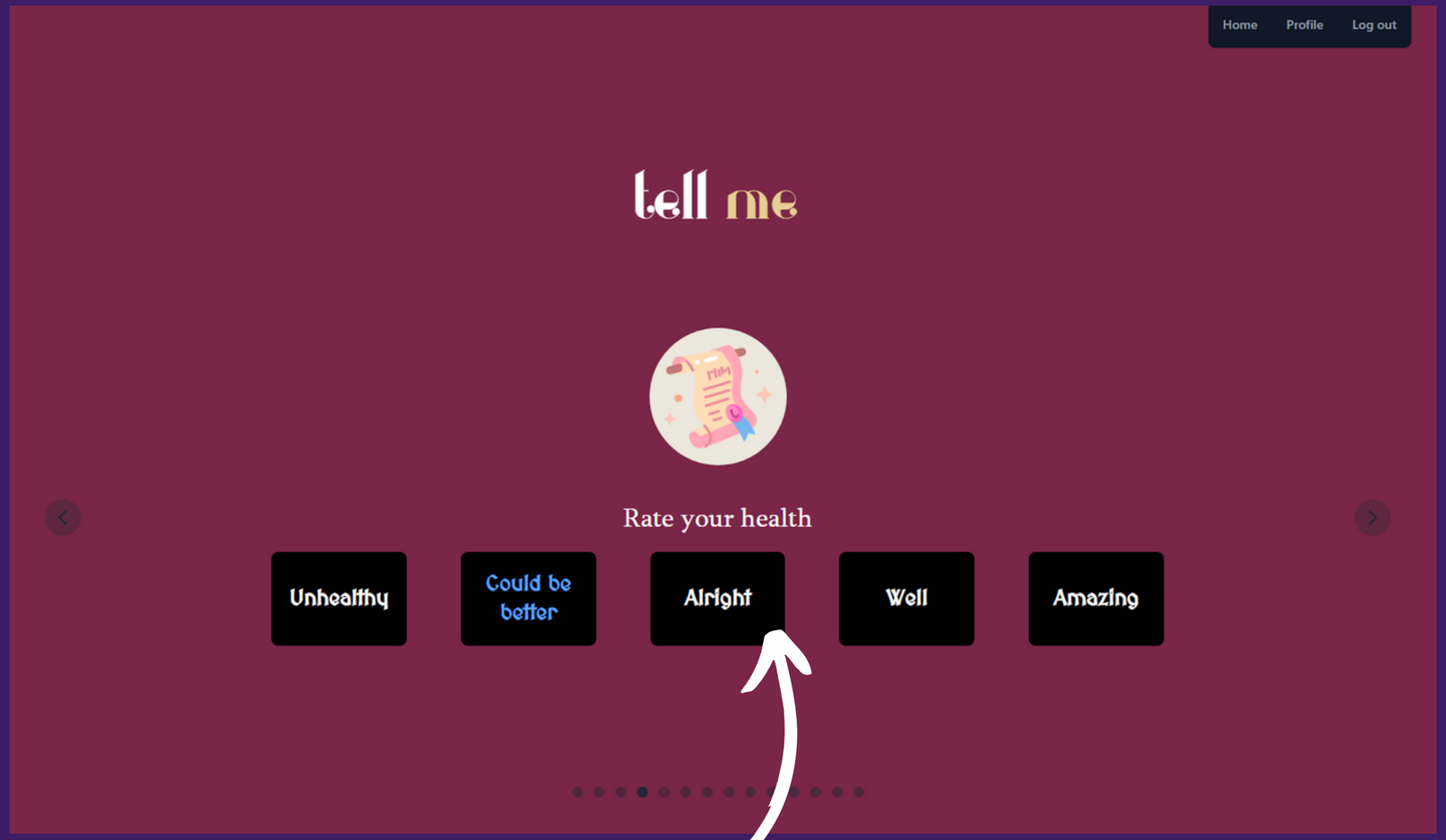
Bypassing the authentication by typing in direct link is addressed and is prevented.

username: student
password: student

Responsive + Animated website design using Tailwind CSS and JS

Navbar to move to other pages

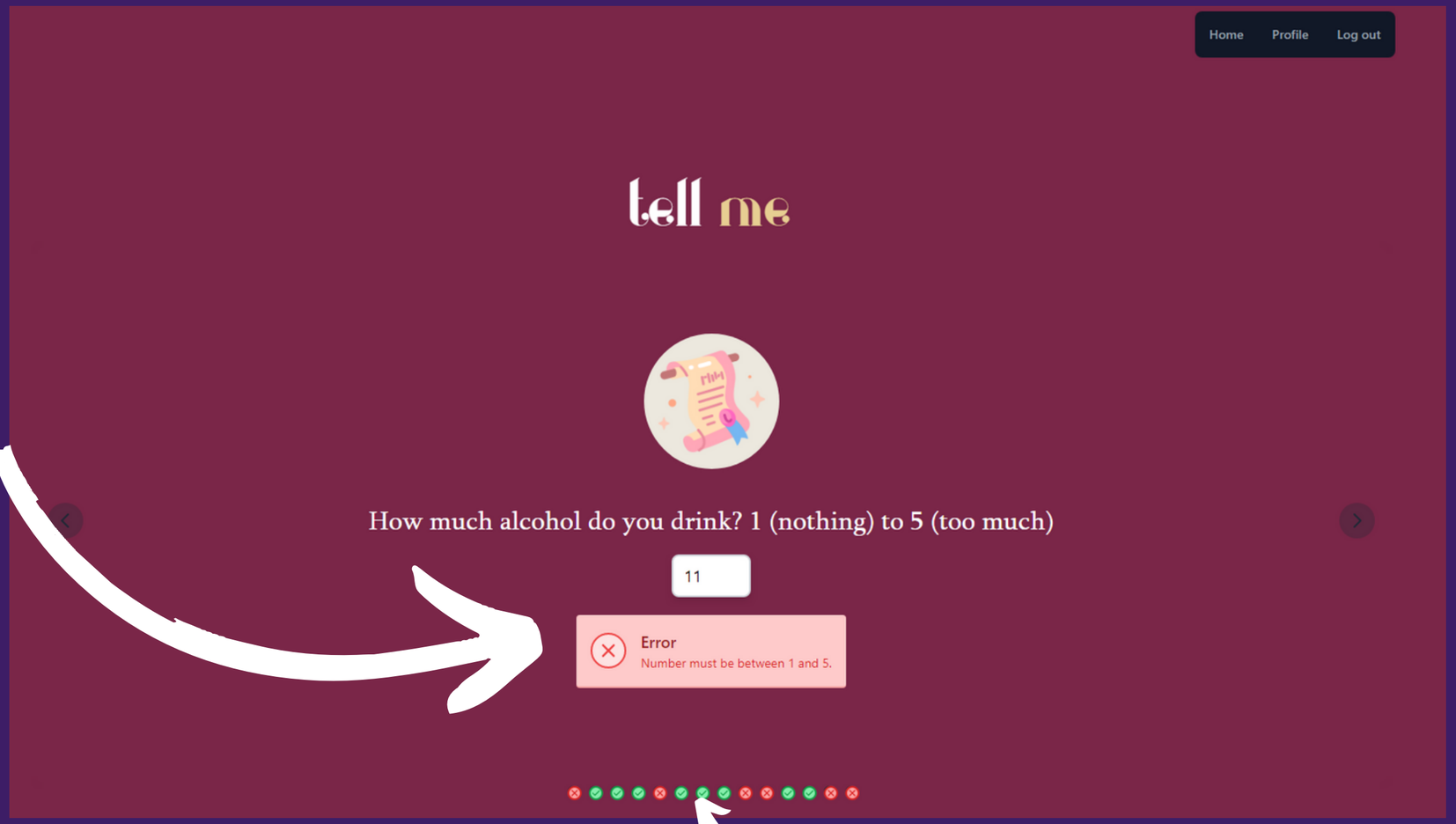
Landing page. Click on the lamp to begin the ritual!



A non-traditional approach for tackling forms.

Click to choose and use the arrows to navigate!

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



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

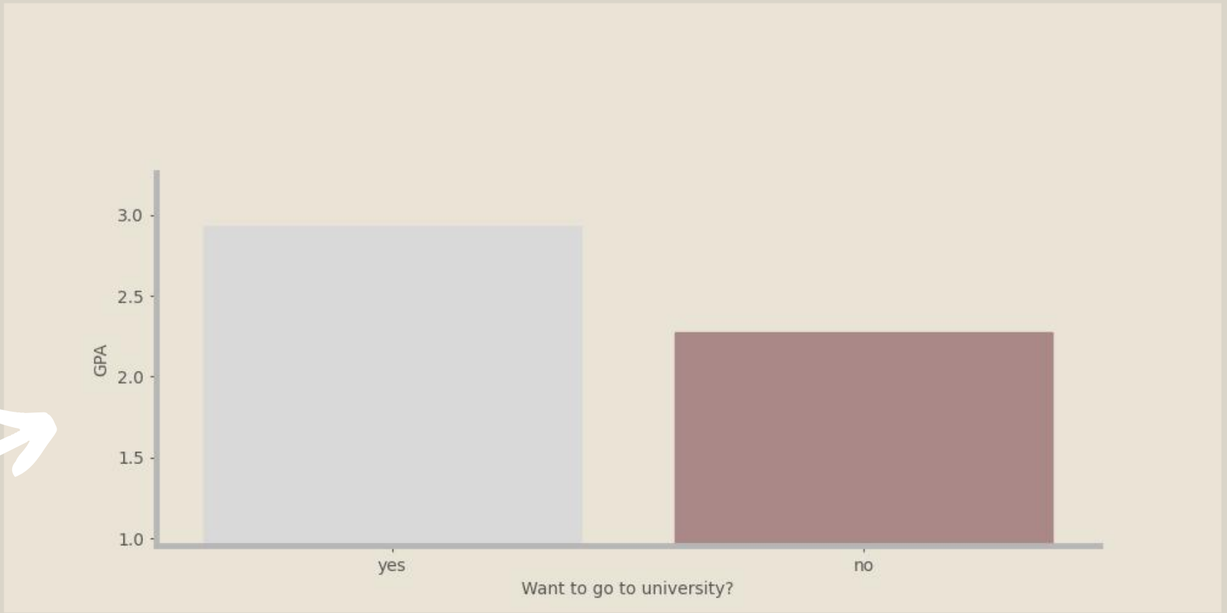
Prediction results are displayed with a simple animation

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

insights

dream big.

students that aim for university attain better results.



you should aim to improve here.

Home Profile Log out

good to see you student.

improvement

based on our predictions

your GPA has changed by

+0.08

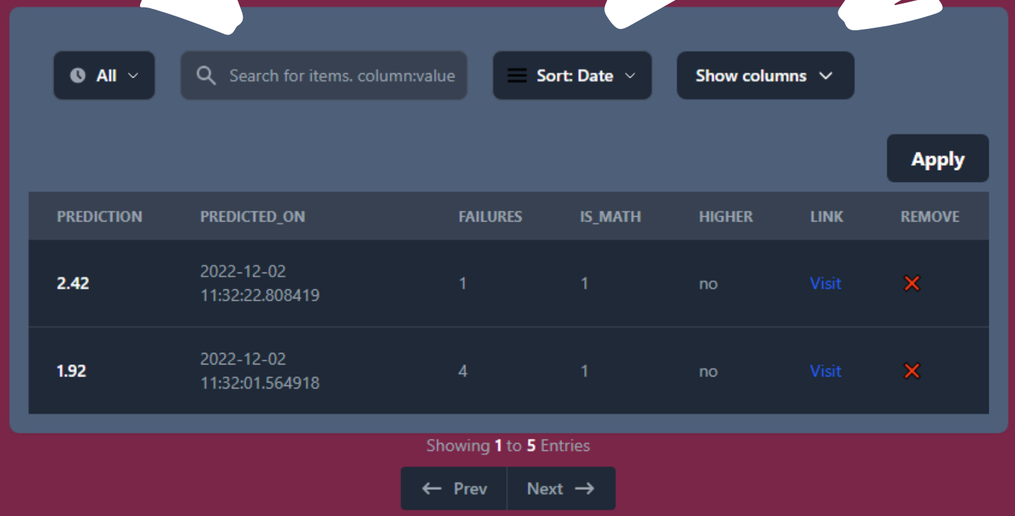
Visit your profile to see your progress!

Filter by the previous number of days

Search for keywords

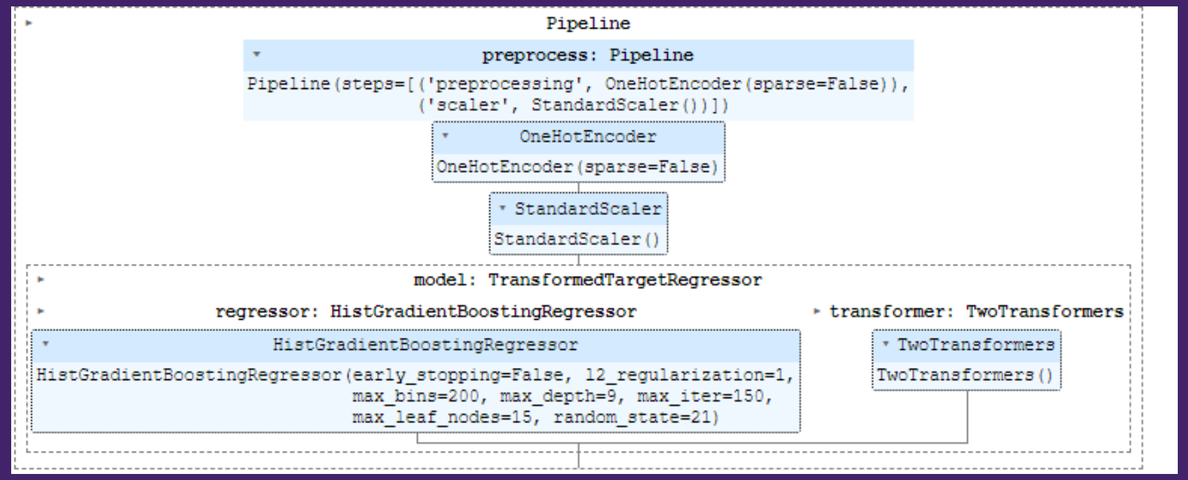
Sort by GPA or Date

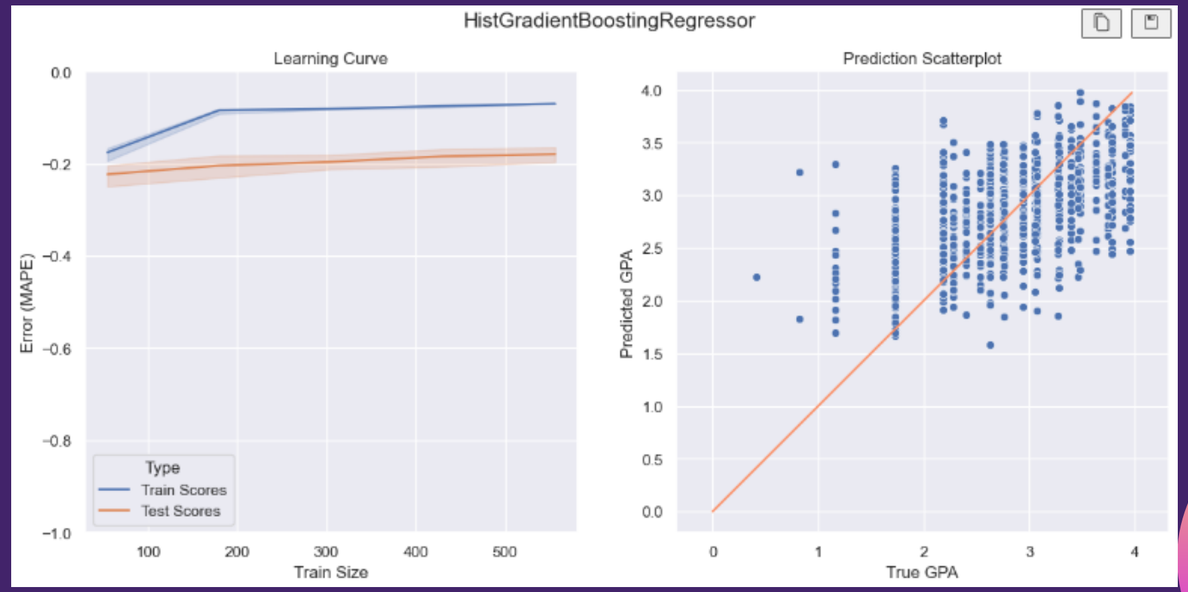
Choose columns to display



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

2022 PRESENTATION