Date	18 November 2022
Team ID	PNT2022TMID03986
Project Name	University Admit Eligibility Predictor

Project Report

1. **INTRODUCTION**

1.1 Project Overview

The aim of this project is to help students in shortlisting universities with their profiles. The predicted output gives them a fair idea about their admission chances in a particular university. This analysis should also help students who are currently preparing or will be preparing to get a better idea.

1.2 Purpose

The students or parents require a way to analyze and list the universities availablefor their cut-off mark so that the student or parent will be directly benefitted by preparing themselves in par with the university's requirement. This can be implemented using Machine learning, Data analyzing and etc.

2. **LITERATURE SURVEY**

2.1 Existing Solution and Problem

[1] **Authors**: S. Sridhar, S. Mootha and S. Kolagati, ,.

Title: "A University Admission Prediction System using Stacked Ensemble Learning," 2020

Abstract: For an aspiring graduate student, shortlisting the universities to apply to is a difficult problem. Since an application is extremely dynamic, students often tend to wonder if their profile matches the requirement of a certain university. Moreover, the cost of applying to a university is extremely high making it critical that students shortlist universities based on their profile. A university admission prediction system is quite useful for students to determine their chances of acceptance to a specific university. The system could make use of data related to previous applicants to various universities and their admit or reject status. Earlier models of such prediction systems suffer from several drawbacks such as not considering important parameters like GRE (Graduate Record Exam) scores or research experience. Further, the accuracy reported by earlier models is also not sufficiently high. In this paper, a stacked ensemble model that predicts the chances of admit of a student to a particular university has been proposed. The proposed model takes into consideration various factors related to the student including their research experience, industry experience etc. Further, the system proposed has been evaluated against various other machine learning algorithms including other deep learning methods. It is observed that the proposed model easily outperforms all other models and provides a very high accuracy. Observation: An effective method has been proposed to predict the chances of a student being admitted to a specific university. In addition, we have compared the performance of various machine learning algorithms to the proposed method in predicting admits. It is observed that the proposed method provides the best performance with an accuracy of 91%.

[2] **Authors**: S. Fong, Y. -W. Si and R. P. Biuk-Aghai,

Title: "Applying a hybrid model of neural network and decision tree classifier for predicting university admission," .

Abstract: Predicting university admission is a complex decision making process that is more than merely relying on test scores. It is known by researchers that students' backgrounds and other factors correlate to the performance of their tertiary education. This paper proposes a hybrid model of neural network and decision tree classifier that predicts the likelihood of which university a student may enter, by analyzing his academic merits, background and the university admission criteria from that of historical records. Our prototype system was tested with live data from sources of Macau secondary school students. In addition to the high prediction accuracy rate, flexibility is an advantage as the system can predict suitable universities that match the students' profiles and the suitable channels through which the students are advised to enter. Our model can be generalized with other attributes and perform faster when compared to using a neural network alone.

Observation : A hybrid model upon which the Recommender System of Admission to University (RSAU) prototype is built. It analyses secondary school pupils' data from numerous sources to forecast their prospects of admission to institutions. It assists secondary school administrators, instructors, and senior secondary students in making recommendations to universities.

References

[1] S. Sridhar, S. Mootha and S. Kolagati, "A University Admission Prediction System using Stacked Ensemble Learning," 2020 Advanced Computing and Communication Technologies for High Performance Applications (ACCTHPA), 2020, pp. 162-167, doi: 10.1109/ACCTHPA49271.2020.9213205.

[2] S. Fong, Y. -W. Si and R. P. Biuk-Aghai, "Applying a hybrid model of neural network and decision tree classifier for predicting university admission," 2009 7th International Conference on Information, Communications and Signal Processing (ICICS), 2009, pp. 1-5, doi: 10.1109/ICICS.2009.5397665

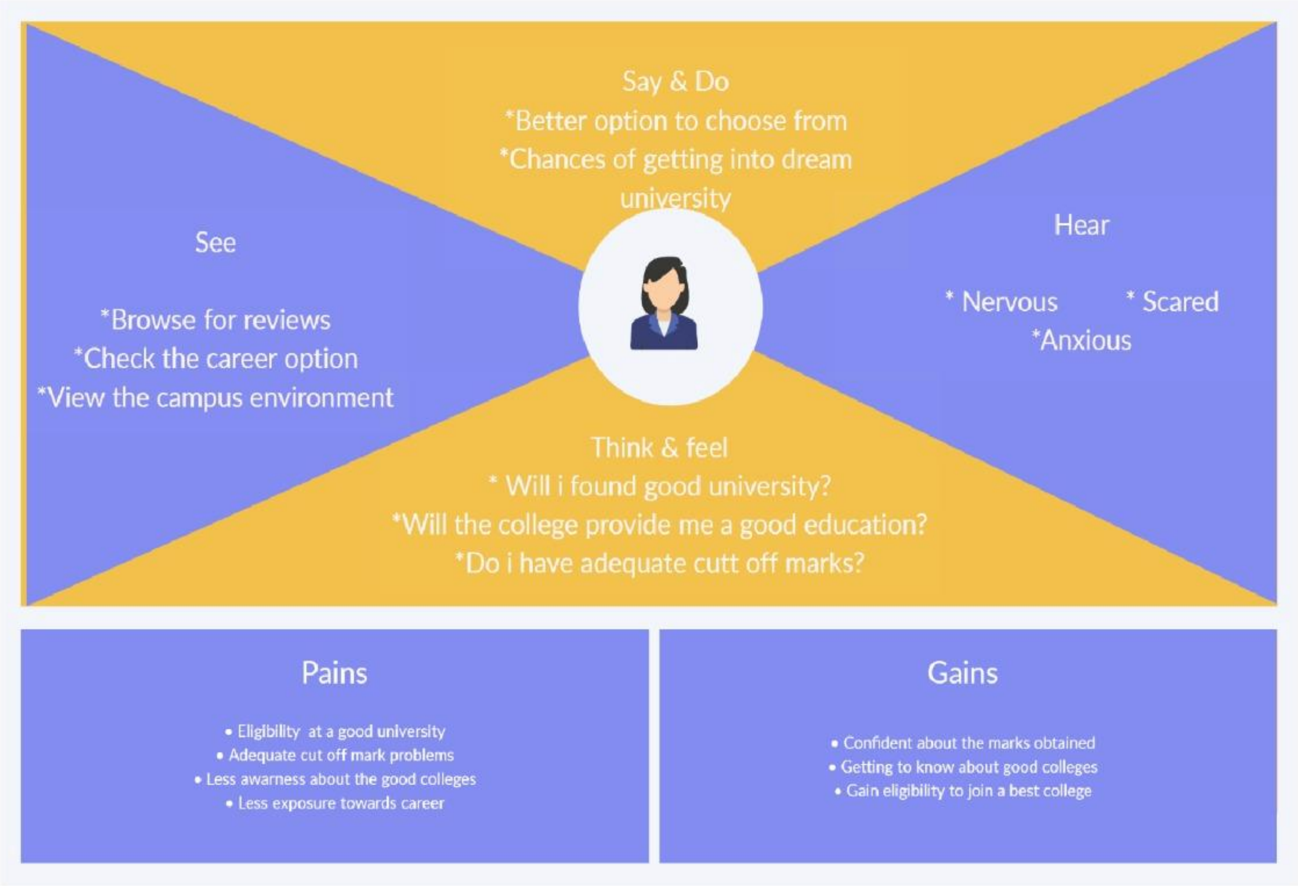
[3] Ahammad, Khalil & Chakraborty, Partha & Akter, Evana & Fomey, Umme & Rahman, Saifur. (2021). A Comparative Study of Different Machine Learning Techniques to Predict the Result of an Individual Student Using Previous Performances. International Journal of Computer Science and Information Security,. 19. 5-10. 10.5281/zenodo.4533374.

2.2 Problem Statement Definition

Students are often worried about their chances of admission to University. The aim of this project is to help students in short listing universities with their profiles. The predicted output gives them a fair idea about their admission chances in a particular university. This analysis should also help students who are currently preparing or will be preparing to get a better idea .The students or parents require a way to analyze and list the universities available for their cut-off mark so that the student or parent will be directly benefitted by preparing themselves in par with the university’s requirement. This can be implemented using Machine learning, Data analyzing and etc.

3. **IDEATION & PROPOSED SOLUTION**

3.1 Empathy Map Canvas



Say & Do

*Better option to choose from

*Chances of getting into dream university

See

*Browse for reviews

*Check the career option

*View the campus environment

Hear

* Nervous * Scared

*Anxious

Think & feel

* Will i found good university?

*Will the college provide me a good education?

*Do i have adequate cutt off marks?

Pains

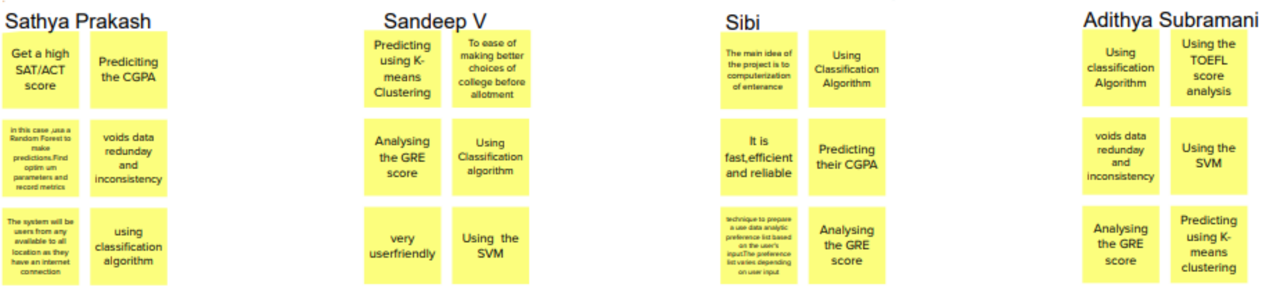
- Eligibility at a good university
- Adequate cut off mark problems
- Less awarness about the good colleges
- Less exposure towards career

Gains

- Confident about the marks obtained
- Getting to know about good colleges
- Gain eligibility to join a best college

3.2 Ideation & Brainstorming

Brainstorming



Sathya Prakash

Get a high SAT/ACT score

Prediciting the CGPA

in this case ,usa a Random Forest to make predictions.Find optim um parameters and record metrics

voids data redunday and inconsistency

The system will be users from any available to all location as they have an internet connection

using classification algorithm

Sandeep V

Predicting using K-means Clustering

To ease of making better choices of college before allotment

Analysing the GRE score

Using Classification algorithm

very userfriendly

Using the SVM

Sibi

The main idea of the project is to computerization of enterance

Using Classification Algorithm

It is fast,efficient and reliable

Predicting their CGPA

technique to prepare a use data analytic preference list based on the user's input.The preference list varies depending on user input

Analysing the GRE score

Adithya Subramani

Using classification Algorithm

Using the TOEFL score analysis

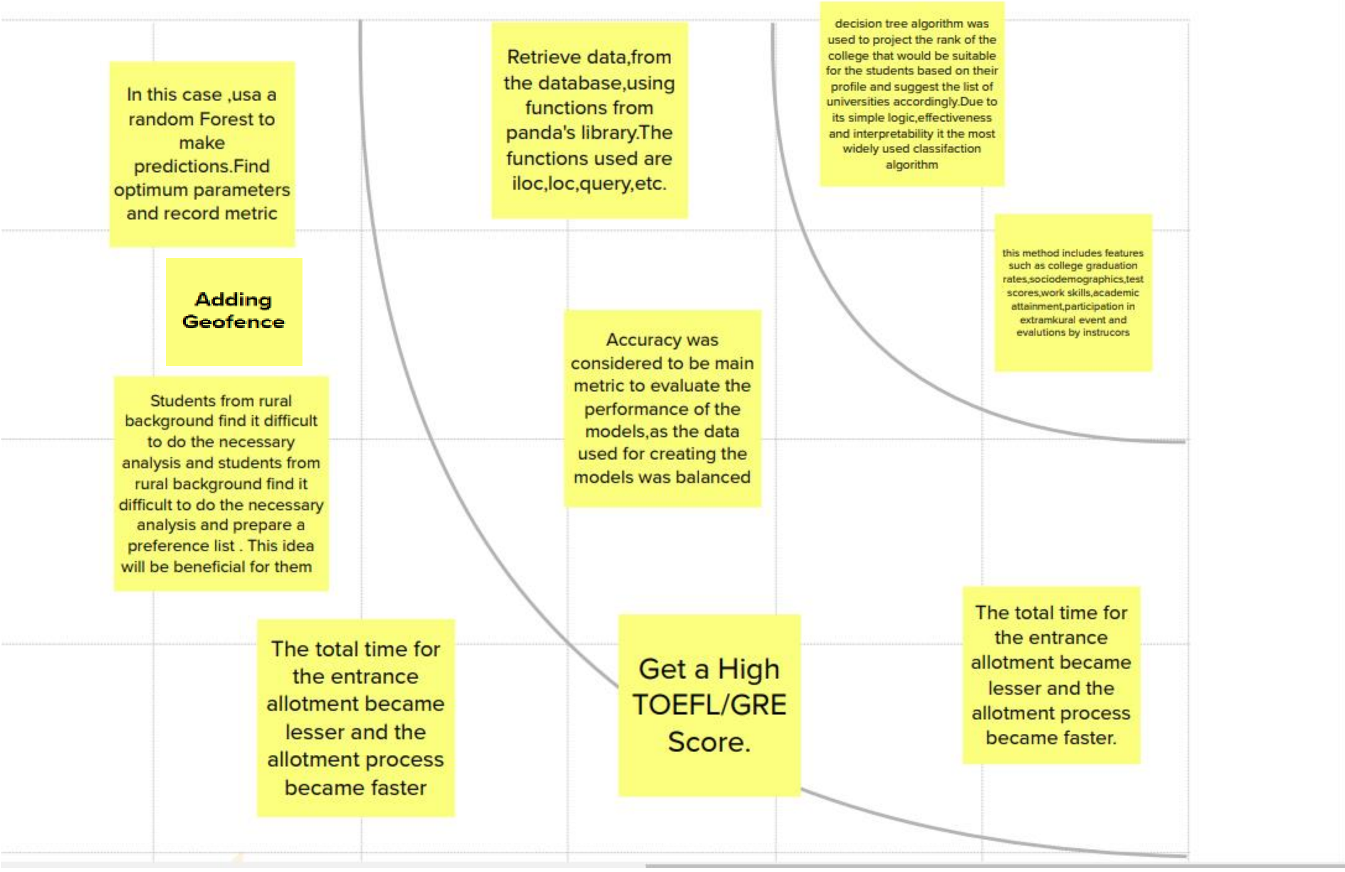
voids data redunday and inconsistency

Using the SVM

Analysing the GRE score

Predicting using K-means clustering

Ideation Prioritization



In this case ,usa a random Forest to make predictions.Find optimum parameters and record metric

Retrieve data,from the database,using functions from panda's library.The functions used are iloc,loc,query,etc.

decision tree algorithm was used to project the rank of the college that would be suitable for the students based on their profile and suggest the list of universities accordingly.Due to its simple logic,effectiveness and interpretability it the most widely used classifaction algorithm

Adding Geofence

this method includes features such as college graduation rates,sociodemographics,test scores,work skills,academic attainment,participation in extramkural event and evalutions by instrucors

Accuracy was considered to be main metric to evaluate the performance of the models,as the data used for creating the models was balanced

Students from rural background find it difficult to do the necessary analysis and students from rural background find it difficult to do the necessary analysis and prepare a preference list . This idea will be beneficial for them

The total time for the entrance allotment became lesser and the allotment process became faster

Get a High TOEFL/GRE Score.

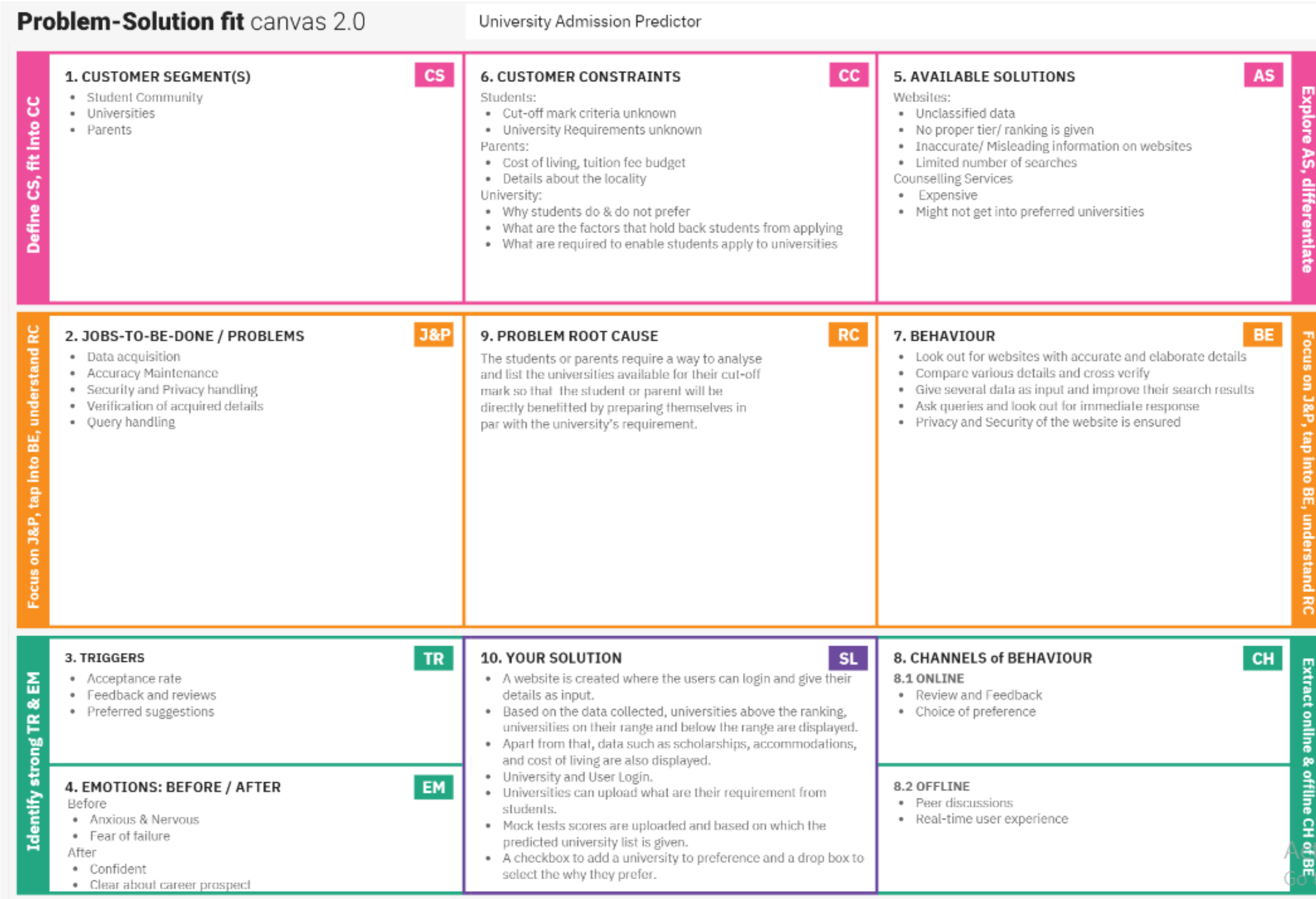
The total time for the entrance allotment became lesser and the allotment process became faster.

3.3 Proposed Solution

4.

S.No	Parameter	Description
1.	Problem Statement (Problem to be solved)	The students or parents require a way to analyse and list the universities available for their cut-off mark so that the student or parent will be directly benefitted by preparing themselves in par with the university's requirement.
2.	Idea / Solution description	A website is created where the users can login and give their details as input. Based on the data collected, universities above the ranking, universities on their range and below the range are displayed. Apart from that, data such as scholarships, accommodations, and cost of living are also displayed.
3.	Novelty / Uniqueness	University and User Login. Universities can upload what are their requirement from students. Mock tests scores are uploaded and based on which the predicted university list is given. A checkbox to add a university to preference and a drop box to select the why they prefer.
4.	Social Impact / Customer Satisfaction	Better performance of students are expected based on the results due to mock tests. Anxiety and Stress levels are reduced amidst users.
5.	Business Model (Revenue Model)	Subscription based model. Revenue from marketing.
6.	Scalability of the Solution	The solution proposed can be used by parents as well as students to know their cadre. Apart from this, universities can also make use of this website to know how many students are preferring the universities based on what criteria. Hence the scalability of the solution is high and widespread.

4.1 Problem Solution fit



Problem-Solution fit canvas 2.0

University Admission Predictor

Define CS, fit into CC
Focus on J&P, tap into BE, understand RC
Identify strong TR & EM
Explore AS, differentiate
Focus on J&P, tap into BE, understand RC
Extract online & offline CH of BE

1. CUSTOMER SEGMENT(S) CS

- Student Community
- Universities
- Parents

6. CUSTOMER CONSTRAINTS CC

Students:
- Cut-off mark criteria unknown
- University Requirements unknown

Parents:
- Cost of living, tuition fee budget
- Details about the locality

University:
- Why students do & do not prefer
- What are the factors that hold back students from applying
- What are required to enable students apply to universities

5. AVAILABLE SOLUTIONS AS

Websites:
- Unclassified data
- No proper tier/ ranking is given
- Inaccurate/ Misleading information on websites
- Limited number of searches

Counselling Services
- Expensive
- Might not get into preferred universities

2. JOBS-TO-BE-DONE / PROBLEMS J&P

- Data acquisition
- Accuracy Maintenance
- Security and Privacy handling
- Verification of acquired details
- Query handling

9. PROBLEM ROOT CAUSE RC

The students or parents require a way to analyse and list the universities available for their cut-off mark so that the student or parent will be directly benefitted by preparing themselves in par with the university's requirement.

7. BEHAVIOUR BE

- Look out for websites with accurate and elaborate details
- Compare various details and cross verify
- Give several data as input and improve their search results
- Ask queries and look out for immediate response
- Privacy and Security of the website is ensured

3. TRIGGERS TR

- Acceptance rate
- Feedback and reviews
- Preferred suggestions

4. EMOTIONS: BEFORE / AFTER EM

Before
- Anxious & Nervous
- Fear of failure

After
- Confident
- Clear about career prospect

10. YOUR SOLUTION SL

- A website is created where the users can login and give their details as input.
- Based on the data collected, universities above the ranking, universities on their range and below the range are displayed.
- Apart from that, data such as scholarships, accommodations, and cost of living are also displayed.
- University and User Login.
- Universities can upload what are their requirement from students.
- Mock tests scores are uploaded and based on which the predicted university list is given.
- A checkbox to add a university to preference and a drop box to select the why they prefer.

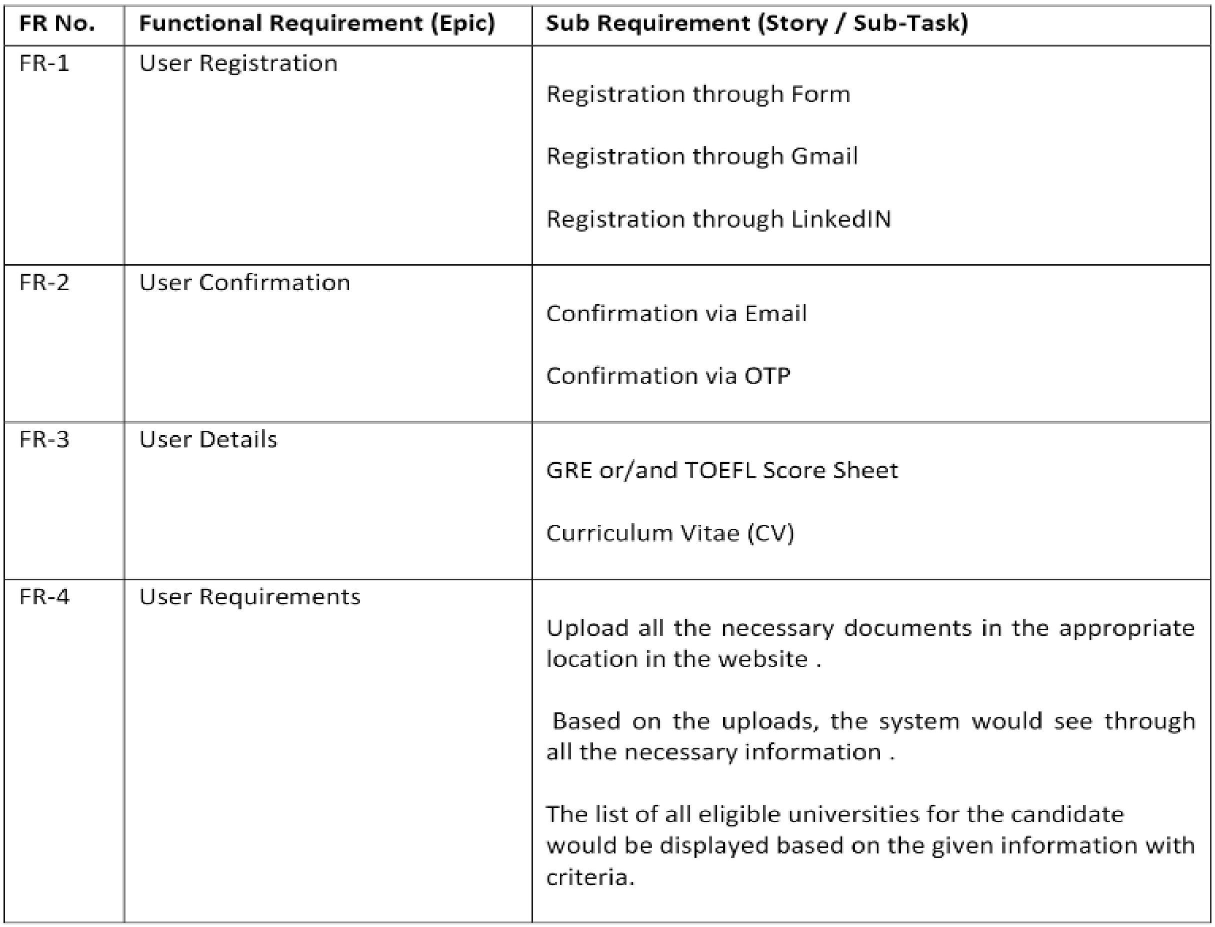
8. CHANNELS of BEHAVIOUR CH

8.1 ONLINE
- Review and Feedback
- Choice of preference

8.2 OFFLINE
- Peer discussions
- Real-time user experience

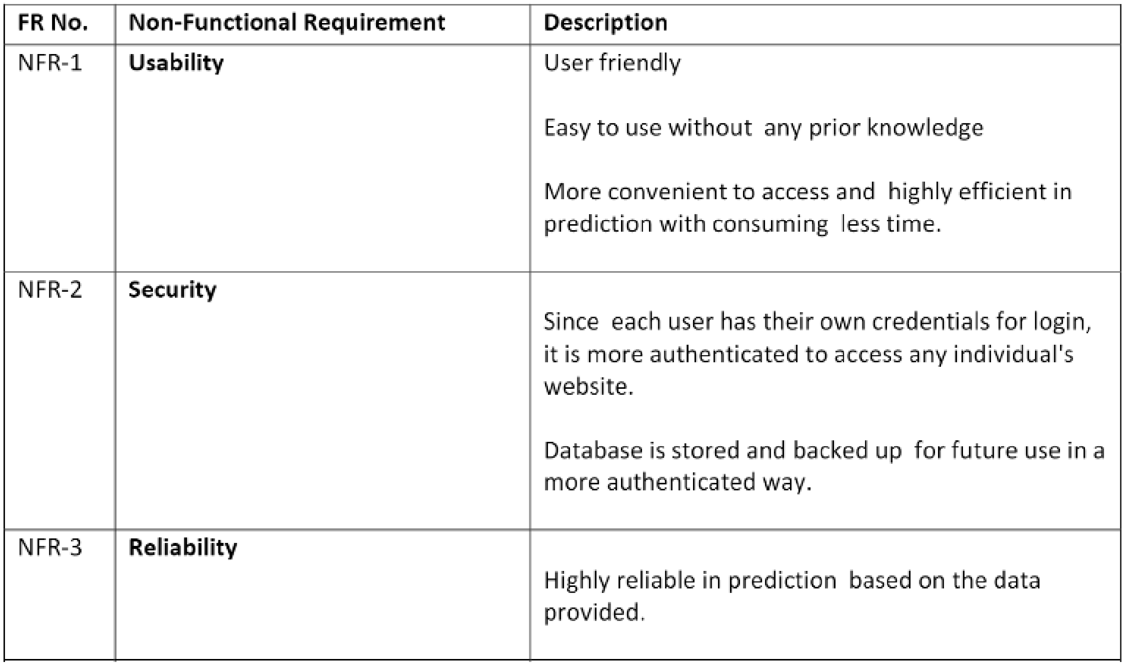
5. REQUIREMENT ANALYSIS

6.1.Functional Requirements

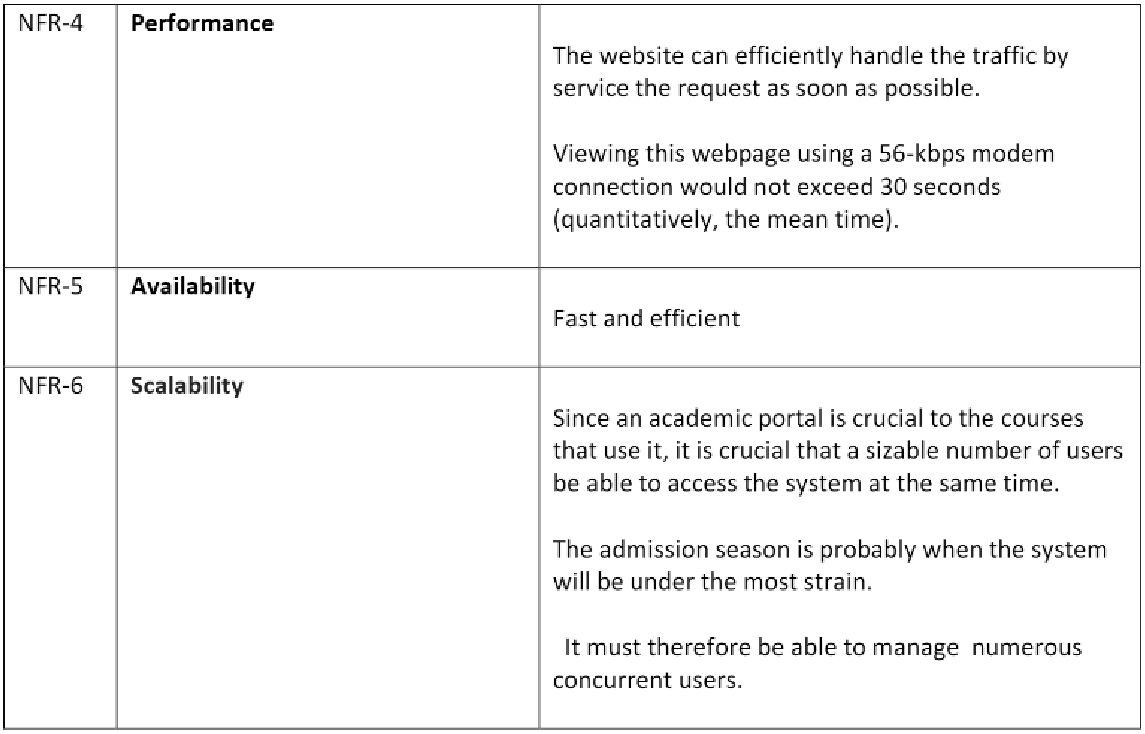


FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	User Registration	Registration through Form Registration through Gmail Registration through LinkedIN
FR-2	User Confirmation	Confirmation via Email Confirmation via OTP
FR-3	User Details	GRE or/and TOEFL Score Sheet Curriculum Vitae (CV)
FR-4	User Requirements	Upload all the necessary documents in the appropriate location in the website . Based on the uploads, the system would see through all the necessary information . The list of all eligible universities for the candidate would be displayed based on the given information with criteria.

Non-Functional requirements



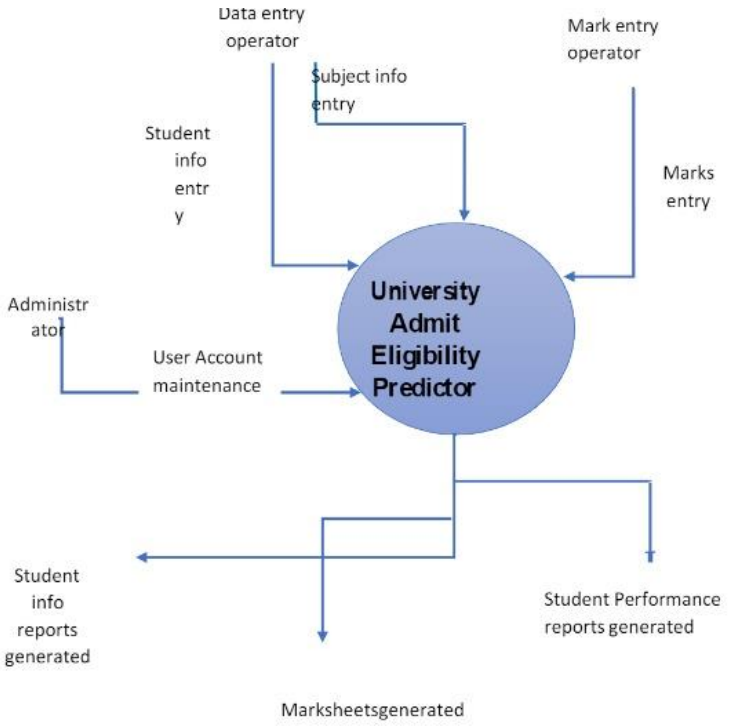
FR No.	Non-Functional Requirement	Description
NFR-1	**Usability**	User friendly Easy to use without any prior knowledge More convenient to access and highly efficient in prediction with consuming less time.
NFR-2	**Security**	Since each user has their own credentials for login, it is more authenticated to access any individual's website. Database is stored and backed up for future use in a more authenticated way.
NFR-3	**Reliability**	Highly reliable in prediction based on the data provided.



NFR-4	**Performance**	The website can efficiently handle the traffic by service the request as soon as possible. Viewing this webpage using a 56-kbps modem connection would not exceed 30 seconds (quantitatively, the mean time).
NFR-5	**Availability**	Fast and efficient
NFR-6	**Scalability**	Since an academic portal is crucial to the courses that use it, it is crucial that a sizable number of users be able to access the system at the same time. The admission season is probably when the system will be under the most strain. It must therefore be able to manage numerous concurrent users.

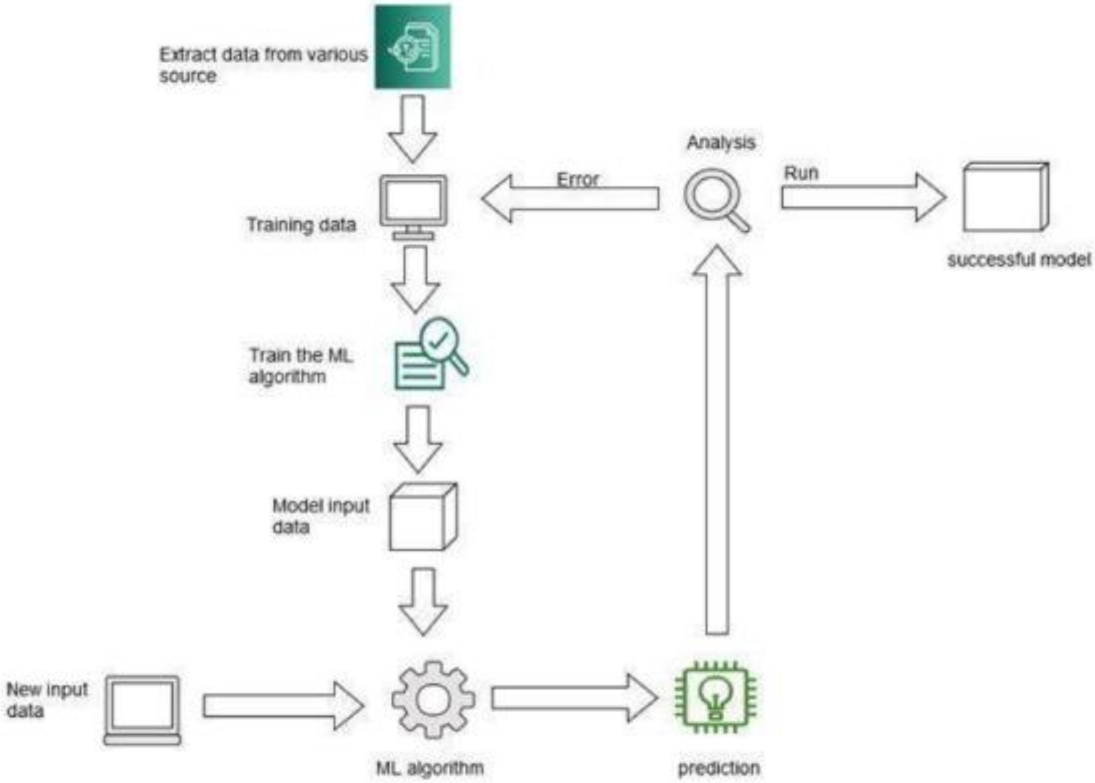
6. PROJECT DESIGN

6.1 Data Flow Diagrams



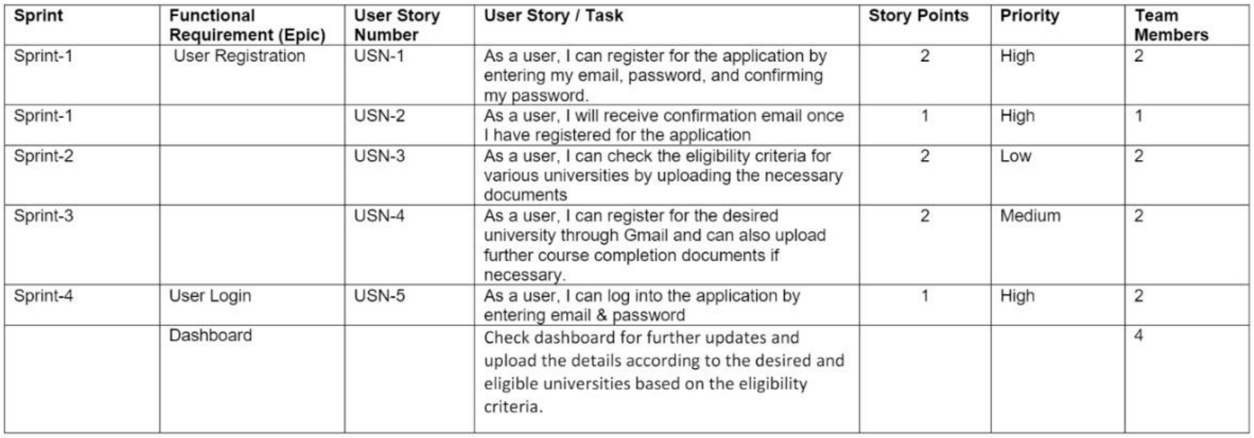
6.2 Solution & Technical Architecture

➔ Technical Architecture



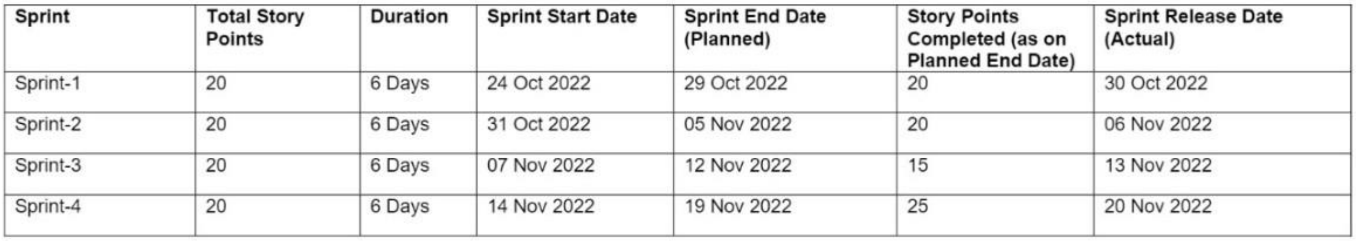
7. PROJECT PLANNING & SCHEDULING

7.1 Sprint Planning & Estimation



Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-1	User Registration	USN-1	As a user, I can register for the application by entering my email, password, and confirming my password.	2	High	2
Sprint-1		USN-2	As a user, I will receive confirmation email once I have registered for the application	1	High	1
Sprint-2		USN-3	As a user, I can check the eligibility criteria for various universities by uploading the necessary documents	2	Low	2
Sprint-3		USN-4	As a user, I can register for the desired university through Gmail and can also upload further course completion documents if necessary.	2	Medium	2
Sprint-4	User Login	USN-5	As a user, I can log into the application by entering email & password	1	High	2
	Dashboard		Check dashboard for further updates and upload the details according to the desired and eligible universities based on the eligibility criteria.			4

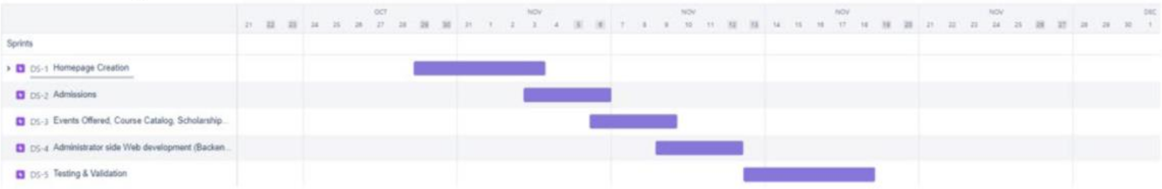
7.2 Sprint Delivery Schedule



Sprint	Total Story Points	Duration	Sprint Start Date	Sprint End Date (Planned)	Story Points Completed (as on Planned End Date)	Sprint Release Date (Actual)
Sprint-1	20	6 Days	24 Oct 2022	29 Oct 2022	20	30 Oct 2022
Sprint-2	20	6 Days	31 Oct 2022	05 Nov 2022	20	06 Nov 2022
Sprint-3	20	6 Days	07 Nov 2022	12 Nov 2022	15	13 Nov 2022
Sprint-4	20	6 Days	14 Nov 2022	19 Nov 2022	25	20 Nov 2022

7.3 Reports from JIRA

- ➔ RoadMap

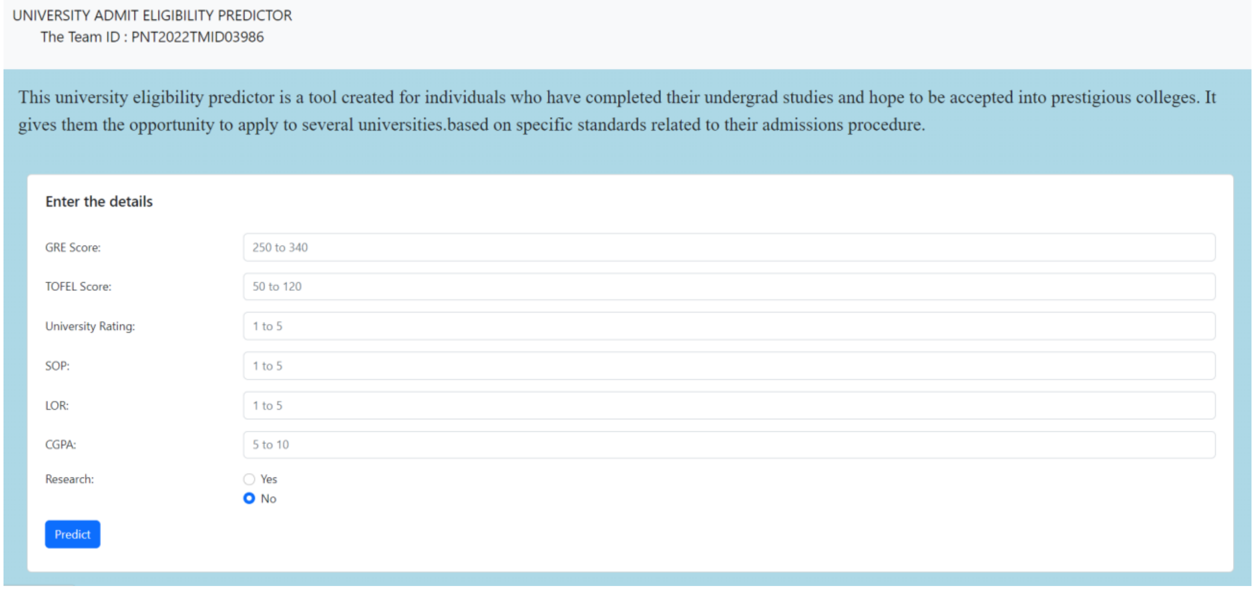


- ➔

VII. CODING & SOLUTIONING:

7.1 Feature 1

HOME.HTML

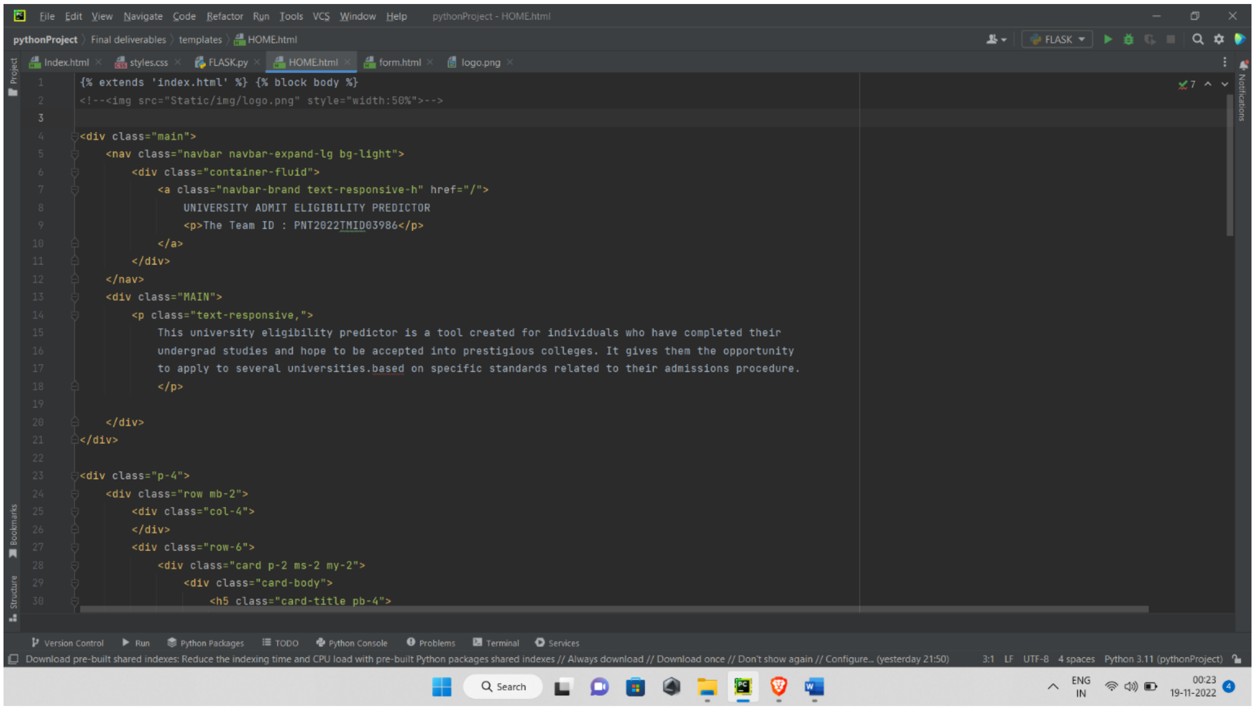


UNIVERSITY ADMIT ELIGIBILITY PREDICTOR
The Team ID : PNT2022TMID03986

This university eligibility predictor is a tool created for individuals who have completed their undergrad studies and hope to be accepted into prestigious colleges. It gives them the opportunity to apply to several universities.based on specific standards related to their admissions procedure.

Enter the details

GRE Score:	250 to 340
TOFEL Score:	50 to 120
University Rating:	1 to 5
SOP:	1 to 5
LOR:	1 to 5
CGPA:	5 to 10
Research:	○ Yes ● No

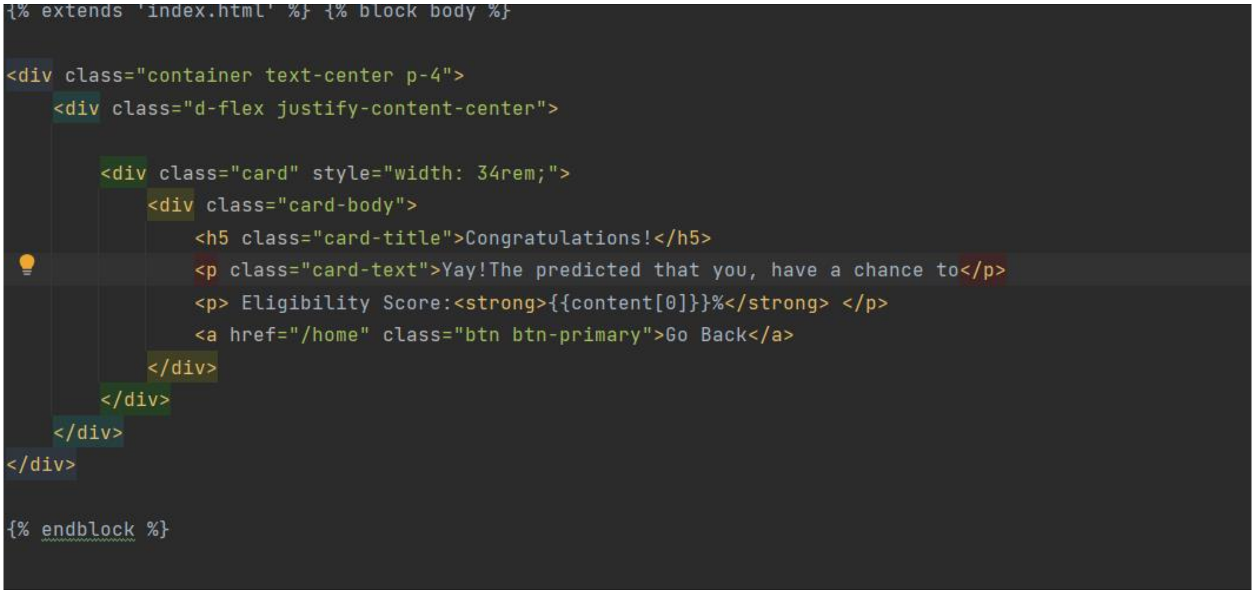


```
{% extends 'index.html' %} {% block body %}
<!--<img src="Static/img/logo.png" style="width:50%">-->

<div class="main">
    <nav class="navbar navbar-expand-lg bg-light">
        <div class="container-fluid">
            <a class="navbar-brand text-responsive-h" href="/">
                UNIVERSITY ADMIT ELIGIBILITY PREDICTOR
                <p>The Team ID : PNT2022TMID03986</p>
            </a>
        </div>
    </nav>
    <div class="MAIN">
        <p class="text-responsive,">
            This university eligibility predictor is a tool created for individuals who have completed their
            undergrad studies and hope to be accepted into prestigious colleges. It gives them the opportunity
            to apply to several universities.based on specific standards related to their admissions procedure.
            </p>

    </div>
</div>

<div class="p-4">
    <div class="row mb-2">
        <div class="col-4">
        </div>
        <div class="row-6">
            <div class="card p-2 ms-2 my-2">
                <div class="card-body">
                    <h5 class="card-title pb-4">
```

Download pre-built shared indexes: Reduce the indexing time and CPU load with pre-built Python packages shared indexes // Always download // Download once // Don't show again // Configure... (yesterday 21:50)

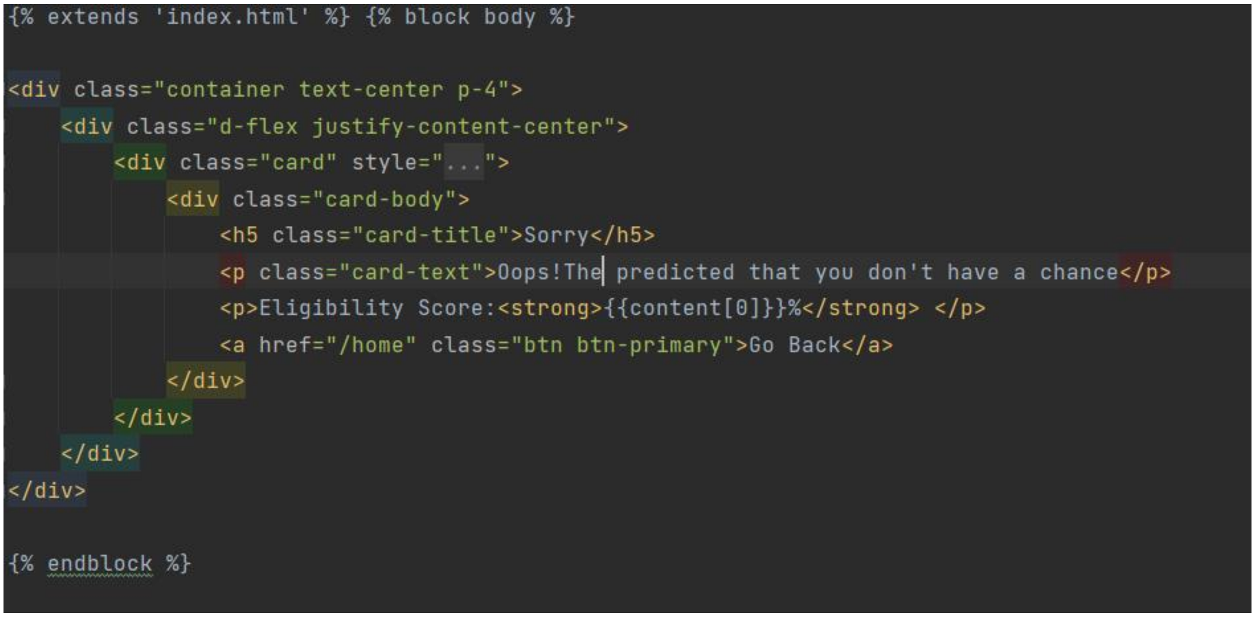
3:1 LF UTF-8 4 spaces Python 3.11 (pythonProject)

CHANGE.HTML



```
{% extends 'index.html' %} {% block body %}

<div class="container text-center p-4">
    <div class="d-flex justify-content-center">

        <div class="card" style="width: 34rem;">
            <div class="card-body">
                <h5 class="card-title">Congratulations!</h5>
                <p class="card-text">Yay!The predicted that you, have a chance to</p>
                <p> Eligibility Score:<strong>{{content[0]}}%</strong> </p>
                <a href="/home" class="btn btn-primary">Go Back</a>
            </div>
        </div>
    </div>
</div>

{% endblock %}
```

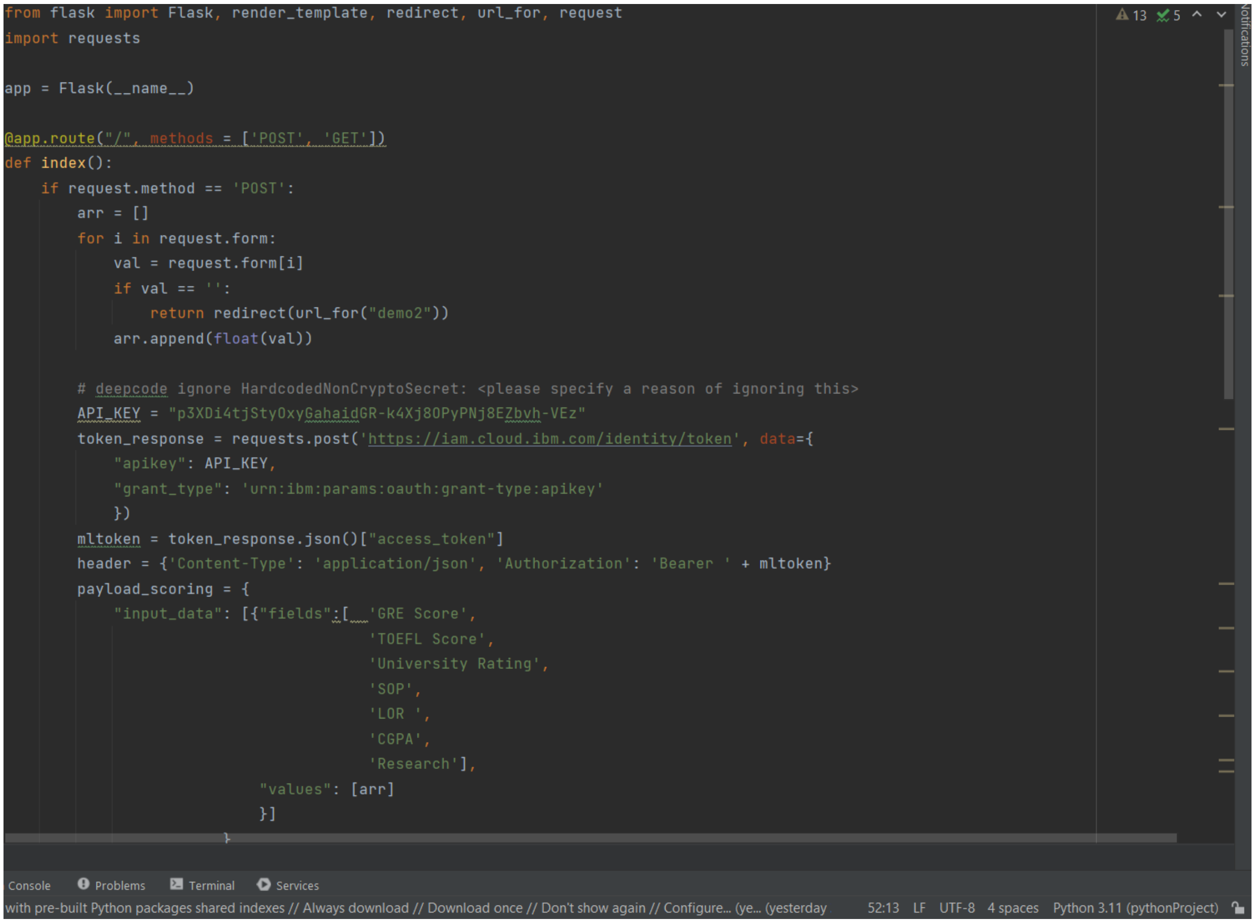
NO_CHANGE.HTML



```
{% extends 'index.html' %} {% block body %}

<div class="container text-center p-4">
    <div class="d-flex justify-content-center">
        <div class="card" style="...">
            <div class="card-body">
                <h5 class="card-title">Sorry</h5>
                <p class="card-text">Oops!The predicted that you don't have a chance</p>
                <p>Eligibility Score:<strong>{{content[0]}}%</strong> </p>
                <a href="/home" class="btn btn-primary">Go Back</a>
            </div>
        </div>
    </div>
</div>

{% endblock %}
```

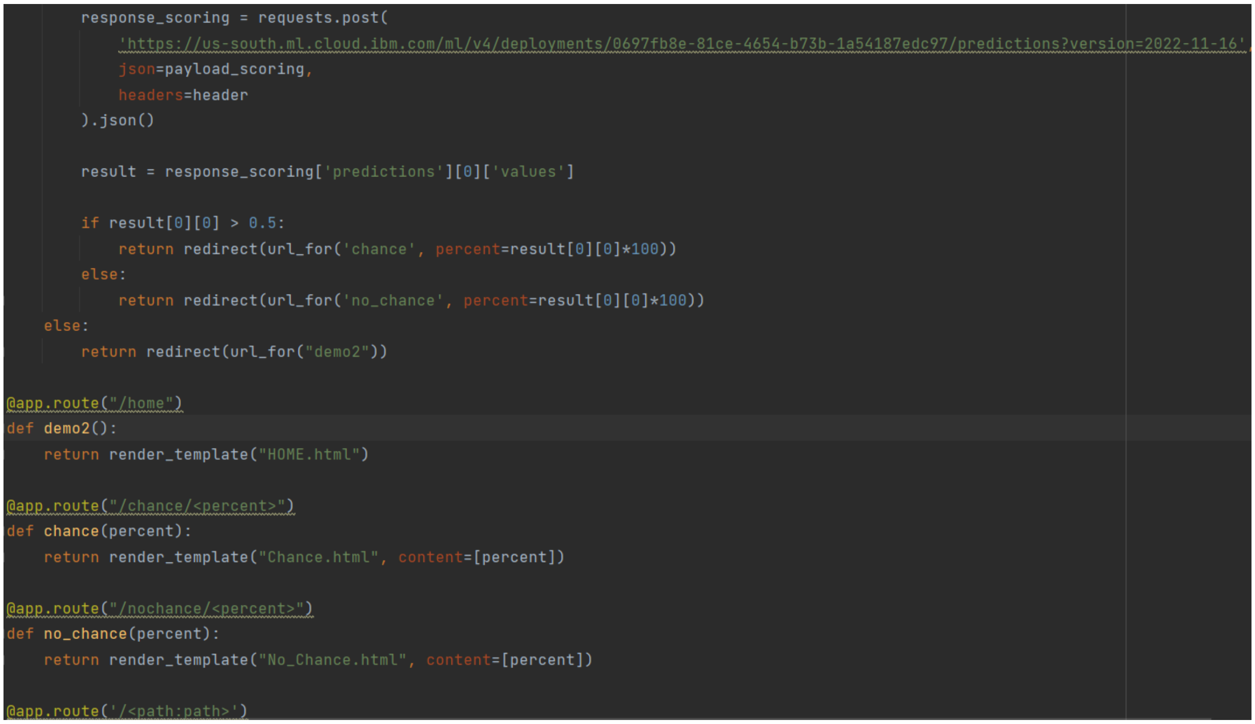
7.2 Feature 2

FLASK.PY



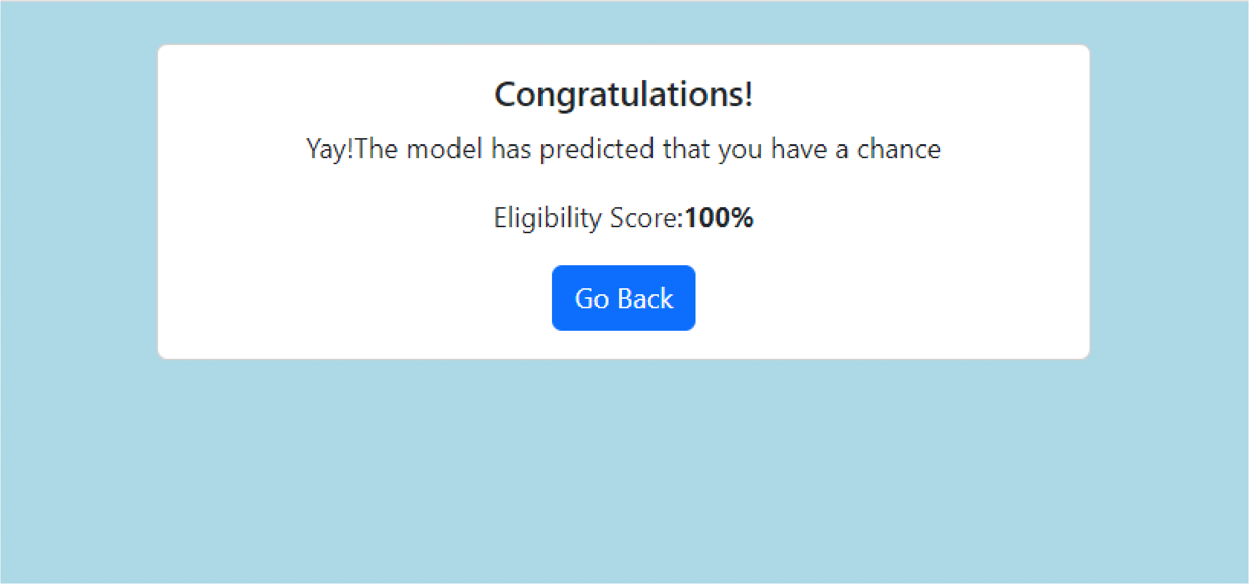
```python
from flask import Flask, render_template, redirect, url_for, request
import requests

app = Flask(__name__)

@app.route("/", methods = ['POST', 'GET'])
def index():
    if request.method == 'POST':
        arr = []
        for i in request.form:
            val = request.form[i]
            if val == '':
                return redirect(url_for("demo2"))
            arr.append(float(val))

        # deepcode ignore HardcodedNonCryptoSecret: <please specify a reason of ignoring this>
        API_KEY = "p3XDi4tjSty0xyGahaidGR-k4Xj8OPyPNj8EZbvh-VEz"
        token_response = requests.post('https://iam.cloud.ibm.com/identity/token', data={
            "apikey": API_KEY,
            "grant_type": 'urn:ibm:params:oauth:grant-type:apikey'
            })
        mltoken = token_response.json()["access_token"]
        header = {'Content-Type': 'application/json', 'Authorization': 'Bearer ' + mltoken}
        payload_scoring = {
            "input_data": [{"fields":[  'GRE Score',
                                        'TOEFL Score',
                                        'University Rating',
                                        'SOP',
                                        'LOR ',
                                        'CGPA',
                                        'Research'],
                            "values": [arr]
                            }]
                        }
```

⚠ 13 ✓ 5
Notifications
Console
Problems
Terminal
Services
with pre-built Python packages shared indexes // Always download // Download once // Don't show again // Configure... (ye... (yesterday
52:13
LF
UTF-8
4 spaces
Python 3.11 (pythonProject)



```python
        response_scoring = requests.post(
            'https://us-south.ml.cloud.ibm.com/ml/v4/deployments/0697fb8e-81ce-4654-b73b-1a54187edc97/predictions?version=2022-11-16',
            json=payload_scoring,
            headers=header
        ).json()

        result = response_scoring['predictions'][0]['values']

        if result[0][0] > 0.5:
            return redirect(url_for('chance', percent=result[0][0]*100))
        else:
            return redirect(url_for('no_chance', percent=result[0][0]*100))
    else:
        return redirect(url_for("demo2"))

@app.route("/home")
def demo2():
    return render_template("HOME.html")

@app.route("/chance/<percent>")
def chance(percent):
    return render_template("Chance.html", content=[percent])

@app.route("/nochance/<percent>")
def no_chance(percent):
    return render_template("No_Chance.html", content=[percent])

@app.route('/<path:path>')
```

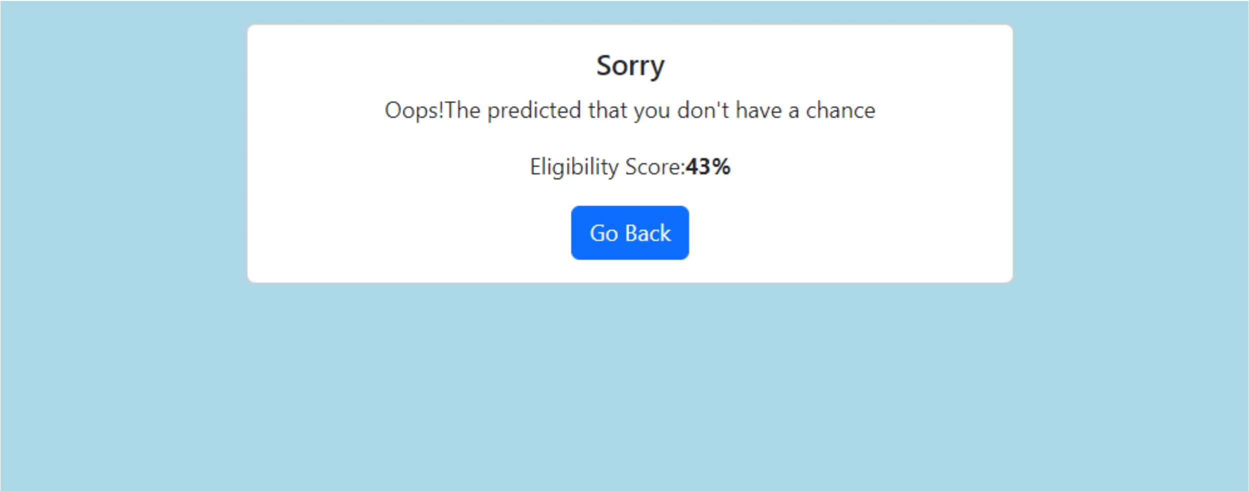
OUTPUT



Congratulations!

Yay!The model has predicted that you have a chance

Eligibility Score:**100%**



Sorry

Oops!The predicted that you don't have a chance

Eligibility Score:**43%**

8. TESTING: 8.1 Test Cases

Test case ID	Feature Type	Component	Test Scenario	Steps To Execute	Test Data	Expected Result	Actual Result	Status
LoginPage-1	UI	Index	Verify the UI elements in home page	1.Enter URL and click go 2.Enter the Scores 3.Click the Submit button	http://127.0.0.1:5000/home	Working as expected	e Working as expected	pass
LoginPage-2	Functional	Change	Verifying whether the student is eligible for admission	1.As per the Entered Model Value. 2.Getting above 50%. 3.You have a Chance will get displayed	http://127.0.0.1:5000/chance/100	Working as expected	e Working as expected	pass
LoginPage-3	Functional	No_ Change	Verifying whether the student does not have a chance of admission	1.As per the Entered Model Value. 2.Getting below 50% 3.You have a Low/No _chance will get displayed	http://127.0.0.1:5000/nochance/43	Working as expected	e Working as expected	pass

8.2 User Acceptance Testing

The purpose of User Acceptance Testing is to briefly explain the test coverage and open issues of the University Admit Eligibility Predictor project at the time of the release to User Acceptance Testing (UAT).

8.2.1 Defect Analysis

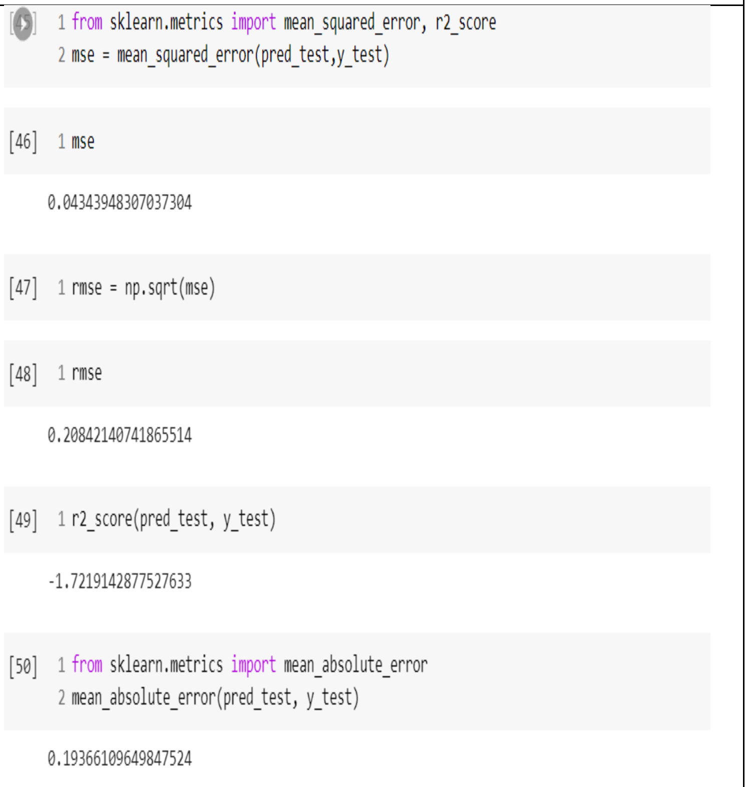
This report shows the number of resolved or closed bugs at each severity level, and how they were resolved

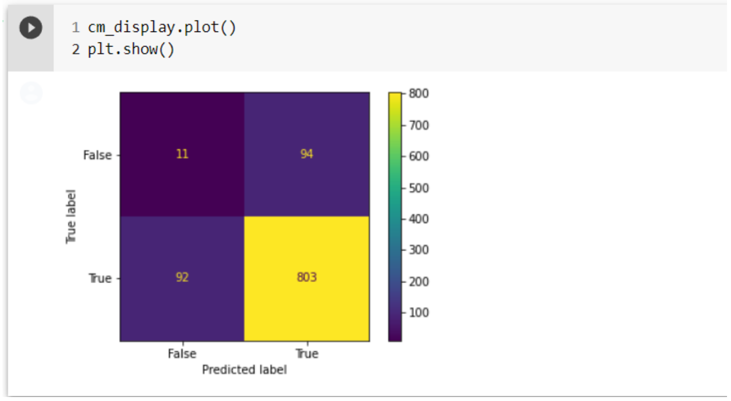
Resolution	Severity 1	Severity 2	Severity 3	Severity 4	Subtotal
By Design	10	4	2	3	20
Duplicate	1	0	3	0	4
External	2	3	0	1	6
Fixed	11	2	4	20	37
Not Reproduced	0	0	1	0	1
Skipped	0	0	1	1	2
Won't Fix	0	5	2	1	8
Totals	24	14	13	26	77

IX. RESULTS:

9.1 Performance Metrics

S.No.	Parameter	Values	Screenshot

1	**Metrics**	**Regression Model:**
		MAE - , 0.043439
		MSE - , 0.04553
		RMSE – 0.208421 ,
		R2 score -1.721914
		Classification Model:
		Confusion Matrix -
			
			[45] `from sklearn.metrics import mean_squared_error, r2_score`
			`mse = mean_squared_error(pred_test,y_test)`
			[46] `mse`
			`0.04343948307037304`
			[47] `rmse = np.sqrt(mse)`
			[48] `rmse`
			`0.20842140741865514`
			[49] `r2_score(pred_test, y_test)`
			`-1.7219142877527633`
			[50] `from sklearn.metrics import mean_absolute_error`
			`mean_absolute_error(pred_test, y_test)`
			`0.19366109649847524`

			
			`cm_display.plot()`
			`plt.show()`
			 True label
			False
			True
			Predicted label
			False
			True
			11
			94
			92
			803
			800
			700
			600
			500
			400
			300
			200
			100

X. ADVANTAGES & DISADVANTAGES

Advantages

• It helps student for making decision for choosing a right college.

• Here the chance of occurrence of error is less when compared with the existing

system.

• It is fast, efficient and reliable.

• Avoids data redundancy and inconsistency.

• Very user-friendly.

• Easy accessibility of data.

DisAdvantages:

• Required active internet connection.

• System will provide inaccurate results if data entered incorrectly.

XI. CONCLUSION

Thus it is concluded that our model provides a robust prediction score with Multiple Linear Regression Algorithm & users are able to predict the scores what they expected. User experience of the website is a simple one to use & puts the user at ease to utilize the feature.

XII. FUTURE SCOPE

We intend to enhance the user experience by adding the details of every universities so that the user can get to know the culture of the place, alumni reviews, rating of the

universities etc.

XIII. APPENDIX

Github: https://github.com/IBM-EPBL/IBM-Project-27453-1660056745