UNIVERSITY ADMIT ELIGIBILITY PREDICTOR

Professional Readiness for Innovation, Employability and Entrepreneurship

A PROJECT REPORT

TEAM ID: PNT2022TMID12009

Submitted by

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ABSTRACT

Many students currently pursue their education outside of their home nations. These international students mostly have the United States of America in mind. India and China account for the majority of foreign students in the United States of America. The number of Indian students enrolling in postgraduate programmes in the USA has sharply increased during the last ten years. Each applicant must contend with a challenging admission process due to the rise in the number of overseas students studying in the United States. It might be challenging for aspiring graduate students to decide which universities to apply to. Students frequently question whether their resume is strong enough for a particular university. This issue has been dealt with in this research by modelling a recommender system based on different classification techniques. Thegradcafe.com provided the necessary data. Based on this data set, several models were developed, and the best one was selected to recommend universities to the students along with others having comparable features. This increased the likelihood that the student would be admitted from that list of universities. Classification algorithms have also been used to forecast a student's likelihood of admission to a specific university. The project uses a machine learning model to estimate, using information like marks and other details, whether the user is qualified for admission to the rating universities that have been chosen. The algorithm is designed to display the % of possibility of admission when the user enters information such as GRE, TOEFL, SOP, LOR, CGPA, and University Rating. A user interface is given to the user so they can enter the abovementioned information for prediction.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF ABBREVIATIONS

ACRONYM	ABBREVIATION
GRE	General Record Examination
TOEFL	Test Of English as a Foreign Language
SOP	Statement Of Purpose
LOR	Letters Of Recommendation
CGPA	Cumulative Grade Point Average

CHAPTER 1

INTRODUCTION

1.1 Project Overview

Students are often worried about their chances of admission to University. 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

A persons education plays a vital role in their life. While planning for education students often have several questions regarding the courses, universities, job opportunities, expenses involved,etc. Securing admission in their dream university is one of their main concerns. It is seen that often students prefer to pursue their education from universities which have global recognition.

CHAPTER 2
LITERATURE SURVEY

when it comes to international students the first choice of the majority of them is the United States of America. With the majority of worlds highly reputed universities, wide range of courses offered in every sector, highly accredited education system and teaching, scholarships provided to students, best job market and many more advantages make it the dream destination for the international 1 students. According to research, there are above 8 Million international students studying in more than 1700 public and 2500 private universities and colleges across the USA. (MasterPortal (2017))

2.1 Existing problem

Universities take into consideration different factors like score on aptitude based examination like the General Record Examination (GRE), command over the English language is judged based on their score in English competency test like Test Of English as a Foreign Language (TOEFL) OR International English Language Testing System (IELTS), their work experience in same or other fields, the quality of the Letters Of Recommendation (LOR) and the Statement Of Purpose (SOP) documents provided by the student etc. Based on the overall profile of the student decision is taken by the universities admission team to admit or reject a particular candidate.

2.2 References

- Geiser, Saul, and with Roger Studley. "UC and the SAT: Predictive validity and differential impact of the SAT I and SAT II at the University of California." Educational Assessment 8.1 (2002): 1-26.
- Rothstein, Jesse M. "College performance predictions and the SAT." Journal of Econometrics 121.1-2 (2004): 297-317.
- Leonard, David K., and Jiming Jiang. "Gender bias and the college predictions of the SATs: A cry of despair." Research in Higher education 40.4 (1999): 375-407.

2.3 Problem Statement Definition

Build an application that predicts the university admission chances of a student powered by machine learning models. Train the model and host it on IBM cloud. The majority of international students studying in the USA are from India and China. In the past decade, India has seen a huge increase in the number of students opting to pursue their education from foreign universities in countries like The USA, Ireland, Australia, Germany, etc. Although there are significant universities and colleges in India, students are finding it difficult to get admission in the highly ranked colleges and also getting a job is a challenge as the ratio of number studentsto the number work opportunities available is quite high. India is one of the leading counties in the number of software engineers produced each year; it becomes tough for the students to find jobs in elite companies due to high competition. This motivates a good number of students to pursue post-graduation in their field. It is seen that the number of students pursuing Masters in Computer Science field from universities in the USA is quite high; the focus of this research willbe on these students.

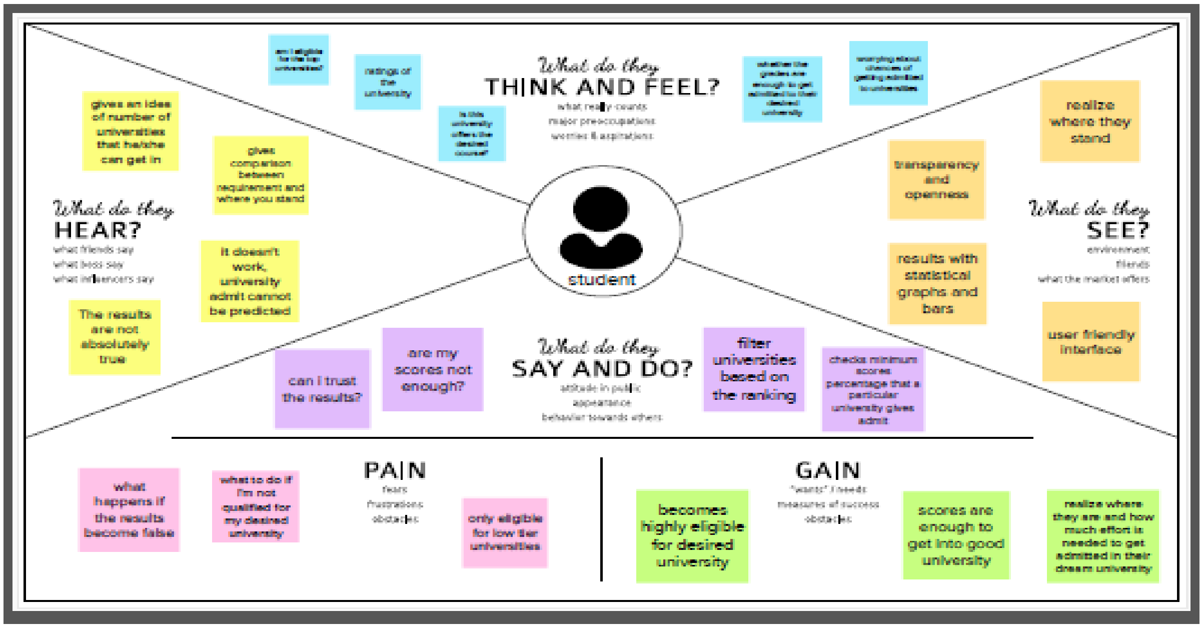
CHAPTER 3

IDEATION & PROPOSED SOLUTION

The project aims to develop an application that uses artificial intelligence with the help of chat bot to customize products for the customers which enhances the fame of ecommerce store andreduce the time which customers spends on choosing products. The application also uses IBMcloud storage for storing objects.

An application that predicts the university admission chances of a student powered by machine learning models. Solution architecture is a complex process – with many sub-processes – thatbridges the gap between business problems and technology solutions. The primary objective of this research is to develop a system to solve the problems the international students are facingwhile applying for universities in the USA.

3.1 Empathy Map Canvas



What do they THINK AND FEEL?
what really counts
major preoccupations
worries & aspirations
am I eligible for the top universities?
ratings of the university
is this university offers the desired course?
whether the grades are enough to get admitted to their desired university
worrying about chances of getting admitted to universities
What do they HEAR?
what friends say
what boss say
what influencers say
gives an idea of number of universities that he/she can get in
gives comparison between requirement and where you stand
it doesn't work, university admit cannot be predicted
The results are not absolutely true
What do they SEE?
environment
friends
what the market offers
realize where they stand
transparency and openness
results with statistical graphs and bars
user friendly interface
student
What do they SAY AND DO?
attitude in public
appearance
behavior towards others
can I trust the results?
are my scores not enough?
filter universities based on the ranking
checks minimum scores percentage that a particular university gives admit
PAIN
fears
frustrations
obstacles
what happens if the results become false
what to do if I'm not qualified for my desired university
only eligible for low tier universities
GAIN
"wants" / needs
measures of success
obstacles
becomes highly eligible for desired university
scores are enough to get into good university
realize where they are and how much effort is needed to get admitted in their dream university

Fig. 3.1 Empathy Map Canvas

3.2 Ideation & Brainstorming

This task of shortlisting the universities where the student has high chances of admission is difficult for mainly for the international students, so they end up with applying to many universities in hopes of getting admission in few of them thus investing an extra amount of money in the applications. There are several portals and websites which provide information and help to students in shortlisting the universities, but they are not reliable. Most of the students don’t take the risk of evaluating the colleges by themselves, and they seek the help of the education consultancy firms to do it for them. Again for this students have to pay a huge amount of fee to the education consultant.

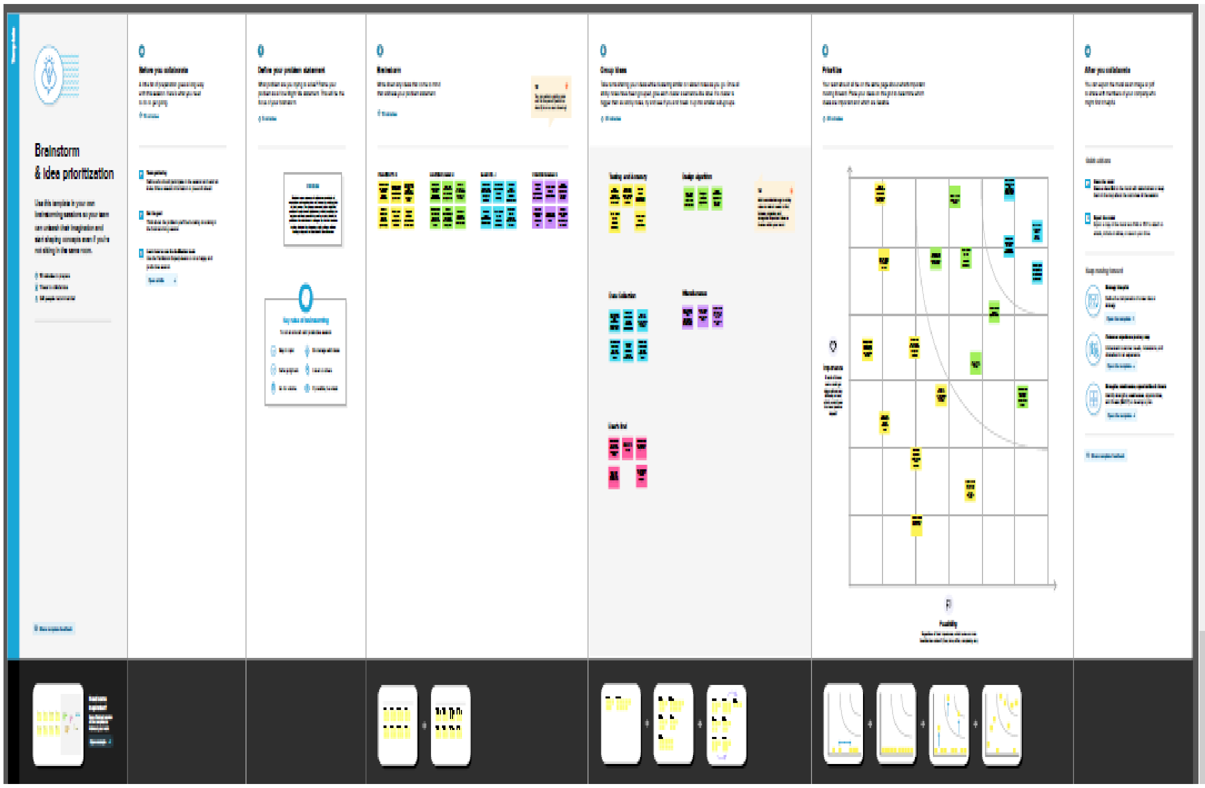


Fig. 3.2 Ideation & Brainstorming

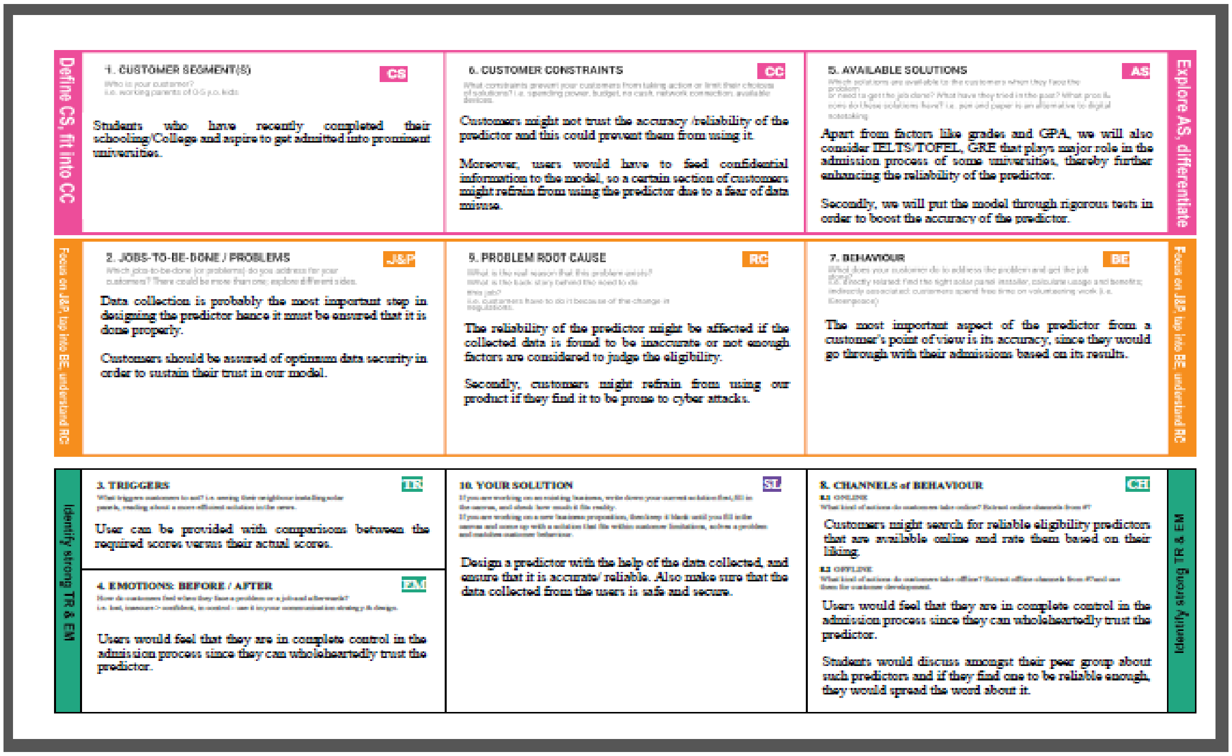
3.3 Proposed Solution

Finally, K Nearest Neighbors and Decision Tree algorithms were used as they were found to be the best fit for the system developed. Also, we will be creating a simple user interface which will help the users to input the data related to student profile and get the predicted result for the application based on the profile as output. This research will thus eventually help students saving the extra amount of time and money they have to spend at the education consultancy firms. And also it will help them to limit their number of application to a small number by proving them the suggestion of the universities where they have the best chance of securing admissionthus saving more money on the application fees.

S.NO.	Parameter	Description
1.	Problem Statement (Problem to be solved)	Choosing the right universities or colleges is definitely a Student have to face. Many students apply for the universities in which they have little chance of acceptance. This leads students of poor economic backgrounds to frustration and anxiety as they only lose surplus amount of money just for applying to those universities.
2.	Idea / Solution description	University and College research being one part of the university application process is itself an arduous and lengthy task. This issue being a big problem for students have not been solved till now. There are recognized sites which filters the best universities and colleges based on the location, tuition fees, major and degree but none of them have use machine learning algorithm to solve the issue. Hence, we have done this research project to solve that issue to some extent with the use of data mining techniques
3.	Novelty / Uniqueness	University Application process itself being a tedious task Students needs lots of endeavor and determination for completing overall application process. It would definitely be easier for students if they get relief from step of selecting best suited universities and colleges for application.
4.	Social Impact / Customer Satisfaction	Results of this project are not applicable to college graduates of each and every major. As there was limitation of information on dataset this system could not predict and recommend universities to students of every major. Nevertheless, the statistical data mining techniques used in this project can be applicable to all majors. If any universities have in sufficient data on the major chosen by the student it will return insufficient data for prediction to the user.
5.	Business Model (Revenue Model)	From this project, financially can earn from the student's admission fees but while they want to first select in their selected college in prediction. Although which is done by this project for prediction. In this project, this problem has been addressed by modeling a recommender system based on various classification algorithms. The required data was obtained from thegradcafe.com. Based on this data set, various models were trained and one best and some other similar properties carrying universities are suggested for the students such that it maximizes the chances of a student getting an admit from that university list.
6.	Scalability of the Solution	In this project, this problem has been addressed by modelling a recommender system based on various classification algorithms. To predict the best University for the particular student his/her GPA score, GRE (Verbal and Quant) Score, TOEFL score has been used as attributes for classification. K nearest neighbor has been used to predict best University and K means clustering has been used to find more similar universities. Support Vector Machine and Random forest has been used to predict the admission chance of particular student on specific University

3.4 Problem Solution fit

We will be developing a University Admit Eligibility Predictor system which will help the students to predict the chances of their application being selected for a particular university for which they wish to apply based on their profile. Also, the system will provide a recommendation of universities to the student to which the student has a high possibility of getting admission. Multiple machine learning classification algorithms were evaluated to develop the system.



Define CS, fit into CC

1. CUSTOMER SEGMENT(S) CS

Who is your customer?
i.e. working parents of 0-5 y.o. kids

Students who have recently completed their schooling/College and aspire to get admitted into prominent universities.

6. CUSTOMER CONSTRAINTS CC

What constraints prevent your customers from taking action or limit their choices of solutions? i.e. spending power, budget, no cash, network connection, available devices.

Customers might not trust the accuracy /reliability of the predictor and this could prevent them from using it.

Moreover, users would have to feed confidential information to the model, so a certain section of customers might refrain from using the predictor due to a fear of data misuse.

5. AVAILABLE SOLUTIONS AS

Which solutions are available to the customers when they face the problem or need to get the job done? What have they tried in the past? What pros & cons do these solutions have? i.e. pen and paper is an alternative to digital notetaking

Apart from factors like grades and GPA, we will also consider IELTS/TOFEL, GRE that plays major role in the admission process of some universities, thereby further enhancing the reliability of the predictor.

Secondly, we will put the model through rigorous tests in order to boost the accuracy of the predictor.

Explore AS, differentiate

Focus on J&P, tap into BE, understand RC

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

Which jobs-to-be-done (or problems) do you address for your customers? There could be more than one; explore different sides.

Data collection is probably the most important step in designing the predictor hence it must be ensured that it is done properly.

Customers should be assured of optimum data security in order to sustain their trust in our model.

9. PROBLEM ROOT CAUSE RC

What is the real reason that this problem exists? What is the back story behind the need to do this job?
i.e. customers have to do it because of the change in regulations.

The reliability of the predictor might be affected if the collected data is found to be inaccurate or not enough factors are considered to judge the eligibility.

Secondly, customers might refrain from using our product if they find it to be prone to cyber attacks.

7. BEHAVIOUR BE

What does your customer do to address the problem and get the job done?
i.e. directly related: find the right solar panel installer, calculate usage and benefits; indirectly associated: customers spend free time on volunteering work (i.e. Greenpeace)

The most important aspect of the predictor from a customer's point of view is its accuracy, since they would go through with their admissions based on its results.

Focus on J&P, tap into BE, understand RC

Identify strong TR & EM

3. TRIGGERS TR

What triggers customers to act? i.e. seeing their neighbour installing solar panels, reading about a more efficient solution in the news.

User can be provided with comparisons between the required scores versus their actual scores.

4. EMOTIONS: BEFORE / AFTER EM

How do customers feel when they face a problem or a job and afterwards?
i.e. lost, insecure > confident, in control - use it in your communication strategy & design.

Users would feel that they are in complete control in the admission process since they can wholeheartedly trust the predictor.

10. YOUR SOLUTION SL

If you are working on an existing business, write down your current solution first, fill in the canvas, and check how much it fits reality.
If you are working on a new business proposition, then keep it blank until you fill in the canvas and come up with a solution that fits within customer limitations, solves a problem and matches customer behaviour.

Design a predictor with the help of the data collected, and ensure that it is accurate/ reliable. Also make sure that the data collected from the users is safe and secure.

8. CHANNELS of BEHAVIOUR CH

8.1 ONLINE
What kind of actions do customers take online? Extract online channels from #7

Customers might search for reliable eligibility predictors that are available online and rate them based on their liking.

8.2 OFFLINE
What kind of actions do customers take offline? Extract offline channels from #7 and use them for customer development.

Users would feel that they are in complete control in the admission process since they can wholeheartedly trust the predictor.

Students would discuss amongst their peer group about such predictors and if they find one to be reliable enough, they would spread the word about it.

Identify strong TR & EM

Fig. 3.3 Problem Solution fit

CHAPTER 4
REQUIREMENT ANALYSIS

Requirements analysis, also called requirements engineering, is the process of determining user expectations for a new or modified product. These features, called requirements, must be quantifiable, relevant and detailed. In software engineering, such requirements are often called functional specifications. Requirements analysis is critical to the success or failure of a systems or software project. The requirements should be documented, actionable, measurable, testable, traceable, related to identified business needs or opportunities, and defined to a level of detail sufficient for system design.

4.1 Functional requirement

- prediction
- input form
- percentage of chance

Following are the functional requirements of the proposed solution:

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 Login	Login using Credentials
FR-4	Search	Get University Details
FR-5	User Details	Enter the Marks scored HSC/Diploma score GRE score TOEFL score GATE score IELTS score CGPA etc
FR-6	Analysis	Bring in Dataset (Entrance score, Grade)
FR-7	Results	The list of universities is filtered based on the eligibility of the students where the order of the list will be based on the ratings of the university.

4.2 Non-Functional requirements

- Speed
- Security
- Portability
- Compatibility
- Capacity
- Reliability
- Environment
- Localization

Following are the non-functional requirements of the proposed solution:

FR NO.	Non-Functional Requirement	Description
NFR-1	Usability	Filters the universities based on the user profile.
NFR-2	Security	Two step verification for user's data security.
NFR-3	Reliability	The users can find universities based on their preferred location and results.
NFR-4	Performance	The website will provide the list of universities within 30 seconds.
NFR-5	Availability	Can be accessed at anytime from anywhere with feasible internet facility.
NFR-6	Scalability	This application will increase workload without Performance degradation. This application will predict eligibility even for the students from nook and corner.

CHAPTER 5

PROJECT DESIGN

5.1 Data Flow Diagrams

A Data Flow Diagram (DFD) is a traditional visual representation of the information flows within a system. A neat and clear DFD can depict the right amount of the system requirement graphically. It shows how data enters and leaves the system, what changes the information, and where data is stored

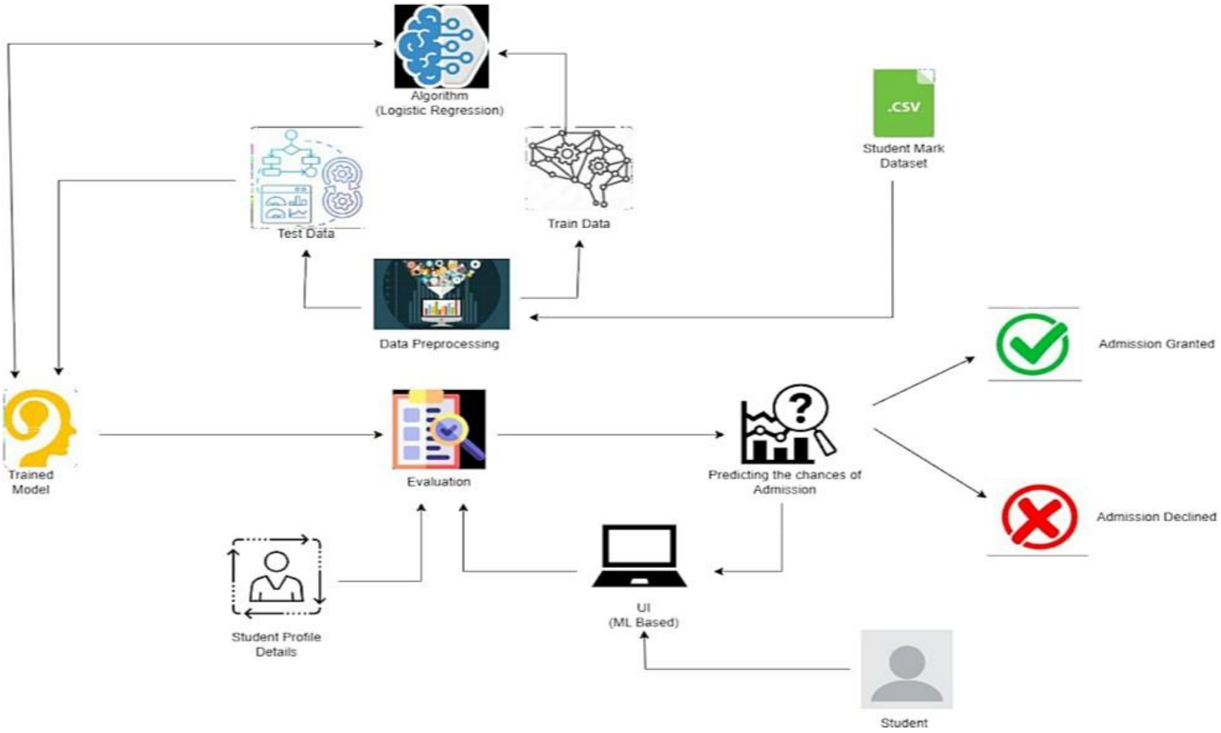


Fig. 5.1 Data Flow Diagrams

5.2 Solution & Technical Architecture

Solution architecture is a complex process – with many sub-processes – that bridges the gap between business problems and technology solutions. Its goals are to:

- Find the best tech solution to solve existing business problems.
- Describe the structure, characteristics, behavior, and other aspects of the software to project stakeholders.
- Define features, development phases, and solution requirements.

Provide specifications according to which the solution is defined, managed, and delivered.

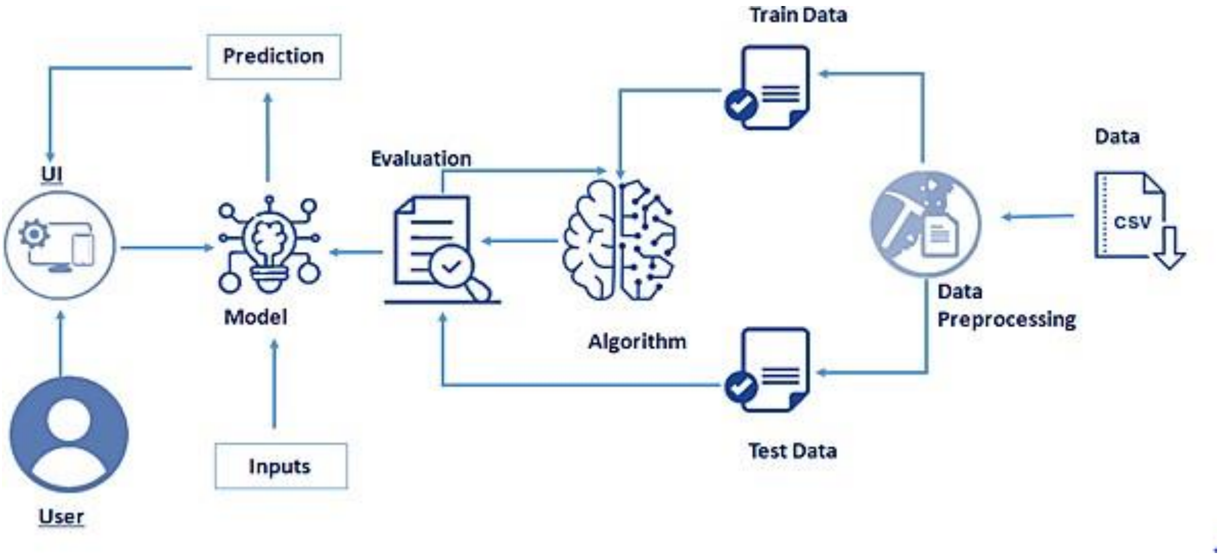


Fig. 5.2 Solution & Technical Architecture

Table-1: Components & Technologies:

S.NO.	Component	Description	Technology
1.	User Interface	How user interacts with application	HTML, CSS
2.	Application Logic-1	Logic for a process in the application	Python
3.	Application Logic-2	Logic for a process in the application	IBM Watson STT service
4.	Application Logic-3	Logic for a process in the application	IBM Watson Assistant
5.	Database	Data Type (CSV FILE)	Kaggle website
6.	Model of the data	Building model of the data	Machine learning
7.	Libraries	Import libraries into data set	Pandas, Seaborn, Matplotlib, Numpy
8.	Training and testing data	Purpose of data training and testing	Regression ,Classification, clusteringAlgorithms , SK learn
9.	Testing Data	Tests data using Agile methodology	Agile methodology
10.	Accuracy	Accuracy of the tested and trained data	Mean_squared_error, Mean_absolute_error
11.	Infrastructure (Server)	Application Deployment on Local System	Local

Table-2: Application Characteristics:

S.NO.	Characteristics	Description	Technology
1.	Open-Source Frameworks	List the open-source frameworks used	Flask framework
2.	CSV file	Importing CSV file	Pandas
3.	Data visualization	Perform data visualization	Matplot(pie charts,histograms)
4.	Testing and Training	Create testing and training for the dataset	Technology used standardScaler, MinMaxScaler
5.	Performance	Design consideration for the performance of the application	Technology used IBM wastson

5.3 User Stories

A user story is an informal, natural language description of features of a software system. Theyare written from the perspective of an end user or user of a system, and may be recorded on index cards, Post-it notes, or digitally in project management software. Depending on the project, user stories may be written by different stakeholders like client, user, manager, or development team.

Use the below template to list all the user stories for the product.

User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria	Priority	Release
Customer (Web user)	Registration	USN-1	As a user, I can register for the application by entering my email, password, and confirming my password.	I can access my account / dashboard.	High	Sprint-1
		USN-2	As a user, I will receive confirmation email once I have registered for the application.	I can receive confirmation email & click confirm.	High	Sprint-1
		USN-3	As a user, I can register for the application through Facebook.	I can register & access the dashboard with Facebook Login.	Low	Sprint-2
		USN-4	As a user, I can register for the application through Gmail.	I can register and access the dashboard.	Medium	Sprint-1
	Login	USN-5	As a user, I can log into the application by entering email & password.	I can access various pages.	High	Sprint-1
	Dashboard	USN-6	As a user, I can search for various universities.	I can access several pages.	High	Sprint-1
	Search	USN-7	As a user, I can search for universities with different field.	I can receive information related to universities on various locations	High	Sprint-2
	View	USN-8	As a user, I can view the University details.	I will get the information on seat availability, eligibility criteria.	High	Sprint-2
	Receive notification	USN-9	As a user, I will receive notifications about the Suggested universities based on student marks.	I will get frequent updates of the preferred universities.	Low	Sprint-2
	Chat with expert	USN-10	As a user, I can chat with the expert for clarifications.	I can clear my doubts through chat with expert option.	Medium	Sprint-2
Admin	Analysis	USN-11	As an admin, I will analyse the given dataset.	I can analyse the dataset.	High	Sprint-2
	Predict	USN-12	As an admin, I will predict the admission.	I can predict eligibility for admission.	High	Sprint-2

CHAPTER 6

PROJECT PLANNING & SCHEDULING

6.1 Sprint Planning & Estimation

Sprint	Functional Requirement(Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-1	Registration	USN-1	As a user, I can register for the application by entering my email, password, and confirming my password	3	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-1	Login	USN-3	As a user, I can log into the application by entering email & password.	4	High	4
Sprint-1	Update Profile	USN-4	As a user, after logging in, I will have to update my profile by providing all the required details.	3	High	3
Sprint-3	Choose University	USN-5	As a user, I will be able to view the list of universities that the students are eligible to apply.	1	High	1
Sprint-3	Choose Course	USN-6	As a user, I will be able to view the list of courses that the students are eligible to apply.	3	Medium	3
Sprint-4	Admission Process	USN-7	As a user, I will be able to view the details of Admission process like date and venue of certification verification.	4	Low	4
Sprint-1	Authentication	USN-8	As a admin, the login credential of the user is authenticated my me.	3	High	3
Sprint-2	Update Profile	USN-9	As a admin, I can verify the user entered details.	2	High	2
Sprint-3	Prediction	USN-10	As a admin, I can test the trained ML model by analyzing the user details by ML algorithms like Logistic Regression.	2	High	2
Sprint-4	Output	USN-11	As a admin, I can upload the confirmation of user for the prediction into the Database.	3	High	3

6.2 Sprint Delivery Schedule

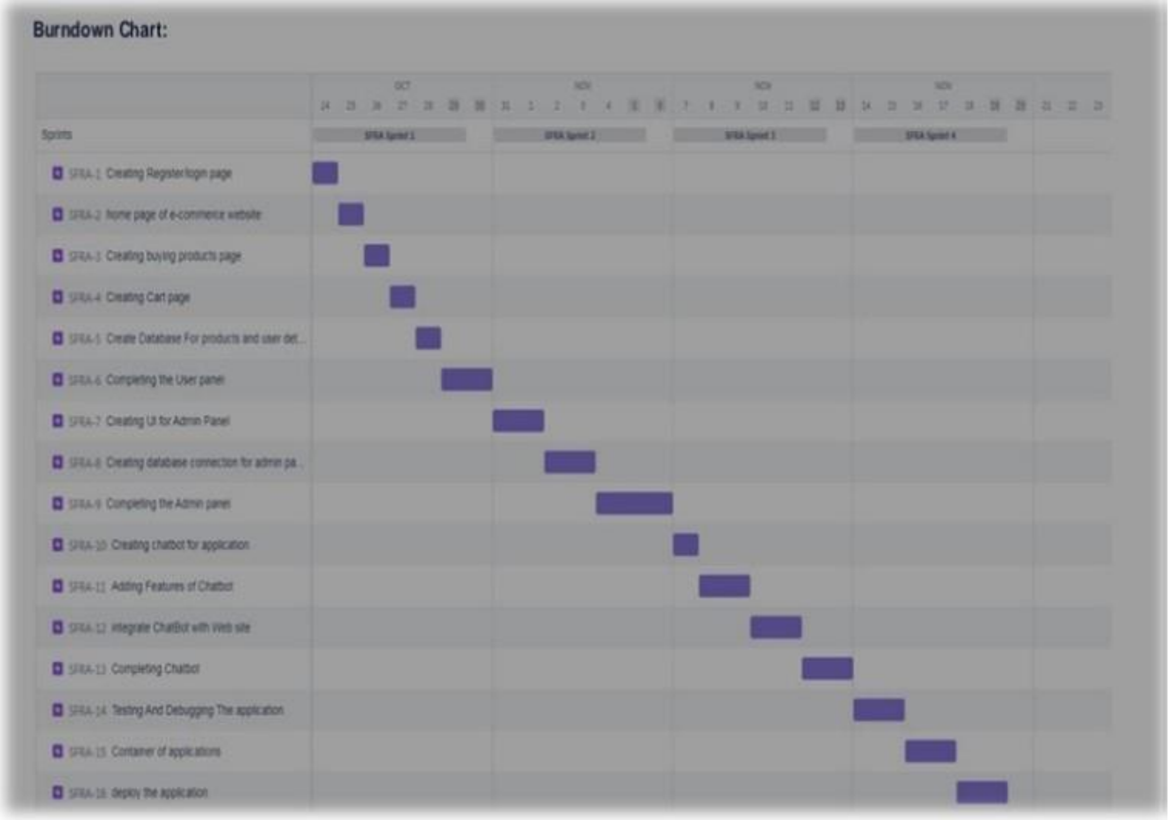
Sprint	Total Story Points	Duration	Sprint Start Date	Sprint End Date (Planned)	Story points Completed (as on Planned End Date)	Sprint Release Date (Actual)
Sprint-1	20	6 Days	24 Oct 2022	29 Oct 2022	20	29 Oct 2022
Sprint-2	20	6 Days	31 Oct 2022	05 Nov 2022	20	05 Nov 2022
Sprint-3	20	6 Days	07 Nov 2022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

Velocity:

Imagine we have 10-day sprint duration, and the velocity of the team is 20 (points per sprint). Let’s calculate the team’s average velocity (AV) per iteration unit (story points per day)

$$AV = \frac{sprint\ duration}{velocity} = \frac{20}{10} = 2$$

6.3 Reports from JIRA



Burndown Chart:

Sprints

- SFRA-1 Creating Register/login page
- SFRA-2 home page of e-commerce website
- SFRA-3 Creating buying products page
- SFRA-4 Creating Cart page
- SFRA-5 Create Database For products and user det...
- SFRA-6 Completing the User panel
- SFRA-7 Creating UI for Admin Panel
- SFRA-8 Creating database connection for admin pa...
- SFRA-9 Completing the Admin panel
- SFRA-10 Creating chatbot for application
- SFRA-11 Adding Features of Chatbot
- SFRA-12 integrate ChatBot with Web site
- SFRA-13 Completing Chatbot
- SFRA-14 Testing And Debugging The application
- SFRA-15 Container of applications
- SFRA-16 deploy the application

BURNDOWN CHART

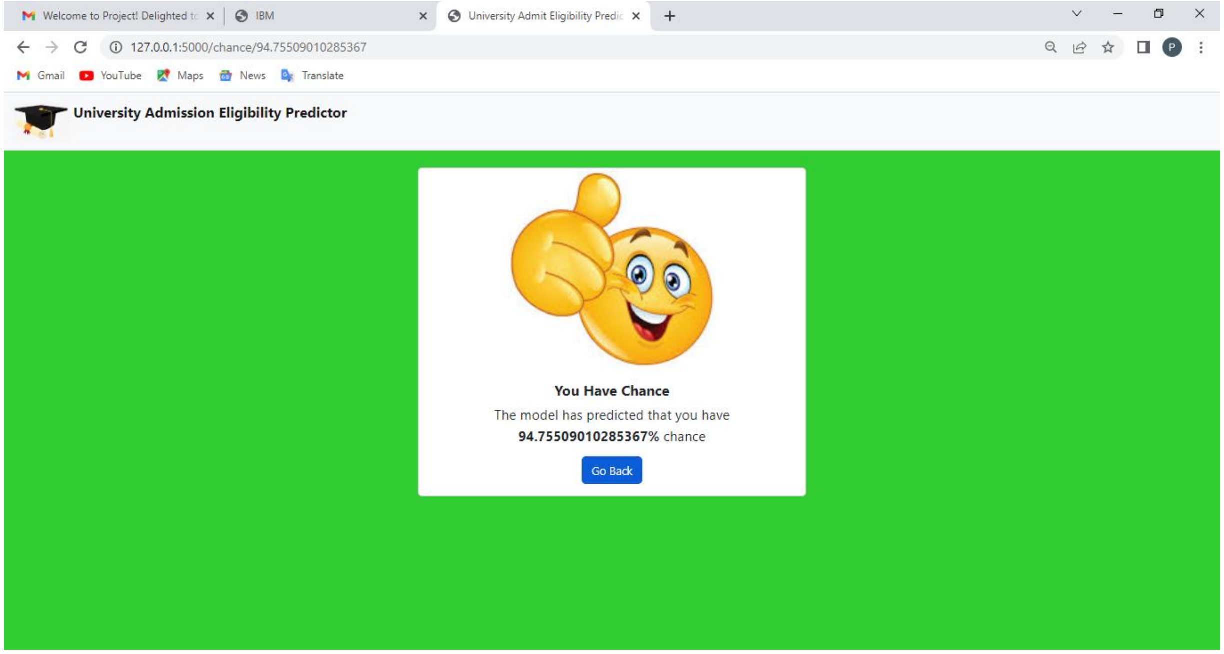
Fig. 6.1 Reports from JIRA

CHAPTER 7

CODING & SOLUTIONING

7.1 Feature 1

The new feature will predict the chances in the admission of the university. The feature was designed in the html code connected with app.py as the backend


Welcome to Project! Delighted tc
IBM
University Admit Eligibility Predic
127.0.0.1:5000/chance/94.75509010285367
Gmail
YouTube
Maps
News
Translate
P

University Admission Eligibility Predictor

You Have Chance

The model has predicted that you have **94.75509010285367%** chance

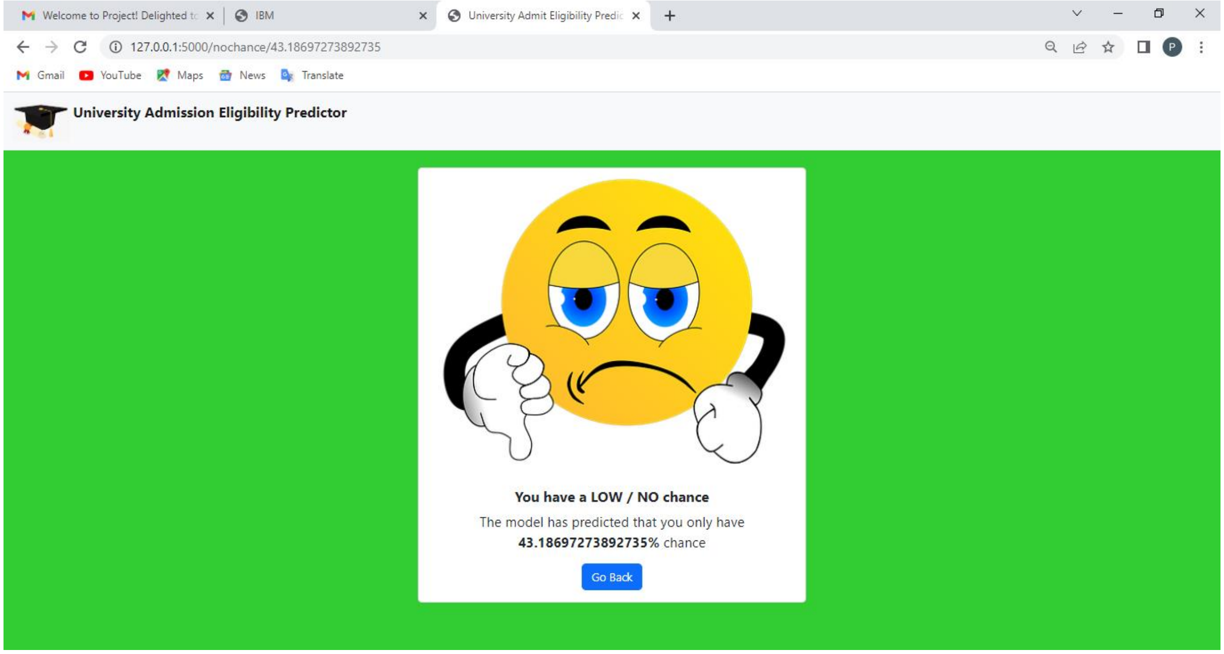
Go Back

Source Code:

```
{% 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;">
            <img src="/static/images/chance.jpeg" class="card-img-top" alt="...">
            <div class="card-body">
                <h5 class="card-title"style="font-weight:bold;">You Have Chance</h5>
                <p class="card-text">The model has predicted that you have
<strong>{{content[0]}}%</strong> chance</p>
                <a href="/home" class="btn btn-primary">Go Back</a>
            </div>
        </div>
    </div>
</div>

{% endblock %}
```

7.2 Feature 2

The new feature will predict the low chances in the admission of the university. The feature was designed in the html code connected with app.py as the backend.


Welcome to Project! Delighted t
IBM
University Admit Eligibility Predic
127.0.0.1:5000/nochance/43.18697273892735
Gmail
YouTube
Maps
News
Translate
Go Back

University Admission Eligibility Predictor

You have a LOW / NO chance

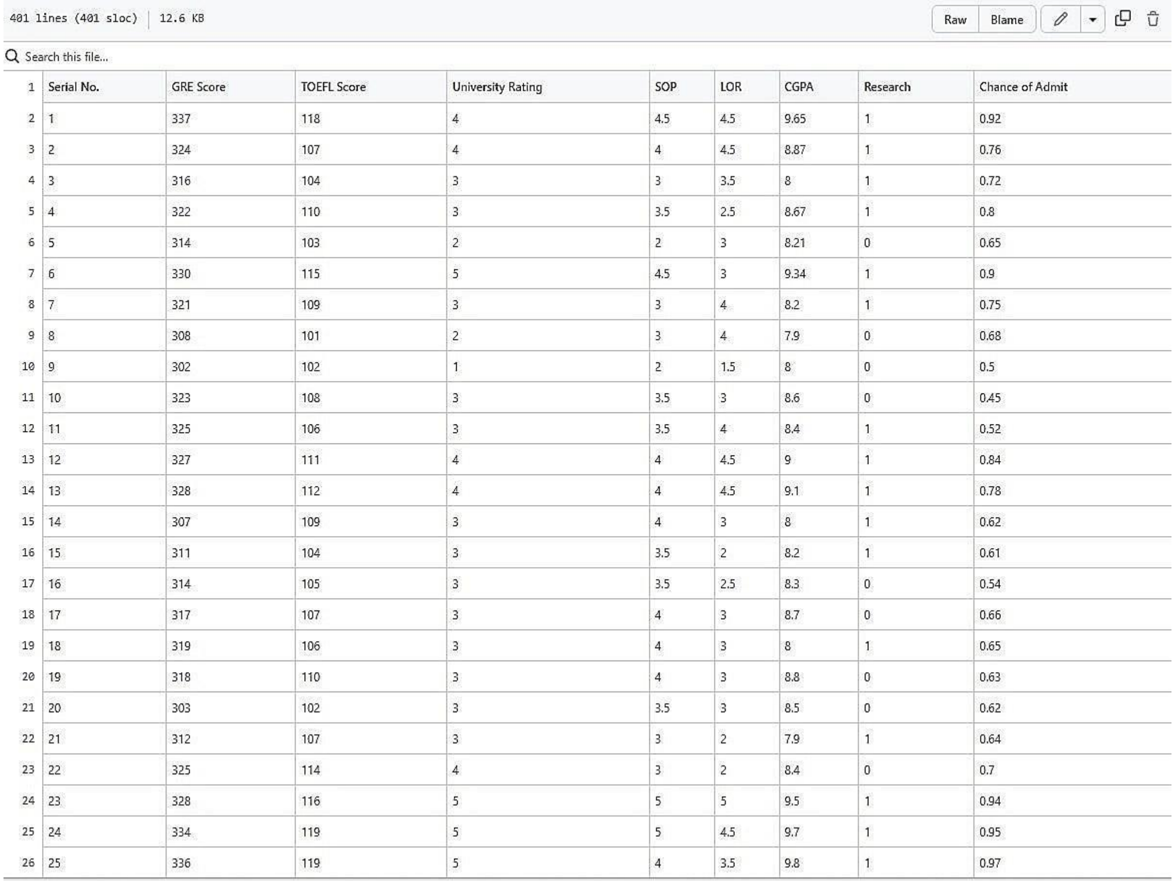
The model has predicted that you only have **43.18697273892735%** chance

Source Code:

```
{% 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;">
            <img src="/static/images/nochance.webp" class="card-img-top" alt="...">
            <div class="card-body">
                <h5 class="card-title"style="font-weight:bold;">You have a LOW / NO chance</h5>
                <p class="card-text">The model has predicted that you only have <strong>{{content[0]}}%</strong> chance</p>
                <a href="/home" class="btn btn-primary">Go Back</a>
            </div>
        </div>
    </div>
</div>


{% endblock %}
```

7.3 Database Schema

The database used here in this project was Admission_Predict.csv. The sample screenshot of thedatabase are,



Serial No.	GRE Score	TOEFL Score	University Rating	SOP	LOR	CGPA	Research	Chance of Admit
1	337	118	4	4.5	4.5	9.65	1	0.92
2	324	107	4	4	4.5	8.87	1	0.76
3	316	104	3	3	3.5	8	1	0.72
4	322	110	3	3.5	2.5	8.67	1	0.8
5	314	103	2	2	3	8.21	0	0.65
6	330	115	5	4.5	3	9.34	1	0.9
7	321	109	3	3	4	8.2	1	0.75
8	308	101	2	3	4	7.9	0	0.68
9	302	102	1	2	1.5	8	0	0.5
10	323	108	3	3.5	3	8.6	0	0.45
11	325	106	3	3.5	4	8.4	1	0.52
12	327	111	4	4	4.5	9	1	0.84
13	328	112	4	4	4.5	9.1	1	0.78
14	307	109	3	4	3	8	1	0.62
15	311	104	3	3.5	2	8.2	1	0.61
16	314	105	3	3.5	2.5	8.3	0	0.54
17	317	107	3	4	3	8.7	0	0.66
18	319	106	3	4	3	8	1	0.65
19	318	110	3	4	3	8.8	0	0.63
20	303	102	3	3.5	3	8.5	0	0.62
21	312	107	3	3	2	7.9	1	0.64
22	325	114	4	3	2	8.4	0	0.7
23	328	116	5	5	5	9.5	1	0.94
24	334	119	5	5	4.5	9.7	1	0.95
25	336	119	5	4	3.5	9.8	1	0.97

CHAPTER 8
TESTING

8.1 Test Cases

Test Case Analysis

This report shows the number of test cases that have passed, failed, and untested

Section	Total Cases	Not Tested	Fail	Pass
Print Engine	7	0	0	7
Client Application	51	0	0	51
Security	2	0	0	2
Outsource Shipping	3	0	0	3
Exception Reporting	9	0	0	9
Final Report Output	4	0	0	4
Version Control	2	0	0	2

8.2 User Acceptance Testing

- **Purpose of Document**

The purpose of this document 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).

- **Defect Analysis**

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

Resolution	Severity 1	Severity 2	Severity 3	Severity 4	Subtotal
By Design	10	4	2	3	19
Duplicate	0	0	0	0	0
External	2	3	0	1	6
Fixed	11	2	4	20	37
Not Reproduced	0	0	0	0	0
Skipped	0	0	1	1	2
Won't Fix	0	0	0	0	0
Totals	24	14	13	26	64

Test Case Analysis

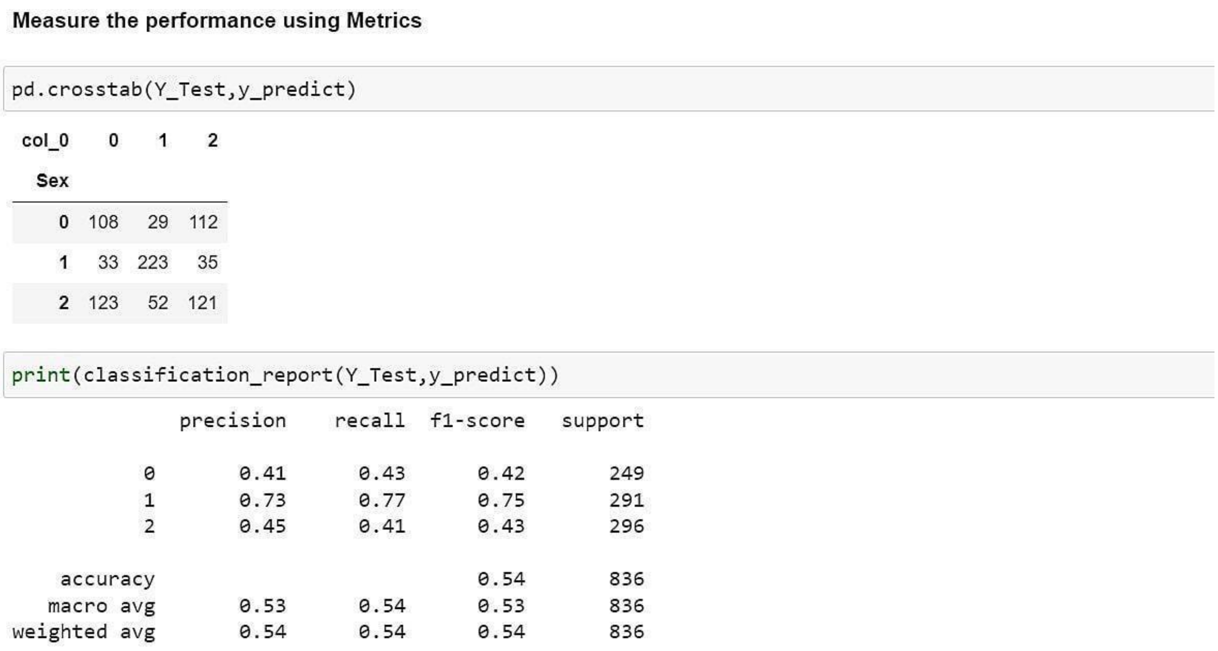
This report shows the number of test cases that have passed, failed, and untested

Section	Total Cases	Not Tested	Fail	Pass
Print Engine	7	0	0	7
Client Application	51	0	0	51
Security	2	0	0	2
Outsource Shipping	3	0	0	3
Exception Reporting	9	0	0	9
Final Report Output	4	0	0	4
Version Control	2	0	0	2

CHAPTER 9

RESULTS

9.1 Performance Metrics



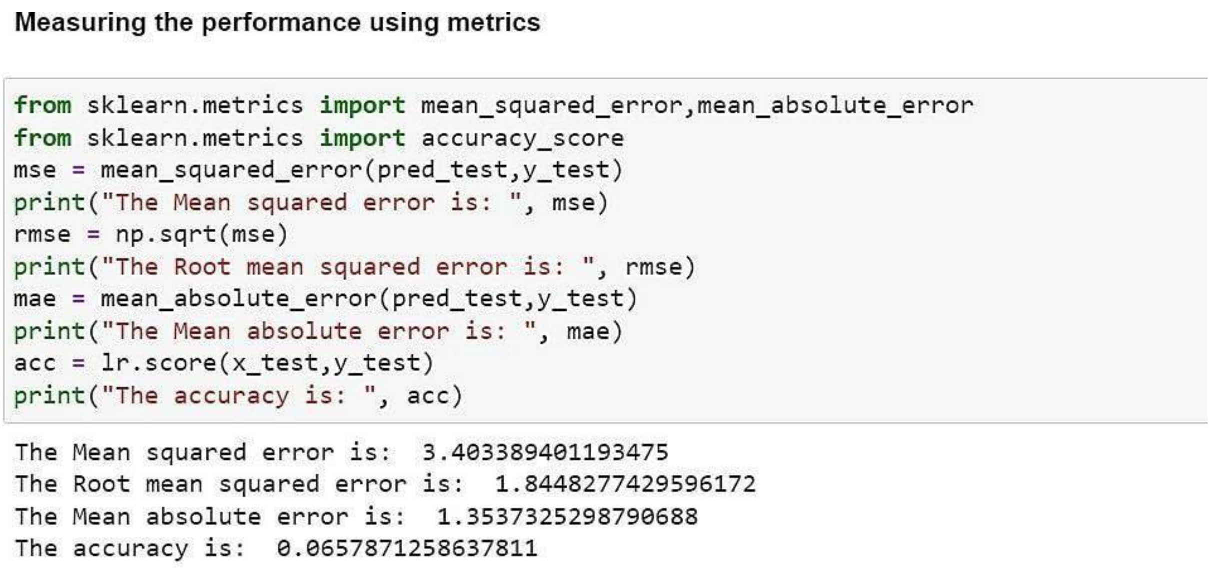
Measure the performance using Metrics

```
pd.crosstab(Y_Test,y_predict)
```

col_0 Sex	0	1	2
0	108	29	112
1	33	223	35
2	123	52	121

```
print(classification_report(Y_Test,y_predict))
```

```
              precision    recall  f1-score   support

           0       0.41      0.43      0.42       249
           1       0.73      0.77      0.75       291
           2       0.45      0.41      0.43       296

    accuracy                           0.54       836
   macro avg       0.53      0.54      0.53       836
weighted avg       0.54      0.54      0.54       836
```



Measuring the performance using metrics

```
from sklearn.metrics import mean_squared_error,mean_absolute_error
from sklearn.metrics import accuracy_score
mse = mean_squared_error(pred_test,y_test)
print("The Mean squared error is: ", mse)
rmse = np.sqrt(mse)
print("The Root mean squared error is: ", rmse)
mae = mean_absolute_error(pred_test,y_test)
print("The Mean absolute error is: ", mae)
acc = lr.score(x_test,y_test)
print("The accuracy is: ", acc)
```

```
The Mean squared error is:  3.403389401193475
The Root mean squared error is:  1.8448277429596172
The Mean absolute error is:  1.3537325298790688
The accuracy is:  0.0657871258637811
```

CHAPTER 10
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

- Significiant investments required
- Inable to capture changes
- Privacy concerns
- Required active internet connection.
- System will provide inaccurate results if data entered incorrectly

CHAPTER 11

CONCLUSION

This system ,being the first we have created in Python using ML algorithms and other front endlanguages such as html, css, java script , has proven more difficult than originally imagined.While it may sound simple to fill out a few forms and process the information, much more is involved in the selection of applicants than this. Every time progress was made and features wereadded, ideas for additional features or methods to improve the usability of the system madethemselves apparent. Furthermore, adding one feature meant that another required feature wasnow possible, and balancing completing these required features with the ideas for improvementas well as remembering everything that had to be done was a project in itself. Debugging cansometimes be a relatively straight forward process, or rather than finding out what you mustdebug can be. Since so many parts of the admissions system are integrated into one another, if anerror occurs on one page, it may be a display error, for example; it may be the information is not correctly read from the database; or even that the information is not correctly stored in the database initially, and all three must be checked on each occasion. This slows down the processand can be frustrating if the apparent cause of a problem is not obvious at first. Language usedmust be simple and easy to understand and compatibility is paramount. If this system were not designed as an entirely web based application, it would not have been possible to recreate its current state of portability. Overall, the system performs well, and while it does not include all ofthe features that may have been desired, it lives up to initial expectations. The majority of features that are included work flawlessly and the errors that do exist are minor or graphical..

CHAPTER 12
FUTURE SCOPE

The future scope of this project is very broad. Few of them are:

- This can be implemented in less time for proper admission process.
- This can be accessed anytime anywhere, since it is a web application provided only aninternet connection.
- The user had not need to travel a long distance for the admission and his/her time isalso saved as a result of this automated system..

CHAPTER 13
APPENDIX

13.1 Source Code

chance.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;">
            <img src="/static/images/chance.jpeg" class="card-img-top" alt="...">
            <div class="card-body">
                <h5 class="card-title"style="font-weight:bold;">You Have Chance</h5>
                <p class="card-text">The model has predicted that you have
<strong>{{content[0]}}%</strong> chance</p>
                <a href="/home" class="btn btn-primary">Go Back</a>
            </div>
        </div>
    </div>
</div>

{% endblock %}
```

demo2.html

```
    {% extends 'index.html' %}
    {% block body %}
        <div class="p-4">
            <div class="row mb-3">
                <div class="col-4">
                    <h2 class="text-responsive-h"style="font-weight:bold;">
                        <p align="justify">
                            Enter your details and get probability of your admission
                        </p>
                    </h2>
                    <p class="text-responsive">
```

```
          <p align="justify">
            Students are often worried about their chances of admission to University.
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.
          </p>
        </p>
        <div class="d-flex justify-content-right">
          <img src="/static/images/anime.jpg" class="card-img-top" alt="..." />
        </div>
        </div>
      <div class="col-8">
        <div class="card p-2 ms-2 my-2">
          <div class="card-body">
            <h5 class="card-title pb-4">
              Enter the details
            </h5>
            <form action="/" method="post" id="theForm">
              <div class="row mb-3">
                <label for="gre" class="col-lg-2 col-form-label">GRE
Score:</label>
                <div class="col-lg-10">
                  <input type="number" class="form-control" id="gre" name="gre"
min="250" max="340" required>
                </div>
              </div>
              <div class="row mb-3">
                <label for="tofel" class="col-lg-2 col-form-label">TOFEL
Score:</label>
                <div class="col-lg-10">
                  <input type="number" class="form-control" id="tofel"
name="tofel" min="50" max="120" required>
                </div>
              </div>
              <div class="row mb-3">
                <label for="university_rating" class="col-lg-2 col-form-
label">University Rating:</label>
```

```
    <div class="col-lg-10">
        <input type="number" class="form-control" id="university_rating" step="0.01" name="university_rating" min="1" max="5" required>
    </div>
</div>
<div class="row mb-3">
    <label for="sop" class="col-lg-2 col-form-label">SOP:</label>
    <div class="col-lg-10">
        <input type="number" class="form-control" id="sop" name="sop" step="0.01" min="1" max="5" required>
    </div>
</div>
<div class="row mb-3">
    <label for="lor" class="col-lg-2 col-form-label">LOR:</label>
    <div class="col-lg-10">
        <input type="number" class="form-control" id="lor" name="lor" step="0.01" min="1" max="5" required>
    </div>
</div>
<div class="row mb-3">
    <label for="cgpa" class="col-lg-2 col-form-label">CGPA:</label>
    <div class="col-lg-10">
        <input type="number" class="form-control" id="cgpa" name="cgpa" step="0.01" min="5" max="10" required>
    </div>
</div>
<fieldset class="row mb-3">
    <legend class="col-form-label col-sm-2 pt-0">Research:</legend>
    <div class="col-sm-10">
        <div class="form-check">
            <input class="form-check-input" type="radio" name="yes_no_radio" id="gridRadios1" value="1">
            <label class="form-check-label" for="yes_no_radio">
            Yes
            </label>
        </div>
        <div class="form-check">
```

```
                    <input class="form-check-input" type="radio"
name="yes_no_radio" id="gridRadios2" value="0" checked>
                    <label class="form-check-label" for="yes_no_radio">
                    No
                    </label>
                  </div>
                </div>
              </fieldset>
              <div class="row lg-3">
                <div class="col-lg-2 mb-2 me-3">
                  <button type="submit" class="btn btn-primary"
id="button">Predict</button>
                </div>
                <div class="col-lg-2" id="spinner">
                  <div class="spinner-border text-primary m-1" role="status">
                    <span class="visually-hidden">Loading...</span>
                  </div>
                  <div class="spinner-grow text-primary m-1" role="status">
                    <span class="visually-hidden">Loading...</span>
                  </div>
                </div>
            </form>
          </div>
        </div>
      </div>
    </div>
  </div>
{% endblock %}
```

index.html

```
<!DOCTYPE html>
<html lang="en">
<head>
  <meta charset="UTF-8">
```

```
    <meta http-equiv="X-UA-Compatible" content="IE=edge">
    <meta name="viewport" content="width=device-width, initial-scale=1.0">
    <meta name="viewport" content="width=device-width, initial-scale=1, maximum-scale=1, user-scalable=no">
    <link rel="stylesheet" type="text/css" rel="noopener" target="_blank" href="/static/css/style.css">
    <link href="https://cdn.jsdelivr.net/npm/bootstrap@5.2.2/dist/css/bootstrap.min.css" rel="stylesheet" integrity="sha384-Zenh87qX5JnK2Jl0vWa8Ck2rdkQ2Bzep5IDxbcnCeuOxjzrPF/et3URy9Bv1WTRi" crossorigin="anonymous">
    <script type="text/javascript" src="/static/js/script.js" async></script>
    <title>University Admit Eligibility Predictor</title>
</head>
<body>
    <nav class="navbar navbar-expand-lg bg-light">
        <div class="container-fluid">
            <a class="navbar-brand text-responsive-h" href="/" style="font-weight:bold;">
                <img src="/static/images/hat.png" alt="Logo" width="80" height="60" class="d-inline-block align-text-top " >
                University Admission Eligibility Predictor
            </a>
        </div>
    </nav>
    {% block body %}
    <h1> Index Page </h1>
    {% endblock %}
    <script src="https://cdn.jsdelivr.net/npm/bootstrap@5.2.2/dist/js/bootstrap.bundle.min.js" integrity="sha384-OERcA2EqjJCMA+/3y+gxIOqMEjwtxJY7qPCqsdltbNJuaOe923+mo//f6V8Qbsw3" crossorigin="anonymous"></script>
</body>
</html>
```

nochance.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;">
            <img src="/static/images/nochance.webp" class="card-img-top" alt="...">
            <div class="card-body">
                <h5 class="card-title"style="font-weight:bold;">You have a LOW / NO chance</h5>
                <p class="card-text">The model has predicted that you only have <strong>{{content[0]}}%</strong> chance</p>
                <a href="/home" class="btn btn-primary">Go Back</a>
            </div>
        </div>
    </div>
</div>


{% endblock %}
```

style.css

```
* {
    margin: 0;
    padding: 0;
    border: 0;
}


body {
    font: 62.5%/1.5  "Lucida Grande", "Lucida Sans", Tahoma, Verdana, sans-serif;
    background: #32CD32;
    background: -webkit-linear-gradient(to right, #32CD32, #32CD32);
    background: linear-gradient(to right, #32CD32, #32CD32);
    color: #000000;
    text-align:center;
}

h1 {
    font-size: 2.2em;
}

h2 {
    font-size: 2.0em;
}

h4 {
    font-size: 1.6em;
}

p {
    font-size: 1.2em;
}

input.text {
  padding: 3px;
  border: 1px solid #999999;
}

img {
    max-width: auto;
    height: auto;
}

.text-responsive {
    font-size: calc(50% + 0.6vw + 0.6vh);
}

.text-responsive-h {
    font-size: calc(80% + 0.6vw + 0.6vh);
}
```

Script.js

```
const button = document.getElementById('button');
const theForm = document.getElementById('theForm');
const loading = document.getElementById('spinner');

const disableButton = () => {
    console.log('Submitting form...');
    button.disabled = true;
    button.className = "btn btn-outline-primary";
    button.innerHTML = "Predicting..."
    loading.style.display = "block"
};

const enableButton = () => {
    console.log('Loading window...');
    button.disabled = false;
    button.className = "btn btn-primary"
    button.innerHTML = "Predict"
    loading.style.display = "none"
}

theForm.onsubmit = disableButton;

window.onload = enableButton;
```

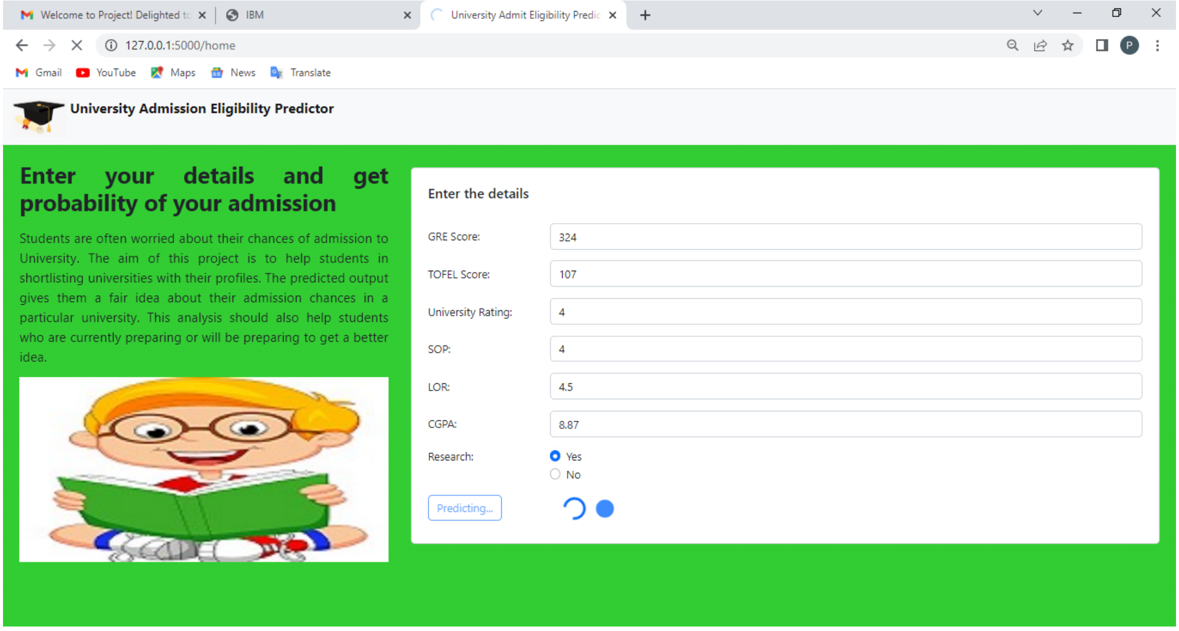
app.py

```
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))

        API_KEY = "eK3IXPY0HTZKGHJasg6AadAO7Ee0me5RxqLrDktQiJqq"
        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]
                      }]
                    }

      response_scoring = requests.post(
         'https://us-south.ml.cloud.ibm.com/ml/v4/deployments/e1fb85c2-8d6e-4180-8b0c-
e8b1410ab1d0/predictions?version=2022-11-23',
         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("demo2.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("nochance.html", content=[percent])

@app.route('/<path:path>')
def catch_all():
    return redirect(url_for("demo2"))

if __name__ == "__main__":
    app.run(debug=True)
```

Output Images:



Welcome to Project! Delighted t
IBM
University Admit Eligibility Predic
127.0.0.1:5000/home
Gmail
YouTube
Maps
News
Translate

University Admission Eligibility Predictor

Enter your details and get probability of your admission

Students are often worried about their chances of admission to University. 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.

Enter the details

GRE Score: 324

TOFEL Score: 107

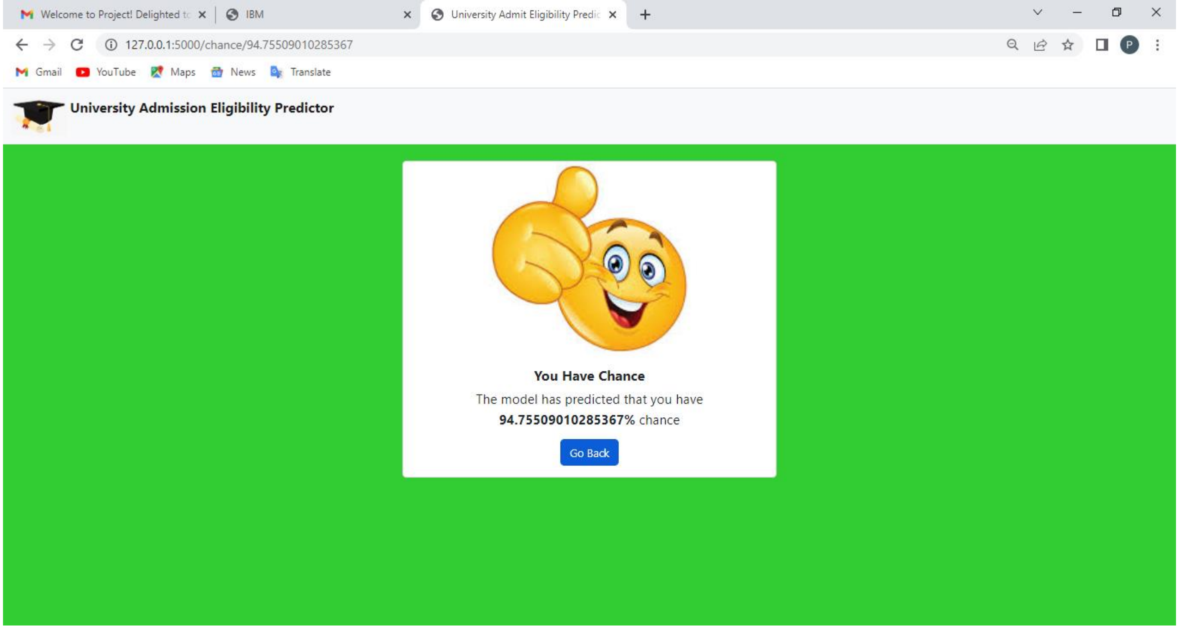
University Rating: 4

SOP: 4

LOR: 4.5

CGPA: 8.87

Research: ● Yes ○ No

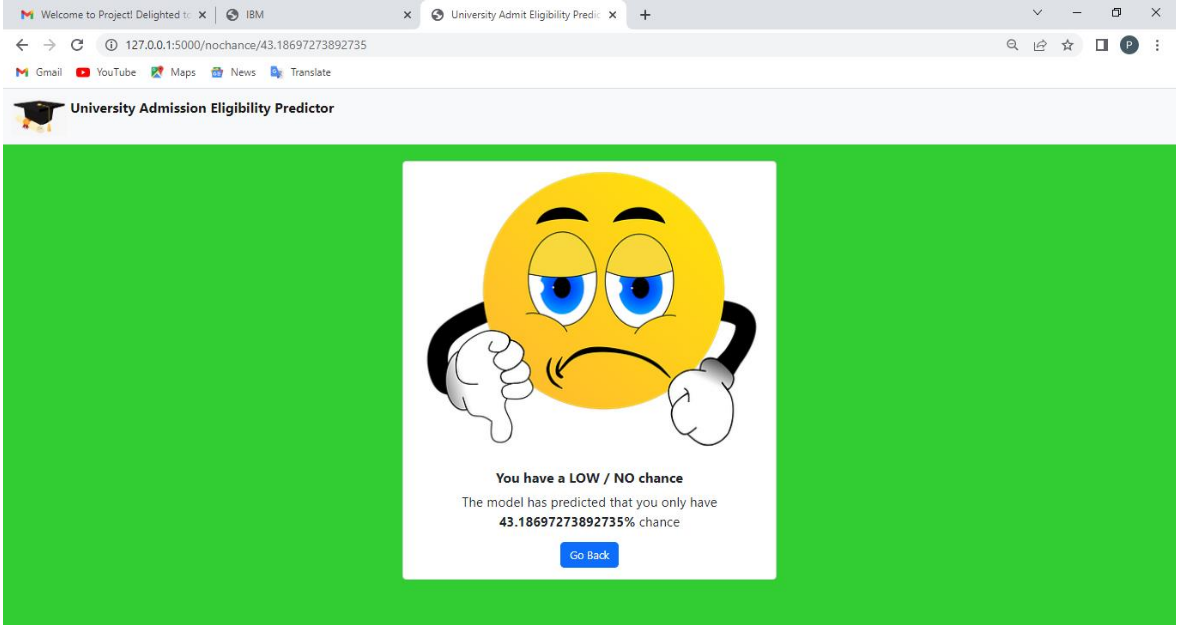


Welcome to Project! Delighted t
IBM
University Admit Eligibility Predic
127.0.0.1:5000/chance/94.75509010285367
Gmail
YouTube
Maps
News
Translate

University Admission Eligibility Predictor

You Have Chance

The model has predicted that you have **94.75509010285367%** chance


Welcome to Project! Delighted t
IBM
University Admit Eligibility Predic
127.0.0.1:5000/nochance/43.18697273892735
Gmail
YouTube
Maps
News
Translate
Go Back

University Admission Eligibility Predictor

You have a LOW / NO chance

The model has predicted that you only have **43.18697273892735%** chance

13.2 GitHub & Project Demo Link

GitHub Link:

https://github.com/IBM-EPBL/IBM-Project-54997-1663329688.git

Project Demo Link:

https://drive.google.com/file/d/1pNvnxLKVqJUGYp9s4QtYxH9MsJN6PVSG/view?usp=share_link