A PROJECT REPORT ON

<u>UNIVERSITY ADMIT ELIGIBILITY PREDICTOR</u>

Domain: Applied Data Science

Team ID: PNT2022TMID35768

College Name: Madras Institute of Technology

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1. INTRODUCTION

1.1. Project Overview

Student admission problem is very important in educational institutions. This project uses machine learning models to predict the chance of a student to be admitted to a master's program. This will assist students to know in advance if they have a chance to get accepted. The Machine learning model linear regression will be used to train the data of user details containing the GRE, TOEFL scores, etc and predict the chance of admit. This analysis which gives the predicted results, should also help students who are currently preparing for admissions to get a fair idea in advance about the chances of getting admitted in their dream universities.

1.2. Purpose

The world markets are developing rapidly and it creates a need for looking out for the best knowledge and experience among people. People who want to stand out, look for better universities for their degrees that can improve their skills. Student admission is a very common problem in educational institutions. Students are often worried about their chances of admission to university. The aim of this project is to help students in shortlisting universities for admission using their profile details. Newly graduate students usually are not knowledgeable of the requirements and the procedures of the postgraduate admission and might spent a considerable amount of money to get advice from consultancy organizations to help them identify their admission chances. Human consultant and calculations might be biased and inaccurate. Thus this project would help students to make better decisions by getting the prediction results.

2. LITERATURE SURVEY

2.1. Existing problem

Previous research done in this area used Naive Bayes algorithm which they evaluate the success probability of student application into a respective university but the drawback is they didn't consider all the factors which will contribute in the student admission process like TOEFL/IELTS, SOP, LOR and under graduate score. Bayesian Networks Algorithm have been used to create a decision support network for evaluating the application submitted by foreign students of the university. This model was developed to forecast the progress of prospective students by comparing the score of students currently studying at university. The model thus predicted whether the aspiring student can be admitted to university on the basis of various scores of students.

2.2. References

1. Thakur, Aanchal. (2020). University Admissions Predictor.

2. Aljasmi, Sara & Nassif, Ali & Shahin, Ismail & Elnagar, Ashraf. (2020). Graduate Admission Prediction Using Machine Learning. 14. 10.46300/91013.2020.14.13.

3. El Guabassi, Inssaf & Bousalem, Zakaria & Rim, Marah & Qazdar, Aimad. (2021). A Recommender System for Predicting Students' Admission to a Graduate Program using Machine Learning Algorithms. International Journal of Online and Biomedical Engineering (iJOE). 17. 135. 10.3991/ijoe.v17i02.20049.

4. Sharan Kumar, Paratala Rajagopal (2020) Predicting student university admission using logistic regression.

5. Jeevan Ratnakar, Koteswara rao, DurgaPrasanth Kumar, Prithvi, Venkata SaiEswar (2021) Graduate Admission Prediction using Machine Learning Techniques.

6. Vandit Manish Jain, Rihaan Satia (2021) College Admission Prediction using Ensemble Machine Learning Models.

7. Anil B, Akram Pasha, Aman Kumar Singh, Aditya Kumar Singh (2019) Multiple Machine Learning Classifiers for students admission into University.

8. Himanshu Sonawane (2017) Student Admission Predictor.

2.3. Problem Statement Definition

Many students are pursuing their education in other countries than their own in the modern day. Indian universities attracted the attention of the foreign students. Students from other nations make up a larger portion of the international student body. There has been a significant increase in foreign students studying in India. Each candidate must contend with fierce competition to get enrolled into their desired university due to the rise in the number of foreign students studying in India. The students typically seek assistance from education consultancy firms to help them successfully secure admission in the universities that are best suited for their profile because they have little knowledge of the procedures, requirements, and details of the universities in India. For this, they must invest a significant sum of money in the form of consultancy fees. There are a few websites and blogs that offer advice to students on the admissions process in addition to these education consultant organisations. Due to their scarcity and lack of dependability when it comes to accuracy and reliability, the resources that are now available have a few major drawbacks. The aim of this research is to develop a system using machine learning algorithms and to help students in shortlisting universities with their profiles. It will also assist them in determining the universities that are most appropriate for their profile and give them information about those universities.

3. IDEATION & PROPOSED SOLUTION

3.1. Empathy Map Canvas

What do they HEAR?
- what boss say
- what influencers say
- what friends say

- Cost of an education and student debt
- Dilemma
- Quick and easy way to choose their dream college
- Choose the best college
- confusion to chose suitable university
- Choose a trending stream
- Application process is vast and complex
- Find the best matched university
- People may start influencing on students
- Good hostel facilities
- College selection advices and ideas
- Lack of Guidance can make it hard for them to choose the career
- Gave worst selection advices and ideas
- Higher cutoff required
- Placement surely Guaranteed if we join certain college
- Advertisements of Universities
- The details provided by students must be valid information regarding them

What do they THINK AND FEEL?
- what really counts
- worries & aspirations
- major preoccupations

- Will it be a good start?
- Eligibility criteria is different for each university
- Will my efforts pay off
- Will I get my preferred college and branch
- Am I capable to compete and score good marks
- Enthusiastic
- Will my school friends join this college?

What do they SAY AND DO?
- attitude in public
- behavior towards others
- appearance

- Whether the Application Website is simple and satisfies the user needs or does it contain unwanted options
- Getting envious on seeing other's score
- Inform your kith and kin regarding your application
- Checking for the availability of all Universities
- Pretending to have an higher accuracy
- Feel down in dumps
- Can you guarantee the accuracy of the application?
- Double verification regarding the university and course
- On cloud nine

What do they SEE ?
- friends
- environment
- what the market offers

- Government may offer to make use of it for their university
- New Opportunities in abroad universities
- Paper based work during the time of an admission is a time consuming process
- Location of College
- An useful application for students
- We would have placed in this institution if we had this kind of admission process
- It is a time consuming process, stressful and error prone
- Reputation of the University and Rankings
- Companies Which come for recruiting the , median, package and alumni base
- Getting used with academic expectations
- People who excelled

PAIN
- Depression, Lack of energy or motivation, hopelessness, being overwhelmed, low self-esteem, homesickness loneliness during the process
- Change in hygiene and food habits
- Managing cultural differences
- Feeling homesick
- Problems in seat allotment
- When some of their friends join better universities
- If we don't get a seat in desired stream or university
- Hostel Curfews
- Unable to cope up with peers
- False application process
- Hundreds of admission teams are striving for the same student's attention

GAIN
- Good Placements
- Degree of Astonomy
- Based upon the historical data student can verify whether the profile is suitable or not
- Applicant doesn't meet with the academic thresholds. The types of courses that students take in high school and the grades they receive in those classes are the best indicators
- Pleasant college life to learn as well as to learn
- Model also provides analysis of scores versus chance of prediction
- Choosing college which shows its identify
- Economic Inequality, Racial inequality will not affect the admission

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3.2. Ideation & Brainstorming

1

Define your problem statement

What problem are you trying to solve? Frame your problem as a How Might We statement. This will be the focus of your brainstorm.

🕐 **5 minutes**

PROBLEM STATEMENT

The students typically seek assistance from education consultancy firms to help them successfully secure admission in the universities that are best suited for their profile. The aim of this research is to develop a system using machine learning algorithms and to help students in shortlisting universities with their profiles. It will also assist them in determining the universities that are most appropriate for their profile and give them information about those universities.

Brainstorm

Write down any ideas that come to mind that address your problem statement.

🕐 10 minutes

Sona S

obtain profile information that can contribute to chances of admission	collect datasets of profile of students already admitted into different universities	remove unwanted information from the dataset
build an user friendly page	collect the dream universities priority list	recommend universities that have high possibility of admission for given profile
find which factors contribute the most among all attributes	apply different ml models for training and find the best model to use for prediction	predict the cutoff of different scores for the universities to check for eligibility

Shangeeth R

Performing Data cleaning process to improve the data accuracy	Comparing the profiles of current students with those of newer students to provide suggestions	Prioritize college based on the student's academic perfomance
Creating a user friendly environment for college applications using a chat bot	Users will see pop up alerts and notifications for the top ranked colleges.	Predict the chance of a student getting admitted in a particular college
Consultation regarding the placement, internship and curriculum of the desired university	Getting suggestions/ reviews from currently enrolled students	Avoiding blocks of text as reply from chatbot and stick to the point.

Anika Lakshmi S

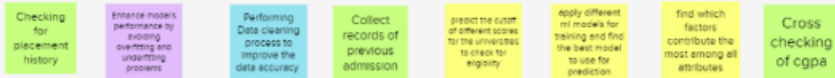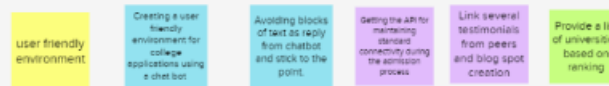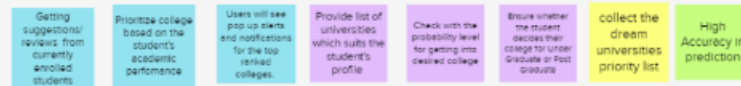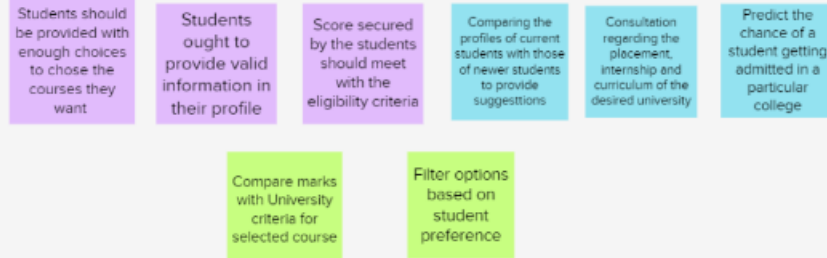|		
Score secured by the students should meet with the eligibility criteria	Enhance model's performance by avoiding overfitting and underfitting problems	Students should be provided with enough choices to chose the courses they want
Ensure whether the student decides their college for Under Graduate or Post Graduate	Students ought to provide valid information in their profile	Provide list of universities which suits the student's profile
Link several testimonials from peers and blog spot creation	Check with the probability level for getting into desired college	Getting the API for maintaining standard connectivity during the admission process

Indhumathi B

Cross checking of cgpa	Checking for placement history	Provide a list of universities based on ranking
Being aware from dealers	Compare marks with University criteria for selected course	High Accuracy in prediction
Filter options based on student preference	Collect records of previous admission	User friendly

③

Group ideas

Take turns sharing your ideas while clustering similar or related notes as you go.
In the last 10 minutes, give each cluster a sentence-like label. If a cluster is bigger
than six sticky notes, try and see if you and break it up into smaller sub-groups.

🕐 20 minutes

MODEL'S PERFORMANCE

Checking for placement history	Enhance model's performance by avoiding overfitting and underfitting problems	Performing Data cleaning process to improve the data accuracy	Collect records of previous admission	predict the cutoff of different scores for the universities to check for eligibility	apply different ml models for training and find the best model to use for prediction	find which factors contribute the most among all attributes	Cross checking of cgpa

WEB APPLICATION

user friendly environment	Creating a user friendly environment for college applications using a chat bot	Avoiding blocks of text as reply from chatbot and stick to the point.	Getting the API for maintaining standard connectivity during the admission process	Link several testimonials from peers and blog spot creation	Provide a list of universities based on ranking

TO MEET WITH USER NECESSITIES

Getting suggestions/ reviews from currently enrolled students	Prioritize college based on the student's academic performance	Users will see pop up alerts and notifications for the top ranked colleges.	Provide list of universities which suits the student's profile	Check with the probability level for getting into desired college	Ensure whether the student decides their college for Under Graduate or Post Graduate	collect the dream universities priority list	High Accuracy in prediction

SYSTEM ENHANCEMENT

Students should be provided with enough choices to chose the courses they want	Students ought to provide valid information in their profile	Score secured by the students should meet with the eligibility criteria	Comparing the profiles of current students with those of newer students to provide suggesttions	Consultation regarding the placement, internship and curriculum of the desired university	Predict the chance of a student getting admitted in a particular college

Compare marks with University criteria for selected course	Filter options based on student preference

4

Prioritize

Your team should all be on the same page about what's important moving forward. Place your ideas on this grid to determine which ideas are important and which are feasible.

⏱ 20 minutes

Importance

If each of these tasks could get done without any difficulty or cost, which would have the most positive impact?

Feasibility

- Avoiding blocks of text as reply from chatbot and stick to the point.
- Avoiding blocks of text as reply from chatbot and stick to the point.
- Ensure whether the student decides their college for Under Graduate or Post Graduate
- Creating a user friendly environment for college applications using a chat bot
- Checking for placement history
- use the data of attributes that impact the chances of admission
- Cross Checking cgpa
- Getting the API for maintaining standard connectivity during the admission process
- High Accuracy in prediction
- Compare marks with University criteria for selected course
- develop user friendly webpage
- Provide list of universities which suits the student's profile
- Link several testimonials from peers and blog spot creation
- Performing Data cleaning process to improve the data accuracy
- Predict the chance of a student getting admitted in a particular college
- use previous history of admissions for training
- Provide a list of universities based on ranking
- Getting suggestions/ reviews from currently enrolled students
- obtain the available seats in different universities for eligibility prediction
- Check with the probability level for getting into desired college
- Comparing the profiles of current students with those of newer students to provide suggesttions
- Collect records of previous admission
- Filter options based on student preference
- Cross checking of cgpa
- Score secured by the students should meet with the eligibility criteria
- Enhance model's performance by avoiding overfitting and underfitting problems
- Consultation regarding the placement, internship and curriculum of the desired university
- recommend universities similar ro dream university
- Users will see pop up alerts and notifications for the top ranked colleges.
- Students ought to provide valid information in their profile
- Prioritize college based on the student's academic perfomance
- Students should be provided with enough choices to chose the courses they want

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3.3. Proposed Solution

1. Problem Statement (Problem to be solved)
To predict the chances of admission of a student into a particular university by obtaining the student's profile details.

2. Idea / Solution description
Since this method shortlists the colleges by comparing the students' score based on CGPA, GRE, TOEFL in order to forecast the likelihood of acceptance, it will provide them ideas of which institutions they should apply to. It will also help students to get clear cut ideas regarding the academic plans, courses, department, placement opportunities offered in that university.

3. Novelty / Uniqueness
Providing mock tests for their dream universities which would definitely help them to build up their confidence for getting into the university. Providing information regarding each university as a tip message.

4. Social Impact / Customer Satisfaction
Students looking forward to getting admitted into universities can use the prediction results to shortlist universities. It also helps in providing a reliable estimate of universities so that they can actively apply for the same. Thus, the project provides a positive social and business impact by helping the students to get admitted into good institutions.

5. Business Model (Revenue Model)
The primary goal of an institution is to increase enrollment by offering a popular blog that generates revenue and promotes the reputation for that university. So this project will provide a clear idea regarding the university, hence it will help to reduce the pressure faced by the organizations to advertise their university.

6. Scalability of the Solution
The solution can be improved to recommend similar universities that have high probability for the student to get admitted.

3.4. Problem Solution fit

Problem-Solution fit canvas 2.0

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Purpose/Vision: To cross check the proposed solution fit with identified problems

1. CUSTOMER SEGMENT(S) — CS
Who is your customer?
i.e. working parents of 0-5 y.o. kids

Students recently completed the exams and yet to join the University
An advisory services provider will be assisting the students regarding the admission process

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 feel insecure about providing their crucial information's like scores.
At first, they may hesitate to use the predictor as they do not trust the accuracy
Lack of awareness regarding each universities eligibility criteria may lead to confusion

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

Available Solutions:
Availability of chat bot. Providing a tip message for each universities eligibility criteria. Prediction results were reliable
CONS:
Non-efficient image processing algorithms were used in traditional approach is a time consuming process. This drawback made us to develop an ease system

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

Customers should be assured of accuracy in prediction

Delay in instant results

Data collection is the most important step in designing the predictor hence it must be ensured

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.

Inaccurate or insufficient factors affects the reliability of the predictor
Securing users ownership privacy
Unreliable information regarding irrelevant ads irrespective if student needs

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)

Students consult expert advisory. They do look for the consultancy within the budget.

Posting queries in online forums

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.

Students interest to predict the chances of admitting in their dream college

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.

Designing the predictor with effective ML algorithms. Providing an user-friendly visual graphics. Ensuring data security.
Recommending preferable Universities based on their academic scores. Generating report in a legible format

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

Users information will be coupled with a bit of reality check, hence they would feel that they are in complete control in admission process

8. CHANNELS of BEHAVIOUR — CH
8.1 ONLINE
What kind of actions do customers take online? Extract online channels from #7

Customers search for reliable predictor that are available in online and rate them based on performance and liking

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

Customers will consult for an expert advisory. Taking inperson counseling from the institutions.

(Left side labels: Define CS, fit into CC | Focus on J&P, tap into BE, understand RC | Identify strong TR & EM)
(Right side labels: Explore AS, differentiate | Focus on J&P, tap into BE, understand RC | Extract online & offline CH of BE)

4. REQUIREMENT ANALYSIS

4.1. Functional requirement

FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	User Registration	Registration through the website by entering the username and password
FR-2	User Confirmation	Confirmation via Email
FR-3	Collecting user details	Collect the GRE, TOEFL, University Rating, SOP, LOR, CGPA, Research data from the users.
FR-4	User login	Login page for users with username and password field.
FR-5	Prediction	Using the trained model conduct prediction for the details entered by the user.
FR-6	Display results	display the prediction results to the user along with the percentage of chance of admit and also display the similar universities that the user has good chances of getting admitted.
FR-7	Store user details	store the details entered by the user in the database so that the details of scores need not be collected every time the user wants to check for different universities.

4.2. Non-Functional requirements

FR No.	Non-Functional Requirement	Description
NFR-1	Usability	Website should be accessible by the user and admin without any problems. Website should be user friendly so that no prior experience is needed for users to be able to use it. Results should be prompt.
NFR-2	Security	Ensure that user data is protected so that they are not visible to other users. Users should not be able to login without password verification. Protect the data from any external attacks.
NFR-3	Reliability	Prediction results must be of high accuracy and thus is reliable for the users to take important decisions.

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NFR-4	Performance	Website should load in a few seconds and must be responsive throughout the user's interaction with it.
		The website should not lose the performance even when multiple users use it simultaneously.
		The website needs to have the same specification of the look and feel in both laptop / desktop and mobile phones.
NFR-5	Availability	The website must be available all the time for the users to use it.
		Should have backup servers to ensure the website does not become non functional due to any difficulties.
NFR-6	Scalability	The website must be built in such a way that future addition of any functionality to the website can be made easily or the entire website can be exported as a functionality for any other big application.

5. PROJECT DESIGN

5.1. Data Flow Diagrams
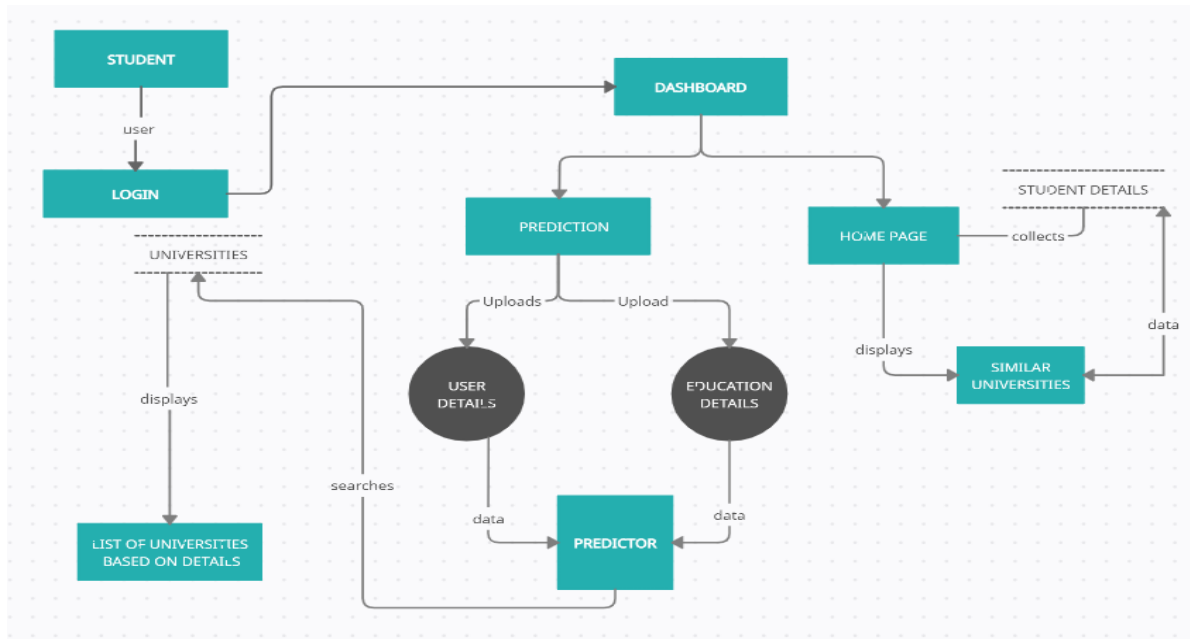
5.2. Solution & Technical architecture

1.This solution helps students to get the list of colleges to which they can apply as the system shortlists the colleges by comparing the student's marks and college's cut off.

2.The chance of occurrence of error is less when compared with the existing system.

3.First, Enter the scores in the fields.

4. Next, request the prediction from web application.

5. Returns the list of colleges based on scores.

6. Predicts the eligibility score.

7. Recommending best suitable universities to students based on their GRE, GPA and TOEFL scores and also predicting admission probability.
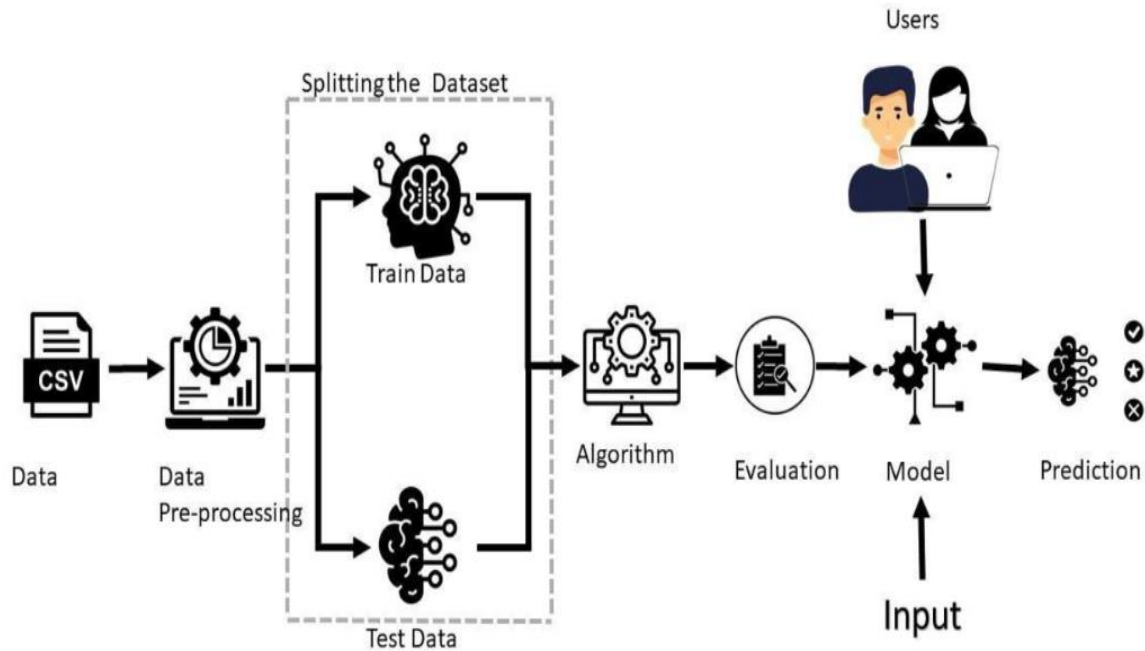
5.3. User Stories

User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria	Priority	Release
Customer (Mobile user)	Registration	USN-1	As a student, I can register for the application by entering my email, password, and confirming my password.	I can access my account / dashboard	High	Sprint-2
		USN-2	As a student, I will receive confirmation email once I have registered for the application	I can receive confirmation email & click confirm	High	Sprint-2
	Login	USN-3	As a student, I can login into the application using login credentials	I can login to the application	High	Sprint-1
	Dashboard	USN-4	As a student, I can view university rankings	I can only view.	Medium	Sprint-1
		USN-5	As a student, I can view the cut-off of previous year rankings	I can access and download files.	High	Sprint-2
Customer (Web user)		USN-6	As a student, I can login and enter the dashboard.	I can access my account / dashboard	High	Sprint-2
		USN-7	As a student, I can sign-up and get the confirmation mail	I can receive confirmation email & click confirm	High	Sprint-1
		USN-8	As a student, I can register to the application	I can enter my details and register to the application	Medium	Sprint-1
Administrator	Dashboard	USN-9	As an admin, I do have the access to update the eligibility criteria for each	I can have access to upload university details	High	Sprint-3

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User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria	Priority	Release
			university.			
		USN-10	As a admin, I can track the eligible students for each university	I can access the list of universities.	Medium	Sprint-3
	Predictor	USN-11	I can view the list of universities, I am eligible to join	I can receive the final results of the universities	Medium	Sprint-3

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.	4	High	Shangeeth R
Sprint-1	Registration	USN-2	As a user, I will receive confirmation email once I have registered for the application	2	High	Sona S
Sprint-2	Registration	USN-3	As a user, I can register for the application through Facebook	5	Low	Shangeeth R
Sprint-1	Registration	USN-4	As a user, I can register for the application through Gmail	3	Medium	Anika Lakshmi S
Sprint-1	Login	USN-5	As a user, I can log into the application by entering email & password	1	High	Indhumathi B
Sprint-3	Dashboard	USN-6	As a student, I can view university rankings	7	Medium	Anika Lakshmi S
Sprint-3	Dashboard	USN-7	As a student, I can view the cut-off of previous year rankings	7	High	Indhumathi B
Sprint-2	Dashboard	USN-8	As a student, I can login and enter the dashboard.	5	High	Sona S
Sprint-4	Administration	USN-9	As an admin, I do have the access to update the eligibility criteria for each university.	6	High	Anika Lakshmi S
Sprint-4	Administration	USN-10	As a admin, I can track the eligible students for each university	7	Medium	Indhumathi B
Sprint-4	Administration	USN-11	As an Administrator, view and manage user permissions in an application.	7	High	Shangeeth R
Sprint-3	Predictor	USN-12	I can view the list of universities, I am eligible to join	6	Medium	Sona S

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

6.3. Reports from JIRA

	OCT							NOV								NOV						NOV					
	24	25	26	27	28	29	30	31	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Sprints																											
⚡ UAEP-1 Registration																											
⚡ UAEP-2 Login																											
⚡ UAEP-3 Dashboard																											
⚡ UAEP-4 Prediction																											
⚡ UAEP-5 Administration																											
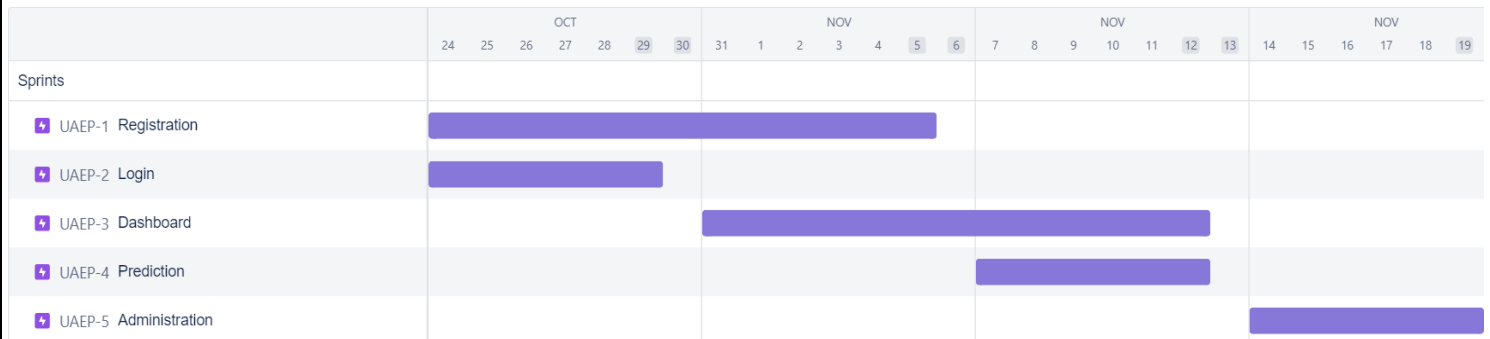
7. CODING & SOLUTIONING

7.1. Feature 1

An interactive index page is developed which gets the inputs of all the user profile data required. It is also appealing and makes student feel its easy to use and user friendly. It makes the user continue using the application. Prediction results are obtained in a less time.

```
1   <!DOCTYPE html>
2   <html>
3   <head>
4       <title>University Admit Eligibility Predictor</title>
5   </head>
6   <link rel="preconnect" href="https://fonts.gstatic.com">
7   <link href="https://fonts.googleapis.com/css2?family=Raleway:wght@100&display=swap" rel="stylesheet">
8   <link href="https://fonts.googleapis.com/css2?family=Noto+Sans+HK:wght@500&display=swap" rel="stylesheet">
9   <style type="text/css">
10
11      h1,h2{
12          font-family: 'Times New Roman', serif;
13          color: black;
14      }
15      h2,h1,form,p,b{
16          text-align: left;
17          color: black;
18      }
19      label,p,b{
20          font-family: 'Arial', sans-serif;
21          color: black;
22      }
23      .elements{
24          padding-top: 1px;
25      }
26
27  </style>
28  <body>
29
30      <img src="https://www.linkpicture.com/q/Screenshot-2022-11-10-185544_1.png" style= "position: -webkit-sticky; position: sticky; top: 0;" align="right">
31      <h1 style="font-size: 3rem; text-decoration-line: underline; text-decoration-thickness: auto;">University Admit Eligibility Predictor</h1>
32
33      <p style="font-size: 2rem; font-family: 'Arial', sans-serif;"> <strong> ABOUT </strong></p>
34      <p style="font-size: 1.5rem; font-family: 'Helvetica', sans-serif;">Enter your details to predict whether you'll get an admission or not .</p>
35
36      <form action="/predict" method="post" class="elements" style="font-size: 1rem;">
37          <p style="font-size: 2rem; font-family: 'Arial', sans-serif;"> <strong> DETAILS </strong></p>
38          <p class="elements">GRE Score</p>
39          <p><input type="text" name="gre" value="Score range 0-340" style=" border-radius: 8px;"></p>
40          <p class="elements">TOEFL Score</p>
41          <p><input type="text" name="tofl" value="Score range 0-120" style=" border-radius: 8px;"></p>
42          <p class="elements"><label>University Rating</label> </p>
43          <select name="rating" style=" border-radius: 8px;">
44              <option value="1">1</option>
45              <option value="2">2</option>
46              <option value="3">3</option>
47              <option value="4">4</option>
48              <option value="5">5</option>
49      </select>
50          <br>
51          <p class="elements">SOP</p>
52          <p><input type="text" name="sop" value="Score range 0-5" style=" border-radius: 8px;"></p>
53          <p class="elements">LOR</p>
54          <p><input type="text" name="lor" value="Score range 0-5" style=" border-radius: 8px;"></p>
55          <p class="elements">CGPA</p>
56          <p><input type="text" name="cgpa" value="Score range 0-10" style=" border-radius: 8px;"></p>
57          <p class="elements"><label>Research</label></p>
58          <select name="research" style=" border-radius: 8px;">
59              <option value="Yes">Yes</option>
60              <option value="No">No</option>
61      </select>
62          <p class="elements"> <input type = "Submit" value = "Submit" style=" border-radius: 8px;"/> </p>
63      </form>
64
65  </body>
66  </html>
```

7.2. Feature 2

admittance_chance

```
1   <!DOCTYPE html>
2   <html>
3   <head>
4       <title>eligibility</title>
5   </head>
6   <body>
7       <img src="https://i.pinimg.com/736x/d7/6f/89/d76f89a73987e8b831253bb9a4b8cfa5.jpg" style="float: right;">
8       <div style="padding-top: 15%">
9       <h2>Predicting chance of admission</h2>
10      <h3>A Machine Learning Web App Using Flask</h3>
11      <p>Prediction : <b>You've a <b>{{p}}</b> chance to get the admission !</b></p>
12      </div>
13  </body>
14  </html>
```

nochance_for_addmission

```
1   <!DOCTYPE html>
2   <html>
3   <head>
4       <title>eligibility</title>
5   </head>
6   <body>
7       <img src="https://ih1.redbubble.net/image.436264386.5214/st,small,507x507-pad,600x600,f8f8f8.u5.jpg" style="float: right; " height="50%" width="50%">
8       <div style="padding-top: 15%">
9       <h2>Predicting chance of admission</h2>
10      <h3>A Machine Learning Web App Using Flask</h3>
11      <p>Prediction : <b>You don't have a chance!</b></p>
12      </div>
13  </body>
14  </html>
```

7.3. Database Schema

	A	B	C	D	E	F	G	H	I	J
1	Serial No.	GRE Score	TOEFL Sco	University	SOP	LOR	CGPA	Research	Chance of Admit	
2	1	337	118	4	4.5	4.5	9.65	1	0.92	
3	2	324	107	4	4	4.5	8.87	1	0.76	
4	3	316	104	3	3	3.5	8	1	0.72	
5	4	322	110	3	3.5	2.5	8.67	1	0.8	
6	5	314	103	2	2	3	8.21	0	0.65	
7	6	330	115	5	4.5	3	9.34	1	0.9	
8	7	321	109	3	3	4	8.2	1	0.75	
9	8	308	101	2	3	4	7.9	0	0.68	
10	9	302	102	1	2	1.5	8	0	0.5	
11	10	323	108	3	3.5	3	8.6	0	0.45	
12	11	325	106	3	3.5	4	8.4	1	0.52	
13	12	327	111	4	4	4.5	9	1	0.84	
14	13	328	112	4	4	4.5	9.1	1	0.78	
15	14	307	109	3	4	3	8	1	0.62	
16	15	311	104	3	3.5	2	8.2	1	0.61	
17	16	314	105	3	3.5	2.5	8.3	0	0.54	

8. TESTING

8.1. Test Cases

	Feature Type	Component	Test Scenario	Pre-Requisite	Steps To Execute	Test Data	Expected Result	Actual Result	Status	Commnets	TC for Automation(Y/N)	BUG ID	Executed By
LoginPage_TC_003	Functional	Home page	Verify user is able to log into application with Valid credentials	Getting to know about the login credentials	1.Enter URL(https://login.html) and click go 2.Click on Signup Button 3.Enter Valid username/email in Email text box 4.Enter valid password in password text box 5.Click on login button	1. Username: indhu123@gmail.com 2. Password: Testpwd123	User should navigate to user account homepage	Working as expected	Pass	Steps were followed properly and the login is working properly	Y	BUG-003	Indhumathi
LoginPage_TC_004	Functional	Login page	Verify user is able to log into application with InValid credentials	Getting to know about the invalid login credentials	1.Enter URL(https://login.html) and click go 2.Click on SignUp Button 3.Enter InValid username/email in Email text box 4.Enter valid password in password text box 5.Click on login button	Username: shan@gmail password: password123	Application should display 'Incorrect email or password' message.	Working as expected	Pass	Steps were followed properly and the page is able to detect the invalid password	Y	BUG-004	Shangeeth
ScoringPage_TC_005	Functional	Scoring page	The page needs to redirect to the score entering details page	Login or Click Learn more	1.Click the Login Button and enter the credentails 2. See if the page opens the scoring page 3. Click the learn more button in Home page 4. Check whether the page redirects to the scoring page	http://127.0.0.1:3000/	Application open the scoring page	Working as expected	Pass	The page correctly opens as per the entered details	Y	BUG-005	Sona
ScoringPage_TC_006	Functional	Entering the scores	Verify the scores entered for prediction of college has a chance of entering the university	Enter the score page by logging in and enter the scores obtained by the user	1.Enter URL(https://127.0.0.1:3000/) and click go. 2. Enter the required scores for chance of getting to the college. GRE - 340 TOFEL - 119 and University Rating - 1 SOP - 4.0 LOR - 3.5	http://127.0.0.1:3000/	Application should show the chances of getting admitted to the university is high	Working as expected	Pass	The page correctly shows the good chance of getting admitted to the university	Y	BUG-006	Anika lakshmi
ScoringPage_TC_007	Functional	Entering the scores	Verify the scores entered for prediction of college has no chance of entering the university	Enter the score page by logging in and enter the scores obtained by the user	1.Enter URL(https://127.0.0.1:3000/) and click go. 2. Enter the required scores for chance of getting to the college. GRE - 270 TOFEL - 95 and University Rating - 4 SOP - 2.5	http://127.0.0.1:3000/	Application should show the chances of getting admitted to the university is low	Working as expected	Pass	The page correctly shows the less chance of getting of getting admitted to the university	Y	BUG-007	Indhumathi

	Feature Type	Component	Test Scenario	Pre-Requisite	Steps To Execute	Test Data	Expected Result	Actual Result	Status	Commnets	TC for Automation(Y/N)	BUG ID	Executed By
About_US_Page_TC_008	Functional	Verify the page opens and displays content	Verify the user is able to view the page	Visit the about us page from home page	1. Enter the About Us page by clicking the button from home page. 2. Check the Read More button by clicking it and get the contents of the page	http://127.0.0.1:3000/	Application should display the about us Page	Working as expected	Pass	The page is displayed	Y	BUG-008	Sona and Indhumathi
Contact_Page_TC_009	Functional	Verify the page opens and displays content	Verify the user is able to view the page	Visit the contact us page from home page	1. Enter the Contact Us by clicking the button from home page. 2. Check the Read More button by clicking it and get the contents of the page	http://127.0.0.1:3000/	Application should display the about us Page	Working as expected	Pass	The page is displayed	Y	BUG-009	Anika lakshmi and shangeeth
Contact_Page_TC_010	Functional	Verify the page opens and the queries are	Verify the user is able to send the queries	Visit the contact us page from home page	1. Enter the Contact Us by clicking the button from home page. 2. Check the message and query that has been mentioned is received by the admin.	http://127.0.0.1:3000/	Application should send the message entered by the user to the required admin via mail	Working as expected	Pass	The contents of query are sent to the admin mail	N	BUG-010	Anika lakshmi, Indhumathi, sona and Shangeeth

8.2. User Acceptance Testing

1. 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).

2. 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	0	0	2	1	3
Duplicate	1	0	0	0	1
External	0	0	1	0	1
Fixed	0	1	1	0	2
Not Reproduced	0	1	0	0	1
Skipped	0	0	0	0	0
Won't Fix	0	1	0	0	1
Totals	1	3	4	1	9

3. Test Case Analysis

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

Section	Total Cases	Not Tested	Fail	Pass
View Home Page	10	0	3	7
Login Page	12	0	1	11
Registration Page	8	0	0	8
Entering scores	20	0	3	17
Click Submit button	2	0	0	2
Page redirect for chance prediction	5	0	0	5
Image displayed	10	0	4	6
Selecting from Drop down option	5	0	0	5
Final Report output	30	0	10	20
About Us page	5	0	0	5
Contact Us	6	0	2	4
Version Control	5	0	2	3

9. RESULTS

9.1. Performance Metrics

S.No.	Parameter	Values	Screenshot

1.	Metrics	**Regression Model:**
		
		MAE -0.0390254623838967,
		MSE -0.0029806758228552222,
		RMSE -0.05459556596331997,
		R2 score -0.835933486388181.
			```from sklearn.metrics import mean_squared_error, r2_score, mean_absolute_error```
			```import numpy as np```
			```print('Mean Absolute Error:', mean_absolute_error(y_test, y_pred))```
			```print('Mean Squared Error:', mean_squared_error(y_test, y_pred))```
			```print('Root Mean Squared Error:', np.sqrt(mean_squared_error(y_test, y_pred)))```
			```print('R2 Error:', r2_score(y_test, y_pred))```
			
			Mean Absolute Error: 0.03909254623838967
			Mean Squared Error: 0.0029806758228552222
			Root Mean Squared Error: 0.05459556596331997
			R2 Error: 0.8359334863688181

2.	Tune the Model	Hyperparameter Tuning and Validation Method – GridSearchCv with Repeated 10 Folds is used to find the set of hyperparameters for the given training set.	```cv = RepeatedKFold(n_splits=10, n_repeats=3, random_state=1)```
			```grid_search = GridSearchCV(estimator=model, param_grid=grid, n_jobs=-1, cv=cv)```
			```grid_result = grid_search.fit(X_train, y_train)```
			```# summarize the best score and configuration```
			```print("Best: %f using %s" % (grid_result.best_score_, grid_result.best_params_)) # summarize all scores that were evaluated```
			
			Best: 0.767087 using {'learning_rate': 0.01, 'max_depth': 3, 'n_estimators': 500, 'subsample': 0.5}

10. ADVANTAGES

- It helps student for making decision for choosing a right university based on their profile.
- It is fast, efficient and reliable.
- Avoids data redundancy and inconsistency.
- It is user-friendly.
- Student profile data is stored in efficient manner and can be accessed easily.
- This method is easy to predict the university/colleges person is applicable for.
- This method is reliable as it would be unbiased and totally transparent.
- Students need not approach and depend upon the advice of consultancies who may be biased and can get reliable predictions at ease from their homes.
- No complex data are required by the predictor.
- Moreover, applying to only that colleges/university where the student has genuine chance would even reduce application process.

DISADVANTAGES

- Requires a device and internet connection.
- If data entered is wrong then prediction results will be inaccurate.
- The prediction does not take into account the cases where universities might give preferences to foreign students.
- Sometimes universities change their policies which breaks from the pattern followed in the previous years' admissions.

11. CONCLUSION

Student admission problem is very important in educational institutions. This project addresses machine learning models to predict the chance of a student to be admitted in their dream university. This will assist students to know in advance if they have a chance to get accepted in order to proceed with applying for them. The machine learning models included are multiple linear regression, k nearest neighbor, random forest, and Multilayer Perceptron. Experiments show that the Multilayer Perceptron model performs well than other models. In future, many more machine learning models can be conducted on the dataset to obtain the best prediction results.

12. FUTURE SCOPE

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

- This can be implemented in lesser time for proper admission process.
- A Database can be implemented for the system so that students can save their data and review and edit it as they progress with the most recent predictions being saved with their profile.
- Other parameters like Co-curricular and extra-curricular achievements, leadership, job and internship experience, etc can also be included as metrics for the model.
- Chat bot can be implemented to provide assistance and good user experience.
- Provide recommendation of similar universities that have better chance of admission for given profile.

13. APPENDIX

13.1. Source Code

```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 = "jhbVAnr8FGf_IHm7hQyyH-4emDxRTTHxn-beT3_RGP2G"
        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://eu-de.ml.cloud.ibm.com/ml/v4/deployments/6f4829ba-dc51-467e-8b78-66a0e44ee9fa/predictions?version=2022-11-10',
            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()
```

13.2   Github & Project Demo Link

Github Link: **https://github.com/IBM-EPBL/IBM-Project-5068-1658747166**

Project Demo Link:

https://drive.google.com/file/d/1M_foqcfo17rmZxsGoVTb0AX2XiVJrz4D/view?u sp=sharing