UNIVERSITY ADMIT ELIGIBILITY PREDICTOR

A machine learning prediction tool

A Nalaiya Thiran Project

Domain – Education

Technology -Data Science, Machine Learning, Python

Submitted by

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Project Report Format

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1. INTRODUCTION

1.1 PROJECT OVERVIEW

India is the second largest source of international students. Post-pandemic, 133155 Indian students left India for academic pursuits in the first 3-months of 2022.

While selecting universities, students look for convenient and instant result-producing services. To not get inundated with anxiety and confusion waiting for approval results. With increased stiff competition in admission at universities which have reported approximately 6.5% increase in applications, the chance of admission at a university has decreased significantly. It becomes crucial that aspirants have ample time and information to choose an apt university.

Most students either opt for internet surfing to find university standards or utilize unknown, expensive prediction apps with outdated data or not updated with modern features. Consequently, students are frustrated with the process and opt for costly educational consulting. However, both prove to be time-consuming, complex and expensive to students. Thus, students often find it depressing and feel anxious to make decisions.

Hence, we designed a University Admit Eligibility Prediction System/ Predictor using powerful ML algorithms. The predictor will help students by predicting a close enough percentage based on data gathered and recommending the university to the students.
Backed with a predictor tool, they will benefit substantially by saving time and money by making on-time decisions.

1.2 PURPOSE

The purpose of the project is to help students make informed decisions.
While researching has been observed that students make the decision regarding universities based on the following:

1. Students have misinformation about the University cut-off and apply to a university that inevitably leads to rejection.
2. Students with no guidance or support take the rash decision and apply to all universities incurring high costs.
3. Students finding difficulties correlating their skills with the university-provided courses opt for lower degrees/courses/universities even with good scoring.
4. Students with no financial support choose a local University with menial opportunities.

Hence the predictor could be used to solve some of the above problems. The instant results of the predictor guide students in making apt decisions about their career path.
Made with efficient Machine Learning algorithms the predictors generate results that depict the chance of admission of a student to a university. This result will help students make appropriate decisions regarding their preparation or applications.

2. LITERATURE SURVEY

2.1 EXISTING PROBLEM

In the existing scenario, students opt for educational counselling that is expensive and not affordable for everyone. Counselling by no means provides a complete guarantee to a student about their admission.
With the university application fees and other costs, counselling becomes more of a financial burden than a relief.
The available tools for the prediction of the chance of admission on the internet are long outdated due to poor User interface, non-modern features or slow and inaccurate predictions that used older Machine learning techniques.
Consequently, students are at a loss and find themselves to be unmotivated and clueless.

2.2 REFERENCES

- **Graduate Admission Prediction Using Machine Learning By Aljasmi, S., Nassif, A.B., Shahin, I. and Elnagar, A., 2020.**
- **Prediction of Graduate Admission Using Multiple Supervised Machine Learning by Bitar, Z. and Al-Mousa, A., 2020, March**
- **A Statistical approach to graduate admissions chance prediction by Chakrabarty, N., Chowdhury, S. and Rana, S., 2020**
- **A Comparison Of Regression Models For Prediction Of Graduate Admission By Acharya, M.S., Armaan, A. and Antony, A.S., 2019,**
- **College Recommendation System For Admission by Monali, D., Dhanashri, G., Dipali, J., Tejaswini, K. and Nale, R.K., 2018**

2.3 PROBLEM STATEMENT DEFINITION

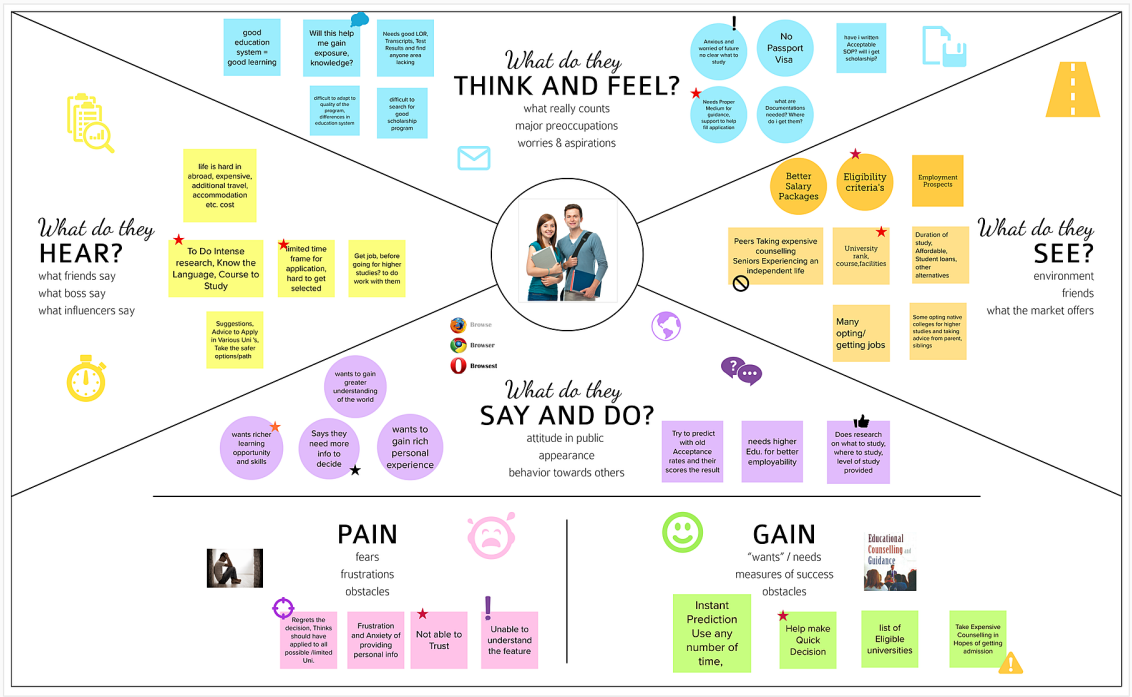
Students want to get into apt Universities that provide niche and specialized courses/programs, higher job opportunities and salary packages. To get into such a university they do ample preparations for entrance exams. With the scores of the exams, the students get the opportunity to apply for the desired University. But the most daunting time is the waiting period after applying to a university to get their selection approval. To foresee such situations students, look for online free prediction tools that can present instant results and determine the next steps. Predictor tools are instant, need no fees and can be accessed easily for mobile devices. Predictors provide valuable insights about the cut-off of a university so that an upcoming aspirant can make use of better decisions.

3.IDEATION AND PROPOSED SOLUTION

3.1 EMPATHY MAP CANVAS

TEAM ID	**PNT2022TMID23950**
PROJECT NAME	**UNIVERSITY ADMIT ELIGIBILITY PREDICTOR**

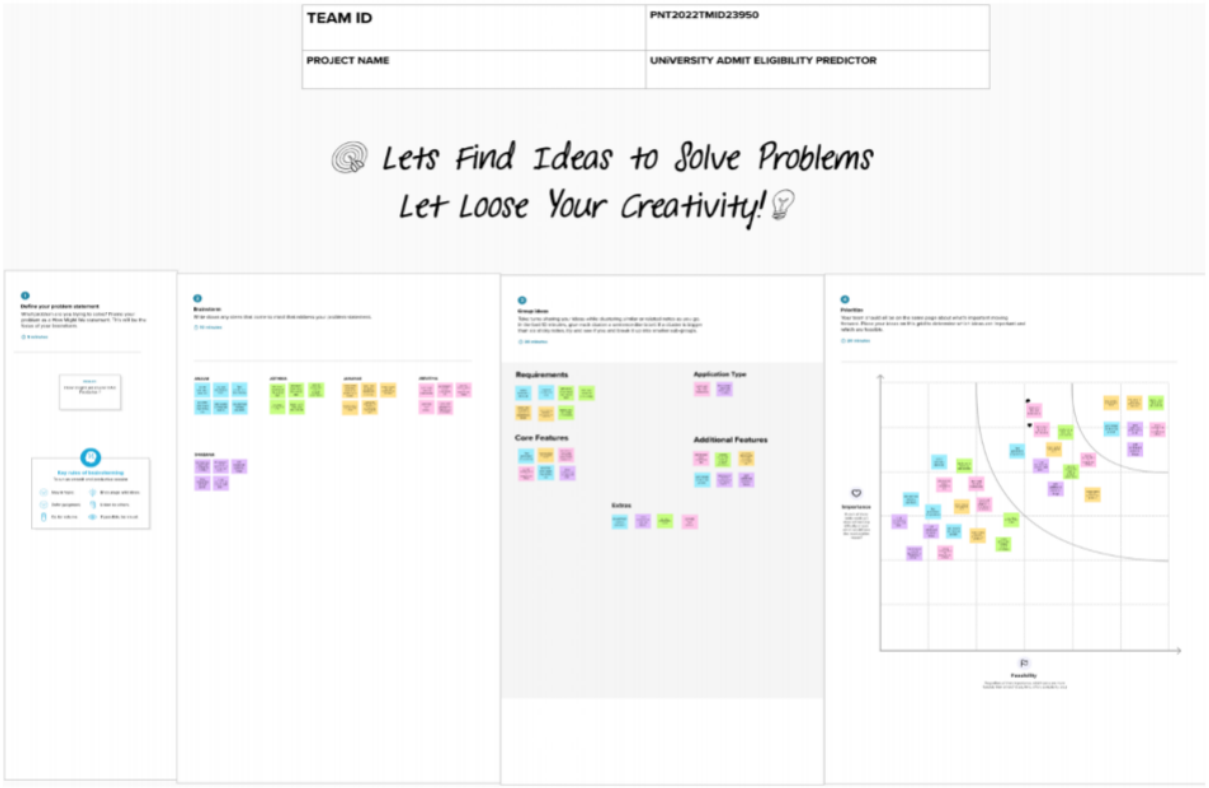
1 Build empathy and keep your focus on the user by putting yourself in their shoes.



Share your feedback

3.2 IDEATION AND BRAINSTORMING

TEAM ID	PNT2022TMID23950
PROJECT NAME	UNIVERSITY ADMIT ELIGIBILITY PREDICTOR



3.3 PROPOSED SOLUTION

Project Design Phase-I
Proposed Solution Template

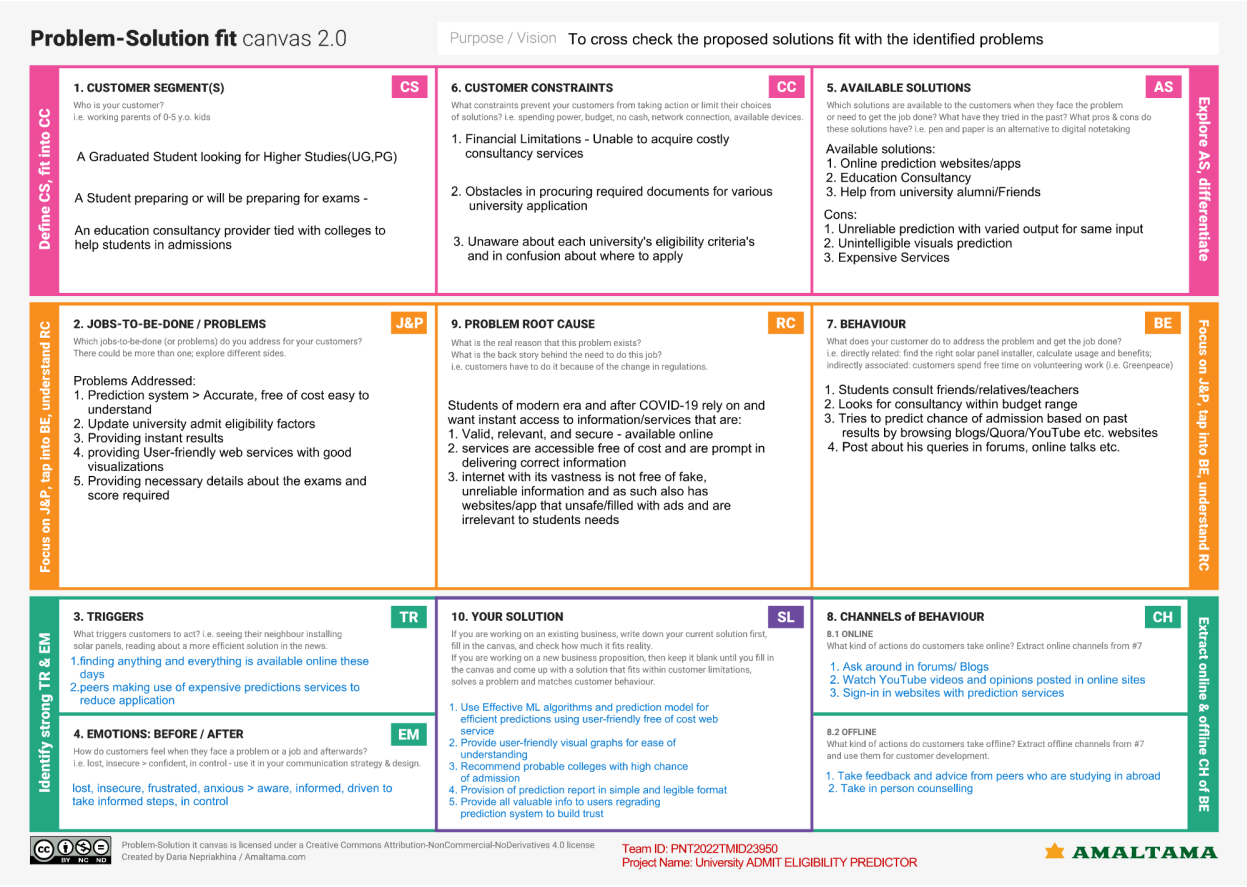
Date	1 October 2022
Team ID	PNT2022TMID23950
Project Name	Project – University Admit Eligibility Predictor
Maximum Marks	2 Marks

Proposed Solution:

S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	With the increased rates in the number of students/learners opting for abroad universities that provide niche and specialized courses/programs, higher job opportunities and salary packages, student want to be able to get in apt Universities. To make such informed decision student look for online free prediction tools that can present them instant results – comprehensive and detailed and need no fees and can be accessed easily.
2.	Idea / Solution description	The Prediction model will be built to be efficient and effective using Machine Learning algorithms like – KNN, linear regression etc that provides accurate prediction based on past data collected. Users will get instant prediction results – the percentage chance of eligibility- on a given input of exam scores and university. Provided in graphical representation users can quickly grasp the output.
3.	Novelty / Uniqueness	1.The prediction system will be embedded in an application service for ubiquitous access and free of charge, sign in requirements, 2.The results of prediction will be visualized in the form of intelligible charts/graphs with the past score/cut-off of a university, 3.Dispaly of all possible eligible University and the requirements other than grades, 4.Provision of necessary links/Blogs for users to discern.

4.	Social Impact / Customer Satisfaction	A fast, consistent and precise UAE prediction system will provide many advantages. 1.The user gets prompt results that are pictorially depicted, 2.Helps users to make informed judgement about Choosing the most fitting college. 3.Acts as a guide for users to prepare, with detailed information about GRE, TOFL etc. exams
5.	Business Model (Revenue Model)	The need for online prediction system/service is in high demand after the covid-19. Student/Users need instant and reliable predictors. This system can cater to wide range of users apart from students and can employ subscriptions, sign in and other features to gain revenue. The system can be licensed to further generate revenue.
6.	Scalability of the Solution	The prediction system equipped with efficient ML algorithm can be further integrated with features like -location based university recommendation system, Colleges with high rate of admit predictions etc. By employing advanced frameworks, the application can be further improved for better user experience and usability.

3.4 PROBLEM SOLUTION FIT



4. REQUIREMENT ANALYSIS

4.1 FUNCTIONAL REQUIREMENTS

Project Design Phase–II
Solution Requirements (Functional & Non–functional)

Team ID	PNT2022TMID23950
Project Name	University Admit Eligibility Predictor

Functional Requirements:

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 Facebook
FR–2	User Confirmation	Confirmation via Email
FR–3	User login	Login via Email Id and password Login directly Facebook Forgot Password
FR–4	User logout	Logout button at navigation bar Logout button at profile page
FR–5	Profile/Dashboard	User Details Settings Log out
FR–6	Admit Predictor	Information about the predictor tool – working, accuracy etc. Fill required fields – target university, varoius scores, grades, etc Confirm details – predict chance
FR–7	Visualized Results	Prediction result output through graphs/charts/bar graphs Summary of the result in text Save result Try again for other university
FR–8	Recommendation Section	Reccommended universities based on past cutoff/score and user score Suggest improvments Link for Relevant Blogs/Helpful resources
FR–9	Universities	Log in View all university based on location Link to university websites Courses and cutoff's of universities
FR–10	Social Share Links	Need help section –FAQ Contact us Email link Reach us out via Twitter Reach us out via Facebook
FR–11	User Review/Feedback	Rate us section Feedback form(Specific to predictor and website experience) Suggest Features/Report Bugs

4.2 NON-FUNCTIONAL REQUIREMENTS

Non–functional Requirements:

Following are the non–functional requirements of the proposed solution.

FR No.	Non–Functional Requirement	Description
NFR–1	**Usability**	Usability of website maintained by : 1. UI/UX designed to support varoius devices, 2. Consistent design and layout with visible links/buttons, modular sub menus, 3. Seamless experience with good navigation, 4. Balanced and clear contents, CTA's and graphics with intuitive split of content on multiple pages, 5. Relevant and attractive images,icons and videos
NFR–2	**Security**	Following CIA triad to secure the website and user data: 1. Confidentiality–acces control on information, limited access and file permissions, IAM,strong passwords(>8 char), admin roles 2. Integrity– accurate and unaltered data via encryption, SSL certification. 3. Availability– data access when needed; with firewalls. 4. Updated and secure extension/software/API(s).
NFR–3	**Reliability**	The website is made reliable by: 1. Fast loading, 2. Secure website, 3. Available at all time – 99.8%, 4. On failure or under attack database rollbacks to safe commits,
NFR–4	**Performance**	For better perforamnace : 1. Simple and Modular website with fast loading(<3sec) 2. Moderate page size of html, css, javascript files,deferred render blocking code, 3. Fully compressed and optimised images/videos, 4. Effective mobile experience, 5.Use of CDN
NFR–5	**Availability**	1. Ensuring anytime, anywhere and all time availability(99.8%), 2. Notified planned maintenance, 3. Automated testing of website to test for uptime,monitoring etc.
NFR–6	**Scalability**	The website is made scalable by: 1. One site = one container logic, 2. Use of cloud (IBM Cloud) features like load balancing, traffic management, resource provisioning etc.

5. PROJECT DESIGN

5.1 DATA FLOW DIAGRAMS

Project Design Phase-II
Data Flow Diagram & User Stories

Team ID	PNT2022TMID23950
Project Name	Project -University Admit Eligibility Predictor

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.

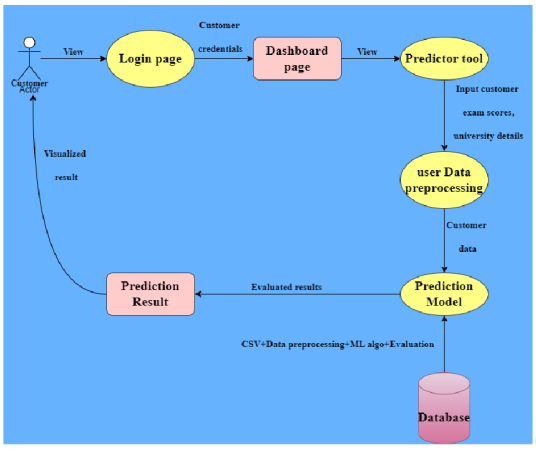


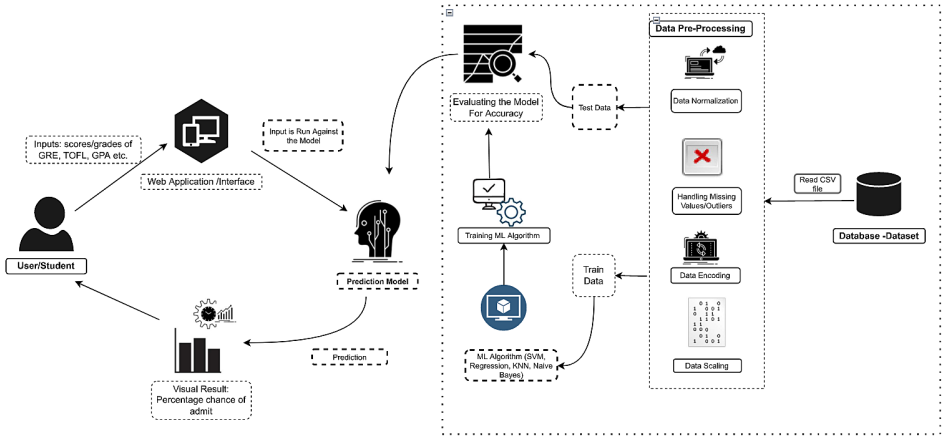
Fig: Data Flow Diagram for UAE Predictor

5.2.1 SOLUTION ARCHITECTURE

TEAM ID: PNT2022TMID23950

PROJECT NAME: UNIVERSITY ELIGIBILITY ADMIT PREDICTOR

SOLUTION ARCHITECTURE - USING MINIMUM VIABLE ARCHITECTURE

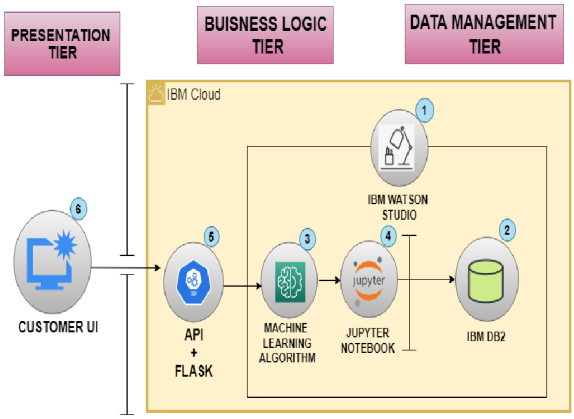


5.2.2 TECHNICAL ARCHITECTURE

Project Design Phase-II
Technology Stack (Architecture & Stack)

Team ID	**PNT2022TMID23950**
Project Name	**University Admit Eligibility Predictor**

Technical Architecture:



Guidelines:

1. **Create a Watson Studio Project on IBM Cloud.**
2. **IBM DB2 on Cloud Database stores information that will be used for machine learning and predictions.**
3. **Watson Machine Learning helps to create ML models so that new predictions can be run against the model.**
4. **Jupyter notebook uses DB2 on Cloud and Watson Machine Learning to create the machine learning model.**
5. **The model is exposed through API and Flask.**
6. **Customer UI uses the API to send new data for predictions.**

Table-1: Components & Technologies

S. No	Component	Description	Technology
1.	User Interface	• Registration through Form, Gmail, Facebook • Confirmation via Mail • Login and Logout via Mail and Password	HTML, CSS, JavaScript
2.	Platform	• Platform for coding purpose	Jupyter notebook
3.	Data pre-processing	• Removing noisy values in the Dataset • Handling Missing Values	Python libraries (pandas, NumPy, Scikit-learn)
4.	Data visualization	• Graphical representation of student details like chart, graph, plots, etc for easy understanding.	Matplotlib, Seaborn
5.	Database	• Storing Student details	IBM DB2
6.	Cloud Database	• Database Service on Cloud	IBM DB2, IBM Watson cloud
7.	Machine Learning Algorithms	• Purpose of Machine Learning Model	Logistic Regressions, SVM, KNN, Decision tree
8.	Infrastructure (Server / Cloud)	• Cloud server configuration for hosting the website.	IBM cloud

Table-2: Application Characteristics:

S. No	Characteristics	Description	Technology
1.	Open-Source Frameworks	▪ To connect front end and backend.	Flask python
2.	Security Implementations	▪ Confidentiality ▪ Integrity ▪ Availability ▪ Updated Software and APIs	Firewall, SSL certification, Encryptions, IAM Controls, Recommending strong passwords, etc
3.	Scalable Architecture	▪ Use of cloud features like resource provisioning in all the 3-tiers	IBM Cloud
4.	Availability	▪ Ensuring anytime and anywhere ▪ Load balancing ▪ Traffic management	IBM Load balancing
5.	Performance	▪ Simple and modular website with fast loading (<5sec) ▪ Moderate page size of html, CSS, JavaScript files ▪ Fully compressed and optimized images and videos	CDN

5.3 USER STORIES

User Stories

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
Customer (Mobile 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
		USN-2	As a user, I will receive confirmation email once I have registered for the application	I can receive confirmation email & click confirm
		USN-3	As a user, I can register for the application through Facebook	I can register & access the dashboard with Facebook Login
		USN-4	As a user, I can register for the application through Gmail	I can register & access the dashboard with Gmail Login
	Login	USN-5	As a user, I can log into the application by entering email & password	I can access my login into my account / dashboard.
	Dashboard	USN-6	As a user, I can access my dashboard in the application	I can view my dashboard and the profile information
Customer (Web user)	Dashboard	USN-7	AS a user, I can access my dashboard in the application through the web browser	I can View and access my dashboard and the profile information
	Prediction Tool	USN-8	As a user, I can use the Prediction tool to predict my admission eligibility in the target University	I can instantly predict my chance of admit into a university
		USN-9	As a user, I can Try the predictor as many times I want with different target Universities	I can predict my chance of admit to various universities
		USN-10	As a user, I can get recommendations of different Universities based on my scores	I can get recommendations of different universities to compare and select the most apt university

User Stories

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

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		USN-2	As a user, I will receive confirmation email once I have registered for the application	I can receive confirmation email & click confirm
		USN-3	As a user, I can register for the application through Facebook	I can register & access the dashboard with Facebook Login
		USN-4	As a user, I can register for the application through Gmail	I can register & access the dashboard with Gmail Login
	Login	USN-5	As a user, I can log into the application by entering email & password	I can access my login into my account / dashboard.
	Dashboard	USN-6	As a user, I can access my dashboard in the application	I can view my dashboard and the profile information
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		USN-10	As a user, I can get recommendations of different Universities based on my scores	I can get recommendations of different universities to compare and select the most apt university

6. PROJECT PLANNING AND SCHEDULING

6.1 SPRINT PLANNING AND ESTIMATION

Project Planning Phase

Project Planning Template (Product Backlog, Sprint Planning, Stories, Story points)

Team ID	PNT2022TMID23950
Project Name	Project – University Admit Eligibility Predictor
Maximum Marks	8 Marks

Product Backlog, Sprint Schedule, and Estimation (4 Marks)

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.	2	High	Jeevitha, Jothika
Sprint-1		USN-2	As a user, I will receive confirmation email once I have registered for the application	1	High	Jeevitha, Jothika
Sprint-3		USN-3	As a user, I can register for the application through Facebook	2	Low	Shabana, Anjum
Sprint-2		USN-4	As a user, I can register for the application through Gmail/Google	2	Medium	Shabana, Janani
Sprint-1	Login	USN-5	As a user, I can log into the application by entering email & password	1	High	Jothika, Jeevitha,
Sprint-2		USN-6	As a user, I can log into the application via Gmail/Google	1	Medium	Shabana,Janani
Sprint-3		USN-7	As a user, I can log into the application via Facebook	1	Low	Shabana,Anjum
Sprint-1	Logout	USN-8	As a user, I can logout of the application by the logout Button	1	High	Anjum, Janani
Sprint-1	(User)Dashboard/ Homepage	USN-9	As a user, I can access my dashboard in the web application	2	High	Jothika, Janani
Sprint-2		USN-10	As a user, I can use my dashboard to view University details	2	Medium	Anjum, Jeevitha
Sprint-3		USN-11	As a user, I can use my dashboard to view my past admit prediction for a target university.	3	Medium	Shabana, Jothika

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-4		USN-12	As a user, I can use my dashboard to compare all my predict chances	3	Medium	Anjum, Jeevitha, Janani
Sprint-4		USN-13	As a user, I can use my dashboard to change settings	2	Low	Jeevitha, Anjum, Janani
Sprint-1	(User) Prediction Tool	USN-14	As a user, I can use the Prediction tool to predict my admission eligibility in the target University	4	High	Jothika, Janani, Shabana
Sprin-1		USN-15	As a user, I can try the predictor as many times I want with different target Universities	3	High	Janani, Jothika,Shabana
Sprint-2		USN-16	As a user, I can get recommendations of different Universities based on my scores and the necessary links	3	Medium	Janani, Anjum, Jeevitha
Sprint-3		USN-17	As a user, I get visual and textual results to better understand the prediction	3	High	Shabana, Jeevitha, Anjum,Janani,Jothika
Sprint-1	Admin Dashboard	USN-18	As an admin, I can use my dashboard to analyze the performance of the website	2	High	Shabana, Jothika, Jeevitha, Janani, Anjum
Sprint-2		USN-19	As an admin, I can use my dashboard to set user privileges and permission	3	High	Shabana, Jothika, Jeevitha, Janani, Anjum
Sprint-3		USN-20	As an admin, I can use my dashboard to monitor details about customer and user profiles to enhance the website UX	2	Medium	Shabana, Jothika, Jeevitha, Janani, Anjum
Sprint-3	Admin Prediction Tool	USN-21	As an admin, I can update the prediction tool for better predictions(with updated model, algorithm dataset etc.)	3	High	Shabana, Jothika, Jeevitha, Janani, Anjum
Sprint-3		USN-22	As an admin, I can update prediction tool page with better UI	3	High	Shabana, Jothika, Jeevitha, Janani, Anjum
Sprint-4		USN-23	As an admin, I can set up a feedback/review/under maintenance page accordingly	3	Low	Shabana, Jothika, Jeevitha, Janani, Anjum
Sprint-1(2,3)	Integration API	USN-24	As an admin, I can enable and update the integration of APIs, web frameworks etc.	3	High	Shabana, Jothika, Jeevitha, Janani, Anjum
Sprint-4		USN-25	As an admin, I can monitor the integration of APIs, web frameworks etc. for security issues	3	Medium	Shabana, Jothika, Jeevitha, Janani, Anjum
Sprint-4	Security and Database	USN-26	As an admin, I can monitor and update security, database of the application	4	High	Shabana, Jothika, Jeevitha, Janani, Anjum

6.2 SPRINT DELIVERY SCHEDULE

SPRINT 1-

- **Create a basic website that lets user login into the website with the email and password , has prediction tool that takes user score, and provides output.**
- **Create the Jupyter Notebook with the prediction model algorithm as selected.**
- **Using the flask integrate the frontend and backend.**

SPRINT 2-

- **Enhance the feature of website**
- **Tunn the Notebook to better predict by hypertrophyin the parameters**

SPRINT 3-

- **Enhance the website features**
- **Jupyter Notebook**

SPRINT 4-

- **Various login option**
- **Prediction tool that gives visual results and chance of admit percentage**
- **University details and etc.**

8.TESTING

8.1 USER ACCEPTANCE TESTING

Acceptance Testing
UAT Execution & Report Submission

Date	19 November 2022
Team ID	PNT2022TMID23950
Project Name	University Admit Eligibility Predictor

1. Purpose of Document

The purpose of this document is to briefly explain the test coverage and open issues of the [students facing issues to get admission in a particular university] 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	10	4	2	3	20
Duplicate	0	0	0	0	0
External	2	3	0	1	6
Fixed	11	2	4	20	37
Not Reproduced	0	0	1	0	1
Skipped	0	0	1	1	2
Won't Fix	0	4	0	0	4
Totals	23	13	8	25	72

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
Client Application	25	0	0	25
Security	2	0	0	2
Final Report Output	3	0	0	3
Version Control	0	0	0	0

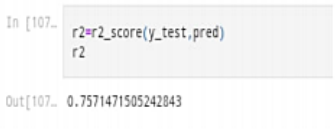
9.RESULTS

9.1 PERFORMANCE METRICS

Project Development Phase
Model Performance Test

Date	19 November 2022
Team ID	PNT2022TMID23950
Project Name	University Admit Eligibility Predictor

Model Performance Testing

S.No	Parameter	Values	Screenshots
1.	Metrics	**Regression Model:** MAE - , MSE - , RMSE - , R2 score -	
2.	Metrics	**Classification Model:** Confusion Matrix - , Accuracy Score- & Classification Report -	

10. ADVANTAGES AND DISADVANTAGES

10.1 ADVANTAGES

- The instant result of the predictor guides students in making apt decisions about their career path regarding their preparation.
- Students get to know about real competition in the outer world and thus making them more focused towards their goal.
- Students become much more responsible as there is a predictor to look after them.

10.2 DISADVANTAGES

- As there is limited dataset, students expectation for prediction of multiple university is impossible.
- SOP and LOR is less considered for eligibility of university admission.
- Since the research attribute is given in terms of yes/no, it is not well defined.

11. CONCLUSION

The project designed is an University Admit Eligibility Prediction System/ Predictor using powerful ML algorithms. The predictor will help students by predicting a close enough percentage based on data gathered and recommending the university to the students. Backed with a predictor tool, they will benefit substantially by saving time and money by making on-time decisions.

12.FUTURE SCOPE

- Large number of data sets can be accessible.
- Features based on researches will be enhanced.
- Version enhancement of graduate admission predictor.

13.SOURCE CODE

```
import
requests

                # NOTE: you must manually set API_KEY below using information retrieved from your
                API_KEY = "Nao5NlrxCCWqpmFusPqFp8KCgT66q4gvH2IiJQFq_HcL"
                token_response = requests.post('https://iam.cloud.ibm.com/identity/token', data={"
                 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

                # NOTE: manually define and pass the array(s) of values to be scored in the next l
                payload_scoring = {"input_data": [{"fields": [array_of_input_fields], "values": [a

                response_scoring = requests.post('https://eu-de.ml.cloud.ibm.com/ml/v4/deployments
                json=payload_scoring,
                 headers={'Authorization': 'Bearer ' + mltoken})
                print("Scoring response")
                print(response_scoring.json())
```

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