VOICE RECOGNITION BASED TRAVELLING ALLOWANCE CALCULATOR

INDUSTRIAL TRAINING PROJECT REPORT

by

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BONAFIDE CERTIFICATE

This is to certify that this project report entitled **"VOICE RECOGNITION BASED TRAVELLING ALLOWANCE CALCULATOR"** submitted to **SHRI VAISHNAV VIDYAPEETH VISHWAVIDYALAYA**, is a bonafide record of work done by **DEVA GANESH NAIR, DIVYAM PITHAWA, JANISH PANCHOLI** and **SARTHAK NAHAR"** under my supervision from **"17 October 2022**" to "**28 October 2022"**

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Place: - Indore
Date: - 30 October 2022

Declaration by Author(s)

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ABSTRACT

Models that use natural language processing may comprehend voice data, react to it, and then answer with text or speech of their own, just like humans do.

With the help of NLP our web app will calculate the displacement between two cities which the user has given as input in the form of speech and display the cost of travel per kilometre as well the total cost of the travel between the two cities.

To calculate trip costs between two locations, all you have to do is enter the source and destination, we have assumed the average cost of travel as 8 Rs/km. So, the total cost of the travel will be the distance between the two cities multiplied by 8. Calculating trip cost is essential when you want to have an estimate of the travel expenses. This calculator gives you an estimate of your fuel expenditure.

Our web app provides an online cost calculator to help you determine the cost of driving between cities. You can use this data to figure out a budget for a road trip. The driving calculation assumes the cost is 8 Rs/km based on the average fuel efficiency of the vehicle and the output is given for one-way travel routes.

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CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

The travel cost method is used to estimate economic use values associated with ecosystems or sites that are used for recreation. The basic premise of the travel cost method is that the time and travel cost expenses that people incur to visit a site represent the price of access to the site. Thus, people's willingness to pay to visit the site can be estimated based on the number of trips that they make at different travel costs. This is analogous to estimating people's willingness to pay for a marketed good based on the quantity demanded at different prices.

Simply enter the source and destination to determine the cost of a trip between the two locations. We've set the average cost of travel at 8 Rs. per km. The distance between the two cities multiplied by eight will therefore equal the total cost of the trip. When attempting to estimate your travel expenses, it is imperative to calculate the journey cost. You can estimate your fuel costs with this calculator.

To calculate trip costs between two locations, all you have to do is enter the source and destination, we have assumed the average cost of travel as 8 Rs/km. So, the total cost of the travel will be the distance between the two cities multiplied by 8. Calculating trip cost is essential when you want to have an estimate of the travel expenses. This calculator gives you an estimate of your fuel expenditure.

You can use the cost calculator on our web app to estimate the cost of travelling between cities. This information can be used to determine a road trip budget. Based on the average fuel economy of the car, the driving calculation makes the assumption that the cost is 8 Rs/km, and the output is provided for one-way travel routes.

We have used geopy, a python library which helps in locate the coordinates of addresses, cities, countries, and landmarks across the globe using third-party geocoders and other data sources and speech_recognition to take voice input from the user of the source and destination.

Geopy is a Python client for many common web services for geocoding, making it easy to locate the coordinates of an address, a city, or a country for Python developers, and vice versa. It uses third-party geocoders and other data sources to find the coordinates of addresses, towns, continents, and landmarks around the globe.

The SpeechRecognition library acts as a wrapper for several popular speech APIs and is thus extremely flexible. It is a library for performing speech recognition, with support for several engines and APIs, online and offline.

1.2 PROBLEM STATEMENT

Till now, there is no web application available which can take speech input from the user and display the estimated cost of the travel.

1.3 NEED FOR PROPER SYSTEM

Voice Recognition based Travelling Allowance Calculator is an application of Voice-Recognition Technology in Travel and Hospitality.

There is no known prominent application that are providing same web services that our system is providing. Our system will help users to travel and manage their budget more judicially.

This web application will also help private sector employees, who need to keep track of their Travelling allowance. They can directly submit or alter our automatically generated travel log to their respective company for getting their spent money back.

We have used geopy, a python library which helps in locate the coordinates of addresses, cities, countries, and landmarks across the globe using third-party geocoders and other data sources and speech_recognition to take voice input from the user of the source and destination.

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Voice-recognition technologies are disrupting existing markets. From widespread smart speaker adoption to impressive new use, voice technologies have reached a tipping point in terms of innovation. Whether these innovations take the form of customer experience improvements or business process optimization, the possibilities for voice are endless and not yet fully understood.

The Growing usage report pegs speech and voice recognition technology market in India at Rs149.95 crore ($22.54 million) as of December 2019. This is expected to grow to Rs210.63 crore by 2020-end. Nearly 78% of the respondents said they are familiar with voice recognition technology, according to the report.
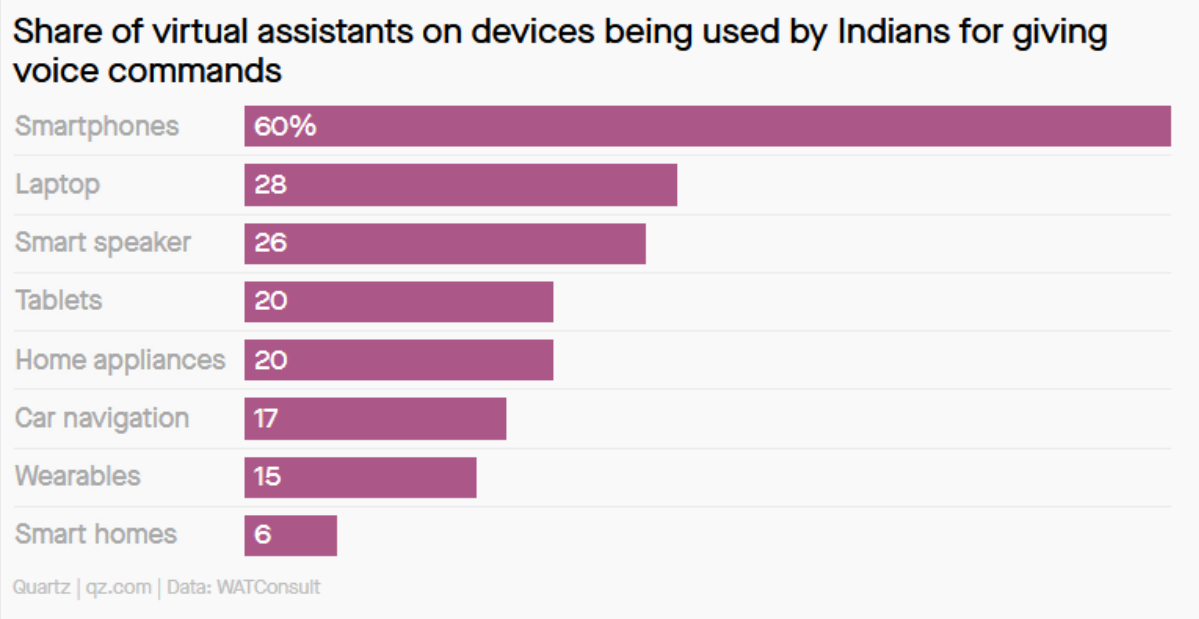
Figure 1: Share of virtual assistants on devices being used by Indians for giving voice commands

According to the above reports we can safely say that most of the voice recognition technology used by Indians are on smartphone devices. Our system can also work on smartphones as a web application.

Voice assistants in India are widely being used for basic tasks like setting up reminders and alarms. Alongside, the respondents are using voice assistants for advanced tasks including placing a product-service order and booking, said the report.

Therefore, it is significant to develop a system that provides information needed for customers travelling needs and managing their budget. The development of Voice Recognition based Travelling Allowance Calculator will help consumers to increase their price consciousness, help them making informed decision to save money as well as help the private company employees to keep track of their travelling allowance.

1.4   OBJECTIVE

The objective of this project is to develop a voice recognition based travelling allowance website that will have the following functions:

- To help users in managing their travelling budget.
- To manage travelling allowances of employees in an organisation.
- To increase price consciousness among the users.
- To show average of their travelling allowance.
- To automatically generate travel log that will help users to keep track of their travels.

1.5 MODULES OF THE SYSTEM

1. Authentication and Verification:

It will help web application to authenticate and verify its users. It contains Login, Sign Up and Reset Password Pages. It also features secure email services for the verification of Account Creation and Reset Password Requests.

Processes it must perform are:

- The system must allow user to enter credentials.
- The system must verify and authenticate users.

2. Voice Recognition

It will help web application to take users input via speech. User can give source and destination to the system for further operations. The given input will be sorted in a CSV/Excel File for later uses. Package used for it is speech_recognition.

Processes it must perform are:

- The system must allow user to give input via speech.
- The system must save the input in a file.

3. Geocoding and Calculating Cost

Geocoding is the process of transforming a description of a location—such as a pair of coordinates, an address, or a name of a place—to a location on the earth's surface. Our System will convert the input from users to coordinates and find the distance between them. After finding the distance, the system will calculate the cost of travel as per the given inputs and show the average cost of all the travel done by the user. Packages used for it are Geopy, Pandas, Numpy.

Processes it must perform are:

- The system must convert the inputs given by the user to its respective coordinates.
- The system must calculate the distance between the given coordinates.
- The system must show the average cost of the travels done by the user.

1.6 SCOPE

The scope of study for this voice recognition based travelling allowance calculator project will be all internet users and it is narrowed down to those who are using internet for travel-related purpose. The users can be employees of any organisation or independent travellers.
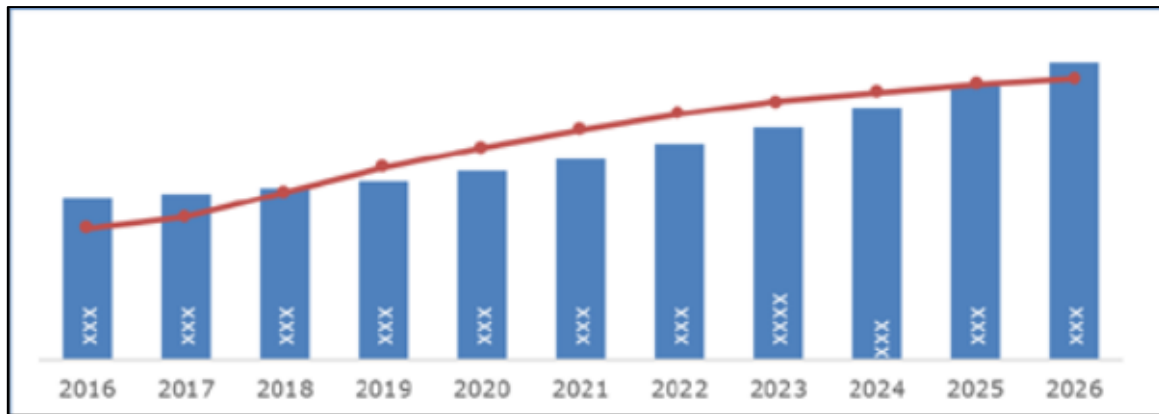
Figure 2: Global Voice Recognition market values and growth, 2018-2026

The global voice recognition market has been witnessing an incremental growth over the last few years and is poised to register steady gains during the forecast period 2018 - 2026.

According to credence research market report of global voice recognition market the users will increase in this market and these users will use our services to manage their travel, TA and budget. Our system will be great help to the travellers in planning their travel.

CHAPTER 2

LITERATURE SURVEY

2.1 EXISTING SYSTEM

A voice command device (VCD) is a device controlled with a voice user interface. Voice user interfaces have been added to automobiles, home automation systems, computer operating systems, home appliances like washing machines and microwave ovens, and television remote controls.

Some of the existing Voice Assistants are:

1. Alexa

Alexa is Amazon's cloud-based voice service available on hundreds of millions of devices from Amazon and third-party device manufacturers. With Alexa, you can build natural voice experiences that offer customers a more intuitive way to interact with the technology they use every day.

2. Siri

Siri is a virtual assistant that is part of Apple Inc.'s iOS, iPadOS, watchOS, macOS, tvOS, and audioOS operating systems.

3. Google Assistant

Google Assistant is a virtual assistant software application developed by Google that is primarily available on mobile and home automation devices. Based on artificial intelligence, Google Assistant can engage in two-way conversations.

2.2 PROPOSSED SYSTEM

Voice Recognition Based Travelling Allowance Calculator will Overcome the limitations of the existing systems like:

- All the above existing systems are very generalized and are not suitable for specific tasks (travel related).
- Managing travel and budget of the users.
- Generating Travel log for analysis of the travel done and future planning.
- Calculating TA using voice inputs.

2.3 FEASIBILITY STUDY

A feasibility study is a detailed analysis that considers all of the critical aspects of a proposed project in order to determine the likelihood of it succeeding.

Success in business may be defined primarily by return on investment, meaning that the project will generate enough profit to justify the investment. However, many other important factors may be identified on the plus or minus side, such as community reaction and environmental impact.

Although feasibility studies can help project managers determine the risk and return of pursuing a plan of action, several steps should be considered before moving forward.

A feasibility study evaluates the project's potential for success; therefore, perceived objectivity is an important factor in the credibility of the study for potential investors and lending institutions. It must, therefore, be conducted with an objective, unbiased approach to provide information upon which decisions can be based. Here, we discuss three major feasibility studies required for our project.

2.3.1 TECHNICAL FEASIBILITY

Technical feasibility is carried out to determine whether the project is feasible in terms of software, hardware, personnel, and expertise, to handle the completion of the project. It considers determining resources for the proposed system.

"Voice Recognition Based Travelling Allowance Calculator" will be available as a Web Application. An open framework might be used to host this Web Application. The usage of such powerful frameworks and programming languages would help in better satisfying the requirements and constraints of the Web Application.

2.3.2 ECONOMICAL FEASIBILITY

Economic feasibility defines whether the expected benefit equals or exceeds the expected costs. It is also commonly referred to as cost/benefit analysis. The procedure is to determine the benefits and the savings expected from the system and compare them with the costs.

The project is economically feasible as the only cost involved is having a computer with the minimum requirements mentioned in the system specifications. For the users to access the application, the only cost involved will be in getting access to the Internet.

2.3.3 OPERATIONAL FEASIBILITY

Operational feasibility is the measure of how well a proposed system solves the problems with the users. Operational feasibility is dependent on human resources available for the project and involves projecting whether the system will be used if it is developed and implemented.

It is noteworthy that the timeframe of the project is critical given the complexity of the project. Thus, in the early stage of the project, only the basic features would be incorporated. For instance, the purchase from our Web Application cannot be implemented in the initial phase. Moreover, the user interface would be very basic and reflect only the main services offered in the Web Application.

CHAPTER 3
REQUIREMENT ANALYSIS

3.1   THE METHOD USED FOR REQUIREMENT ANALYSIS

Group Interviews:

A group interview also has an advantage when there is a time constraint. More thoughts and discussion can be generated, as someone in the group may state or suggest an idea that may have been overlooked by others, which in turn can lead to a discussion or provide more information on a particular issue.

Analyzing Existing Documents:

Analyzing existing documents can prove to be a useful technique in requirement gathering, on its own as well as using it to supplement other techniques. Reviewing the current process and documentation can help the analyst understand the business, or system, and its current situation. Existing documentation will provide with the analyst the titles and names of stakeholders who are involved with the system. This method gives what are the stakeholders of the software.

User Observation:

User observation should be planned to ensure that all elements are constantly surrounding the observation. This will assist in uncertainty, and the consultant can focus on the user and assist in knowing what to look for. The analyst will not be distracted and record, or note, irrelevant issues. The more useful information gathered, the less time it will take for the analyst to dissect and evaluate afterward. Timing of the observation can also prove relevant when planning. In this method, we observe the user i.e. what type of user uses this module and what the user can use this data. In this method, we examine what data we should show to the user. Which data is important to the user?

Research work under this domain:

Previous projects.

3.2   DATA REQUIREMENTS

The Data Requirements section of the SRS provides information on the data used by the software application/system. Data requirements are prescribed directives or consensual agreements that define the content and/or structure that constitute high-quality data instances and values. Data requirements can thereby be stated by several different individuals or groups of individuals.

Data requirements definition establishes the process used to identify, prioritize, precisely formulate, and validate the data needed to achieve business objectives. When documenting data requirements, data should be referenced in business language, reusing approved standard business terms if available. If business terms have not yet been standardized and approved for the data within scope, the data requirements process provides the occasion to develop them. For patient demographic data, governance should be engaged in validating data requirements, with representation from supplying and consuming business areas across the lifecycle to ensure that their requirements are met.

Data requirements definition should follow an organized and sequential discovery and decomposition process. Business rules for system behavior should be developed in parallel with the logical design of the destination data store; this method is bi-directional and iterative. Data requirements should be represented in the logical design of the data store and should reflect standardization across projects.

If data in the new data store already exists elsewhere and will migrate, profiling should be performed to ensure that it meets the business expectations and requirements prior to population (See Data Profiling). This may positively impact the design process by surfacing the need for additional quality rules or specifications, and it will improve the percentage of requirements satisfied and reduce the amount of rework for future releases.

3.3   FUNCTIONAL REQUIREMENTS

Functional requirements are product features or functions those developers must implement to enable users to accomplish their tasks. So, it's important to make them clear both for the development team and the stakeholders. Generally, functional requirements describe system behaviour under specific conditions.

1.Authentication and Verification:

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Processes it must perform are:

- The system must convert the inputs given by the user to its respective coordinates.
- The system must calculate the distance between the given coordinates.
- The system must show the average cost of the travels done by the user.

3.4   NON-FUNCTIONAL REQUIREMENTS

Non-functional requirements address aspects of the system other than the specific functions it performs. These aspects include system performance, costs, and such general system characteristics as reliability, security, and portability. The non-functional requirements also address aspects of the system development process and operational personnel. It includes the following:

• The system was user friendly and consistent.

 • The system provided attractive graphical interface for the user The system allowed developer access to installed environment.

• The system focuses targeted customer base.

• The system should use session technology and cache in order to save memory consumption.

• The system should not have fatal error during run time.

3.5   SYSTEM SPECIFICATION

System requirements is a statement that identifies the functionality that is needed by a system in order to satisfy the customer's requirements. System requirements are a broad and also narrow subject that could be implemented to many items. Whether discussing the system

requirements for certain computers, software, or the business processes from a broad view point. Also, taking it down to the exact hardware or coding that runs the software.

3.5.1 HARDWARE SPECIFICATION

Processor: Intel(R) Core (TM) i5-9300H CPU @ 2.40GHz

Installed RAM: 8.00 GB (7.84 GB usable)

System type: 64-bit operating system, x64-based processor

Disk space: 500 GB (SSD)

3.5.2 SOFTWARE SPECIFICATION

Packages used:

- speech_recognition for Voice Recognition.
- Geopy for Geocoding.
- Pandas and Numpy for calculating Distance and Cost.
- Django for web application Framework.

Framework used:

- Django.

Environment used for the development of project:

- Conda environment: In it we created a virtual environment for the development of the project, so other packages don't cause any error during the development.
- Python virtual environment: It is a virtual environment which is being used in development phase which contains all the libraries with proper dependencies for the project to run properly in development phase of the project.

Tools used:

- VS code, Jupiter Notebook for IDE
- Django Framework for creating web application.
- HTML, CSS, JavaScript and Bootstrap V5 for web designing.
- Anaconda for python + useful packages.

CHAPTER 4
SYSTEM DESIGN & MODELLING

4.1 USE CASE DIAGRAM

A use case diagram in the Unified Modelling Language (UML) can be used to condense information about the users of your system (sometimes referred to as actors) and their interactions with it. You'll need a particular set of connectors and symbols to make one. Your team can discuss and express the following using an effective use case diagram:

A use case diagram's primary goal is to illustrate a system's dynamic nature. The system's requirements, which take into account both internal and external factors, are accumulated. It refers to individuals, use cases, and a number of other things that refer to the actors and components responsible for putting use case diagrams into practise. It displays the potential interactions between a system component and an external entity.

The goals of the use case diagram are as follows:

- The needs of the system are gathered.
- It shows how the system seems from the outside.
- It acknowledges both internal and external influences on the system.
- It depicts how the performers interacted with one another.
- Case studies involving interactions between your system or application and individuals, groups, or outside systems.
- Objectives that those entities (also known as actors) are assisted in achieving by your system or application.
- How broad your system is.

The following guidelines must be adhered to while developing a use case diagram:

- The actor or use case of a system should be given a relevant and meaningful name.
- An actor's communication with a use case must be defined in a clear manner.
- Specific notations that should be utilised as needed.
- Among the numerous interactions between the use case and actors, the most important ones should be depicted.
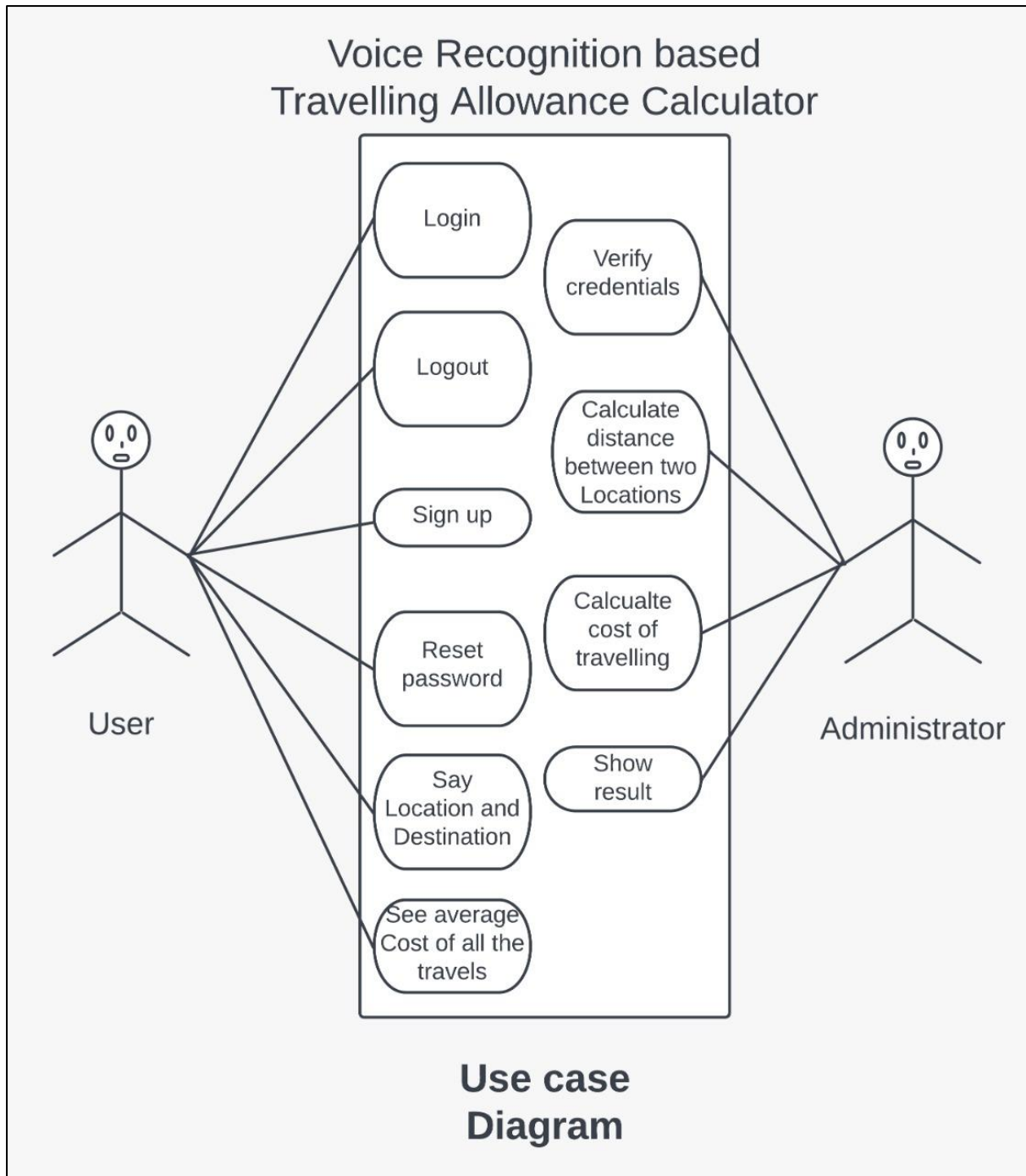
Figure 3: Use Case Diagram

4.2 IPO DIAGRAM

The interactions between input and output elements, commonly referred to as "factors" and "responses," are shown in IPO diagrams to depict processes. It is highly helpful to describe a process as an activity that modifies inputs to produce related outputs.

Input-process-output (I-P-O) is a structured methodology for capturing and visualising all of the inputs, outputs, and process steps that are required to transform inputs into outputs. It is often referred to, interchangeably, as an I-P-O model or an I-P-O diagram, both of which make reference to the intended visual nature of the method.

An **Input-Process-Output (IPO) Model (or IPO Diagram)** is a visual representation of a process or system showing the key inputs, resulting outputs, necessary controls and essential enablers of a system life cycle that is used to approach in systems analysis and software engineering for describing the structure of an information processing program or other process. The IPO chart describes business processes with the description of each component in word, not code or mathematical formulas.

A very high-level diagram known as an IPO (Input-Process-Output) Diagram is used in systems analysis to visually represent business processes and to provide word descriptions for each component. It displays a process' essential inputs and final outputs following a series of activities. Applications for software engineering frequently employ IPO diagrams.

Components

Inputs

Represent everything that enters the system to be processed or transformed to achieve the desired outcome. Inputs can be raw materials, information, data or even an outputs from another process.

Process

Represent the set of operations, calculations and steps required to transform the given inputs into the desired outcome. Process could involve human labor, machines or a combination of both.

Outputs

Represent the final result. Outputs can be finished goods, products, data or new information. In some occasions, outcomes can be inputs for different processes as well.

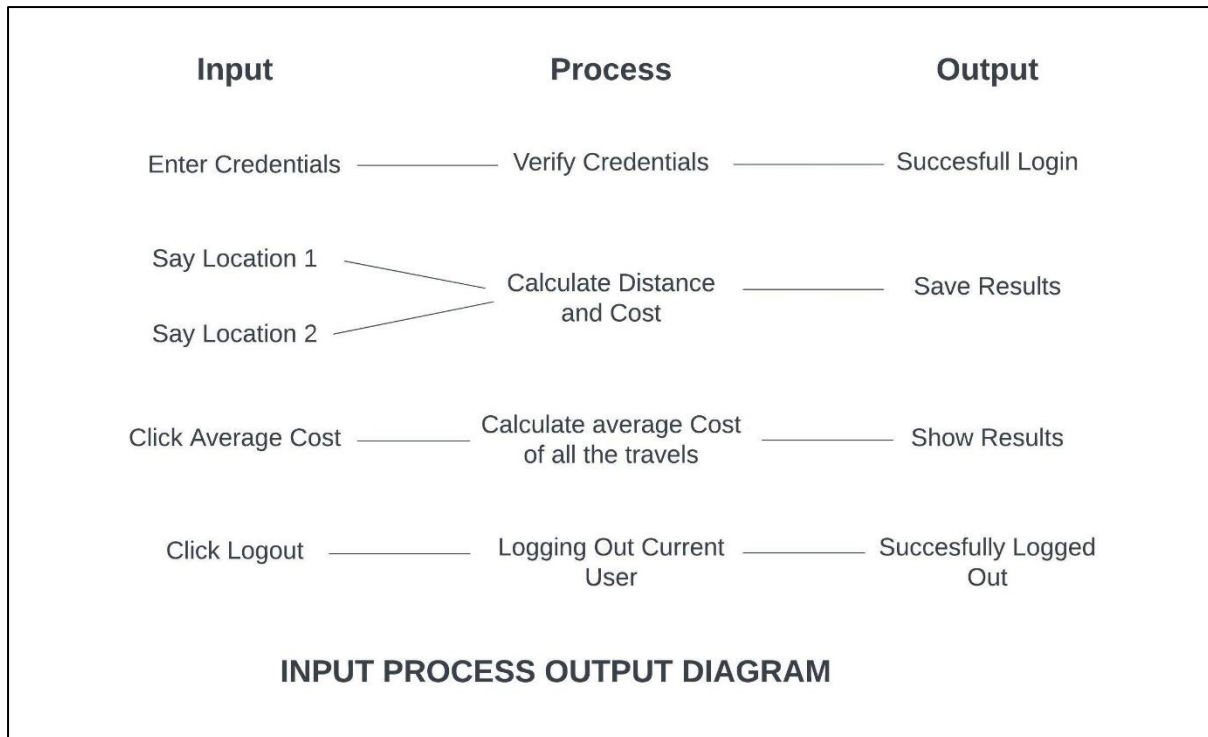Refer the figure below for Voice Recognition Based Travelling Allowance Calculator IPO diagram.

Input   **Process**   **Output**

Enter Credentials ——— Verify Credentials ——— Succesfull Login

Say Location 1
                    Calculate Distance ——— Save Results
                        and Cost
Say Location 2

Click Average Cost ——— Calculate average Cost ——— Show Results
                          of all the travels

Click Logout ——— Logging Out Current ——— Succesfully Logged
                        User   Out

INPUT PROCESS OUTPUT DIAGRAM

Figure 4: IPO Diagram

4.3 ACTIVITY DIAGRAM

The Unified Modelling Language includes several subsets of diagrams, including structure diagrams, interaction diagrams, and behaviour diagrams. Activity diagrams, along with use case and state machine diagrams, are considered behaviour diagrams because they describe what must happen in the system being modelled.

Stakeholders have many issues to manage, so it's important to communicate with clarity and brevity. Activity diagrams help people on the business and development sides of an organization come together to understand the same process and behaviour. You'll use a set of specialized symbols—including those used for starting, ending, merging, or receiving steps in the flow—to make an activity diagram, which we'll cover in more depth within this activity diagram guide.

Activity diagrams present a number of benefits to users. Consider creating an activity diagram to:

• Demonstrate the logic of an algorithm.

• Describe the steps performed in a UML use case.

• Illustrate a business process or workflow between users and the system.

• Simplify and improve any process by clarifying complicated use cases.

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• Model software architecture elements, such as method, function, and operation.
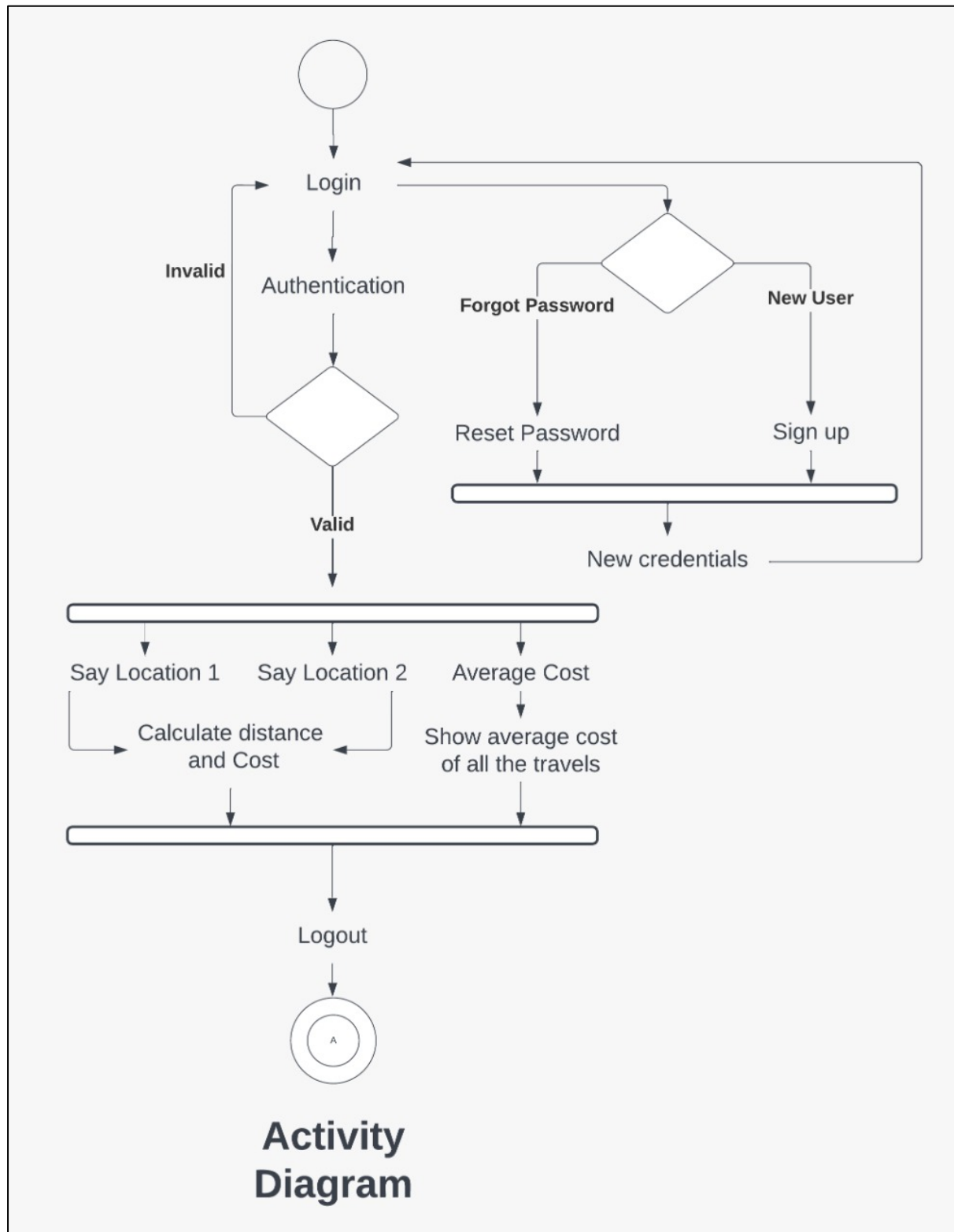
Figure 5: Activity Diagram

4.4 SNAPSHOT (WITH DESCRIPTION)

Login
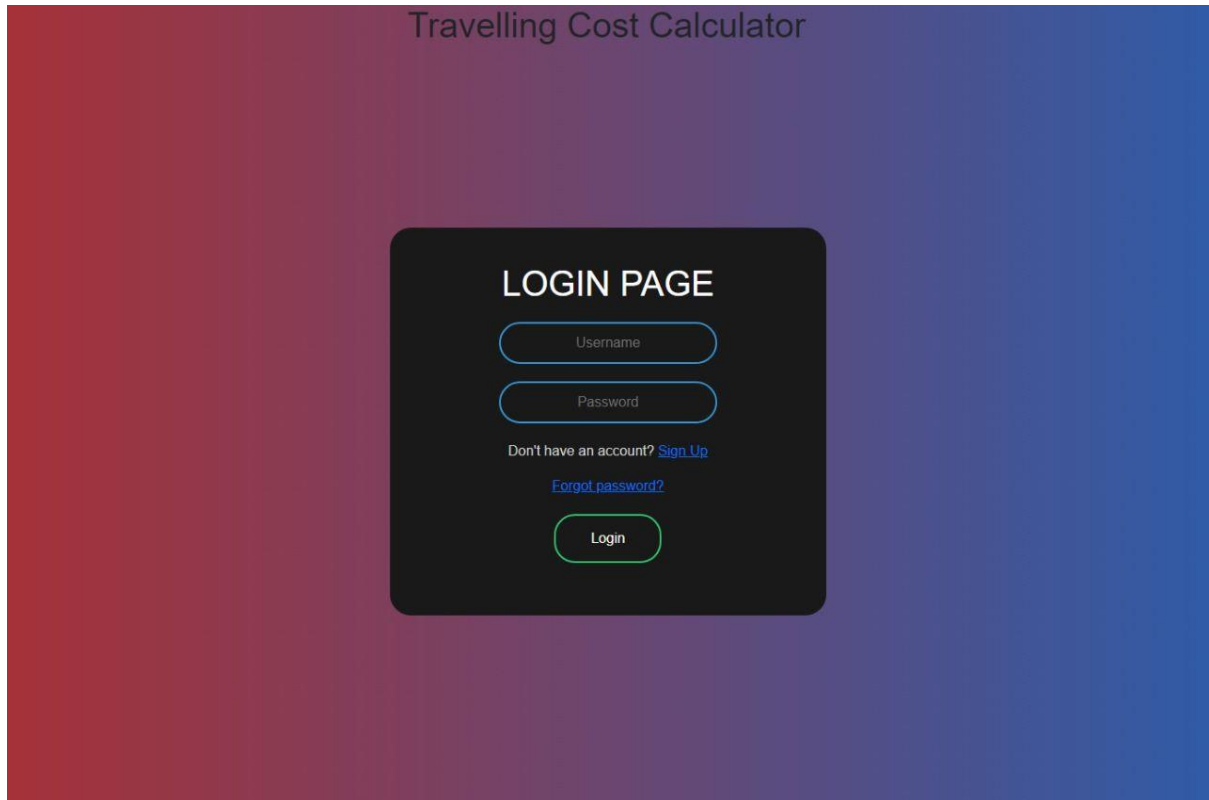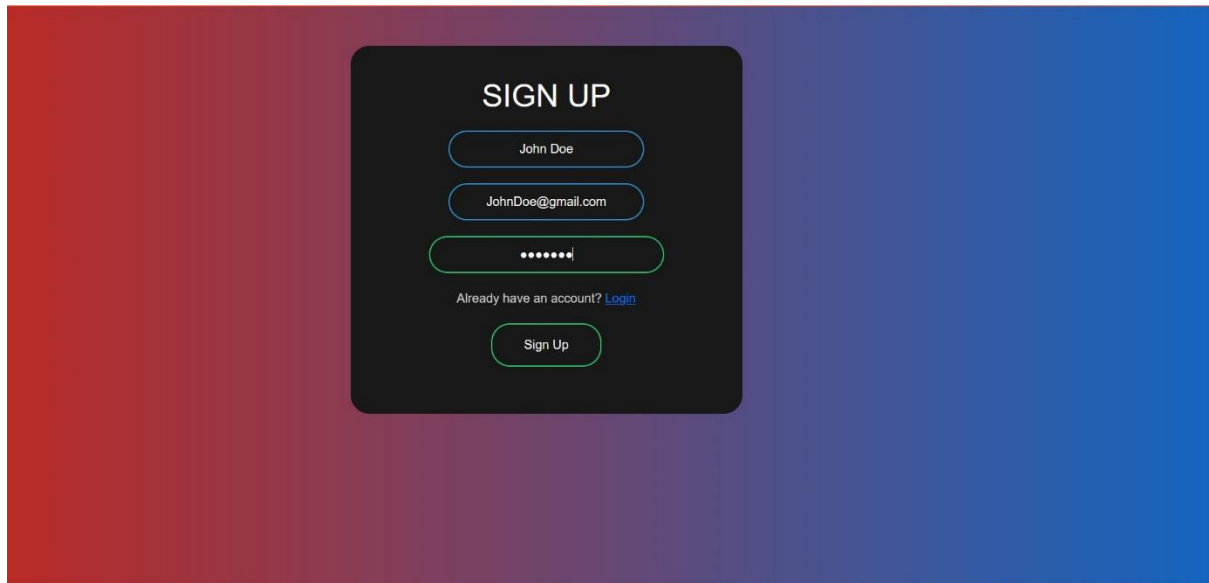
When the user first visits our web application, they will be prompted to Login to their account.

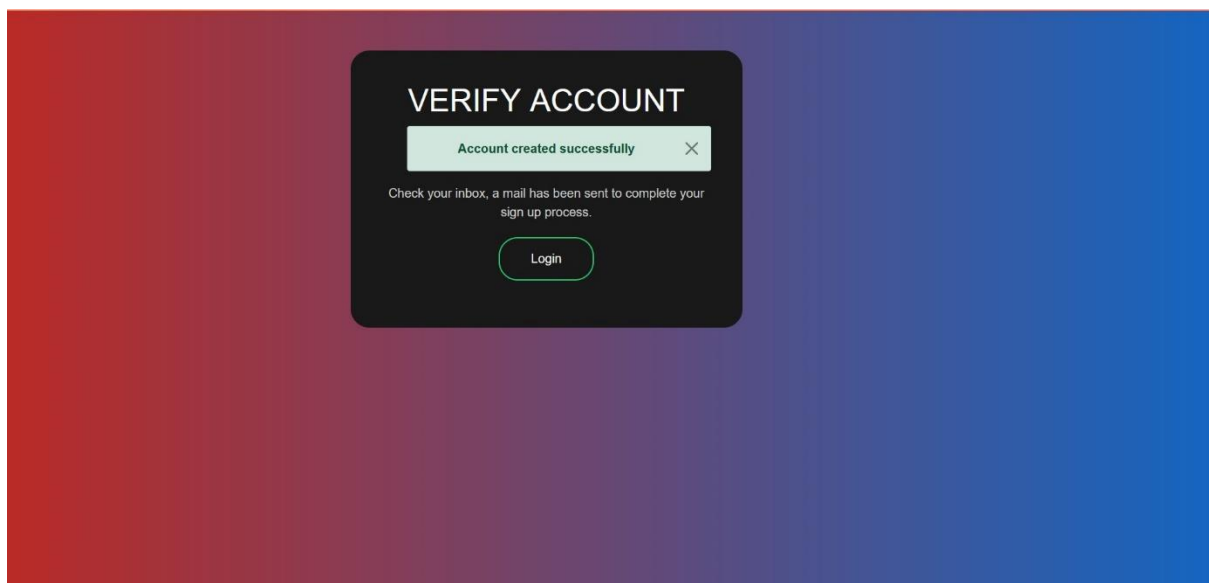If they don't have any, they can use the Sign Up to create a new account.

There is also a Forgot Password button which the user can use when they don't remember their password to their account.
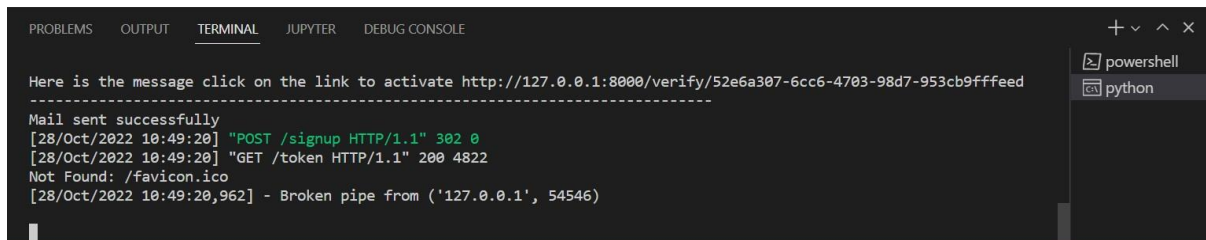
Sign up

On the Sign-Up page the user will be asked to fill in the details like the Name, Email ID, and the Password to create an account.

If the user already has an account they can simple click on the Login to Login tp their respective account.

Once the new user has filled all the necessary fields for creating an account, then a mail will be sent to the user to complete the verification process.

In the mail, the user will find a link using which they can verify their account by opening the link in the browser.

Reset password

If the user forgot the password to their account, they can click on Forgot password? To reset their password.

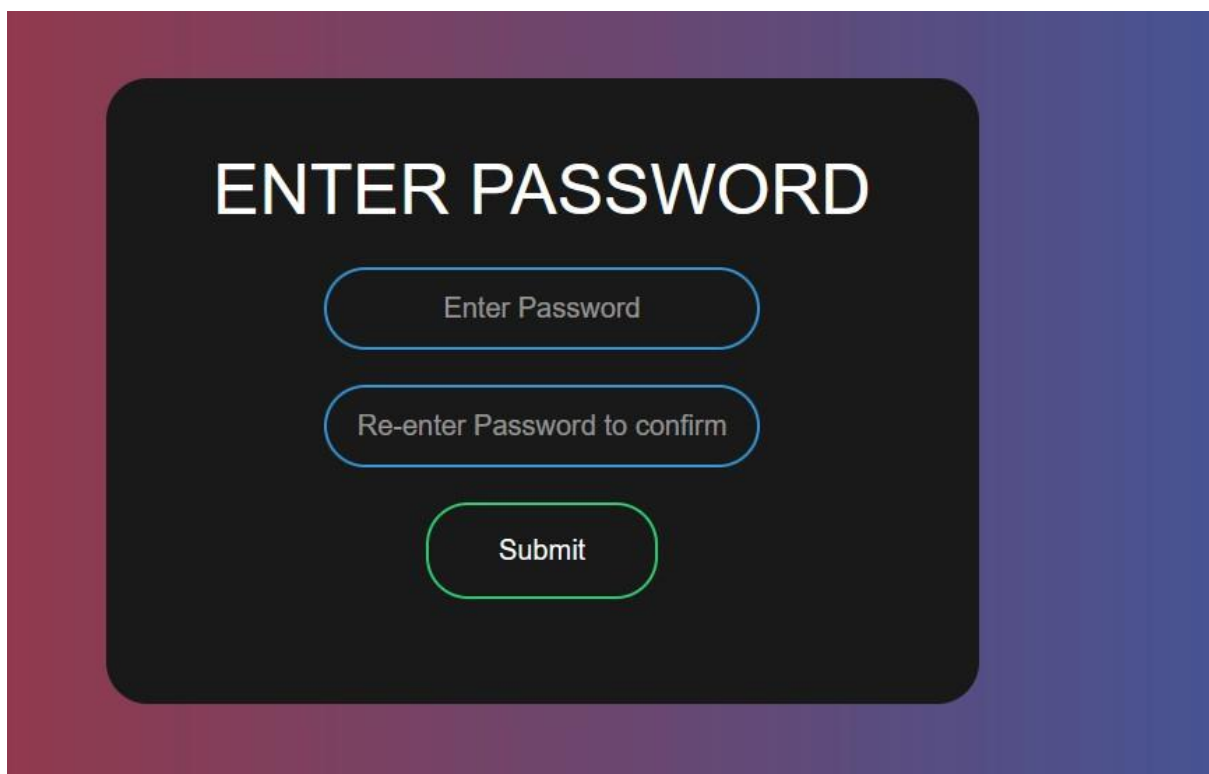They will be redirected to the FORGOT PASSWORD page in which they can enter their registered mail ID.
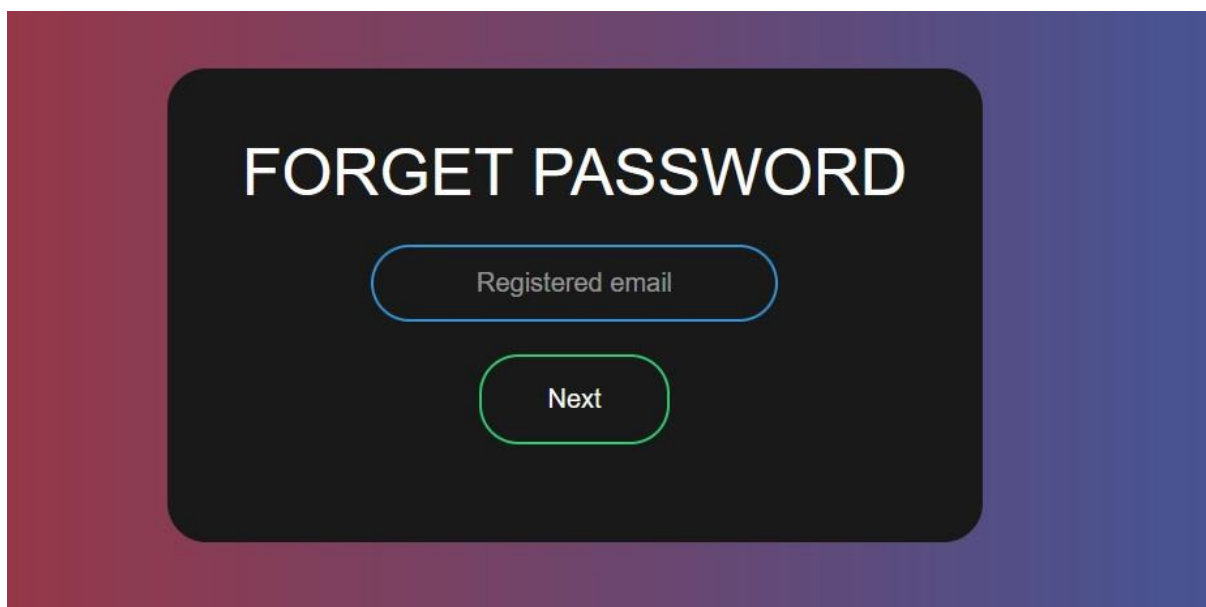
Once the user clicks on Next. They will be sent a mail on their registered mail ID which contains a link to reset the password.

```
[28/Oct/2022 10:58:00] "GET /forgetpass HTTP/1.1" 200 4496
Content-Type: text/plain; charset="utf-8"
MIME-Version: 1.0
Content-Transfer-Encoding: 7bit
Subject: Reset your Password
From: noreply.travellingexpense@gmail.com
To: JohnDoe@gmail.com
Date: Fri, 28 Oct 2022 05:28:44 -0000
Message-ID: <166693492400.17236.2217332911059619520@LAPTOP-LQ3SCPD4>

Follow this link to reset your password http://127.0.0.1:8000/reset/52e6a307-6cc6-4703-98d7-953cb9fffeed
--------------------------------------------------------------------------
[28/Oct/2022 10:58:44] "POST /forgetpass HTTP/1.1" 200 4348
Not Found: /favicon.ico
[28/Oct/2022 10:58:44,335] - Broken pipe from ('127.0.0.1', 54575)
```
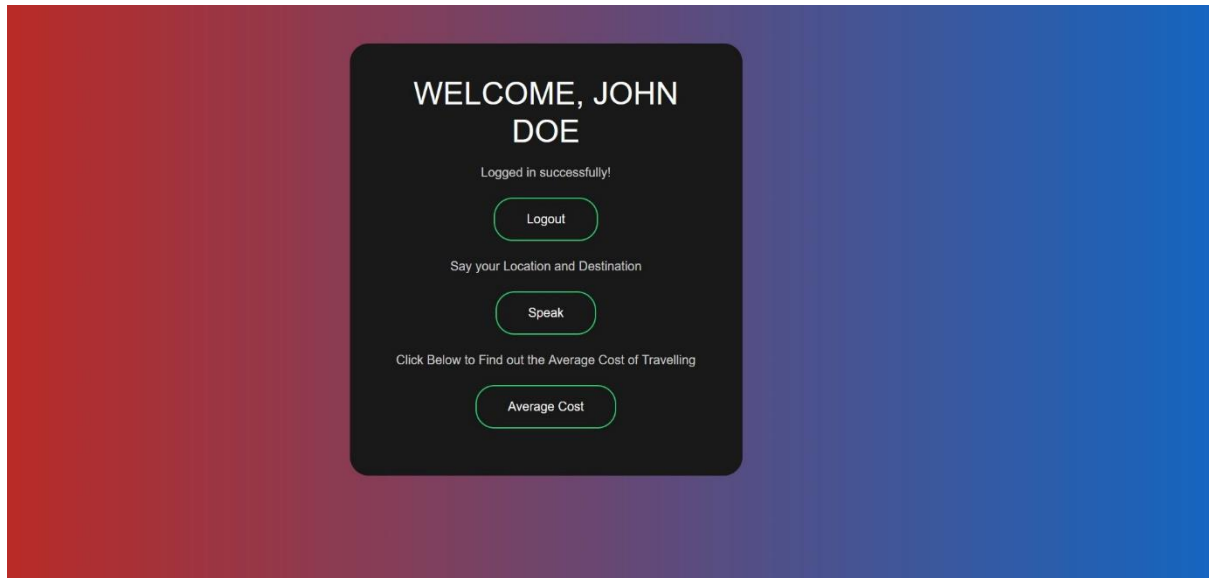
When the user open the link provided in the mail, they will be redirected to the ENTER PASSWORD page where they can enter the new password and they should also re-enter the new password for confirmation.

Homepage

When the user successfully logged in to their account, they will be greeted by their name on the homepage.

Here they will be given the option to logout, to speak the arrival and destination location and after speaking the locations they can click on the Average cost button to find the average cost of the travel.
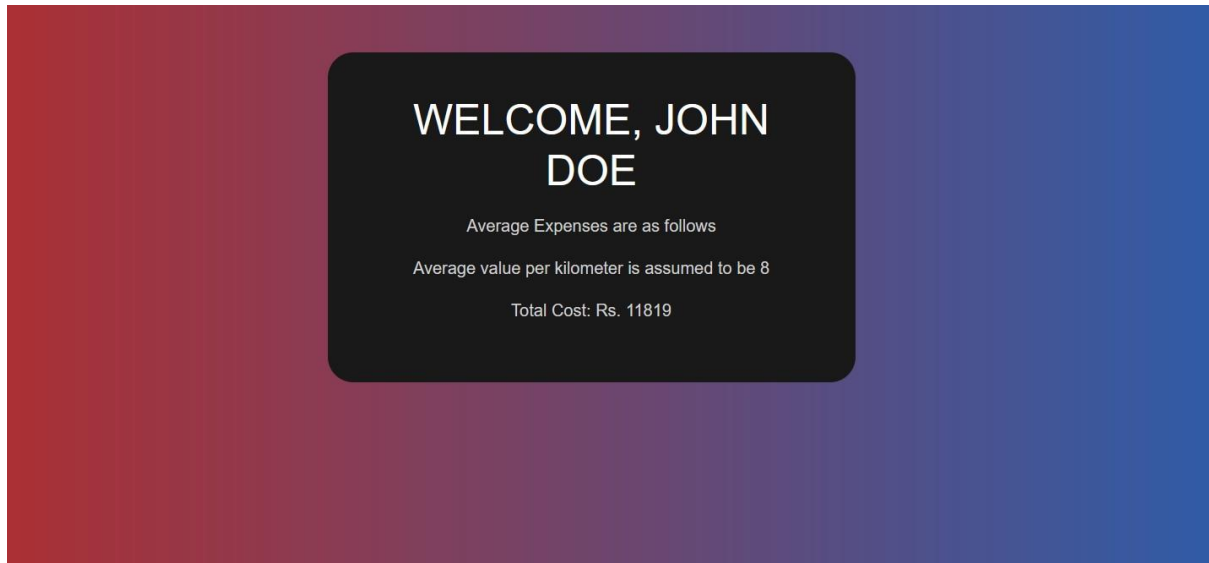
Speak Location and Destination

Average Cost of the travels

Once the user click on Average Cost they will be displayed the Total Cost of the travel by assuming the cost to be 8 Rs per km.

Logout
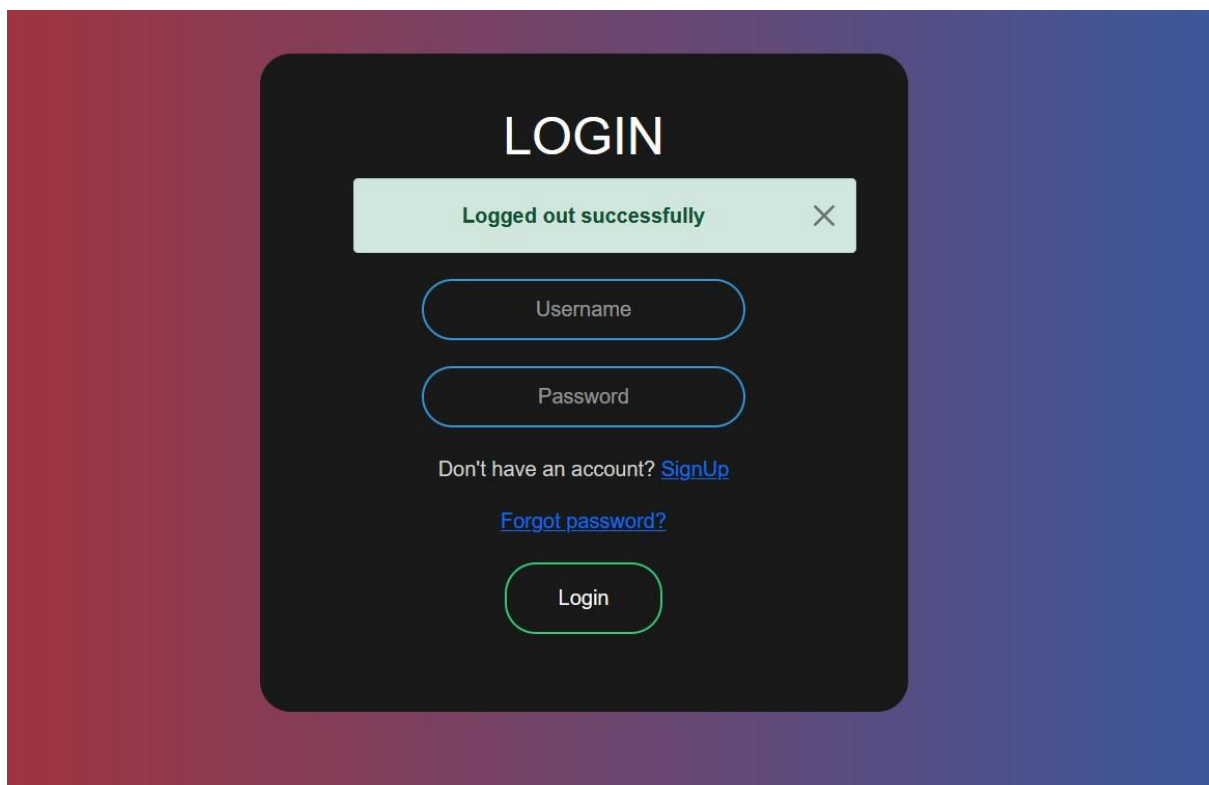
Travel Log Generated in Backend:

source	destination	latitude1	longitude1	latitude2	longitude2	point1	point2	distance_km
indore	bhopal	22.72036	75.8681996	23.2584857	77.401989	22 43m 13.3018s N,	23 15m 30.5485s N, 7	168.1716754
delhi	agra	28.65172	77.2219388	27.1752554	78.0098161	28 39m 6.18408s N,	27 10m 30.9194s N, 7	181.0686101
indore	bhopal	22.72036	75.8681996	23.2584857	77.401989	22 43m 13.3018s N,	23 15m 30.5485s N, 7	168.1716754
indore	bhopal	22.72036	75.8681996	23.2584857	77.401989	22 43m 13.3018s N,	23 15m 30.5485s N, 7	168.1716754
indore	bhopal	22.72036	75.8681996	23.2584857	77.401989	22 43m 13.3018s N,	23 15m 30.5485s N, 7	168.1716754
indore	bhopal	22.72036	75.8681996	23.2584857	77.401989	22 43m 13.3018s N,	23 15m 30.5485s N, 7	168.1716754
delhi	haryana	28.65172	77.2219388	29	76	28 39m 6.18408s N,	29 0m 0s N, 76 0m 0s	125.3538809

All the sources and destinations with their latitude and longitude alongside the points and the distance (in kilometre) between both the locations i.e., both arrival and destination are stored in a csv file.

CHAPTER 5

CONCLUSION AND FUTURE WORK

5.1 LIMITATION OF PROJECT

As much as there are advantages in using VAs however, there might also be disadvantages, such as the following:

- Insufficient briefing and decreased output due to language and cultural barriers.
- Delayed updates due to differences in time zones.
- Lack of focus of a virtual assistant with multiple clients.
- Noisy environments, accents and multiple speakers may degrade results.
- There are also accuracy issues with most speech recognition software. Even the most accurate speech-to-text software solutions are only about 80%-85% accurate.

5.2 FUTURE ENHANCEMENTS

The following things can be done in the future are:

- To improve the accuracy of the voice recognition system.
- To have stable accuracy irrespective of noisy environment or different user accent.
- Modify application so that it can also be used without internet and can help users that are in remote areas.
- Improve the current UI.
- Generate different travel logs for different users using the web app.

CHAPTER 6
BIBLIOGRAPHY AND REFERENCES

6.1 REFERENCES

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