TEAM BINARY BEASTS
REPORT

Problem statement:

An Intelligent app to schedule the timings of transportation, avoiding the over occupancy of public transport / bus stations / railway stations etc.

General description:

Our main objective is to provide a realistic simulation of transport systems capable of effectively managing the administrator side work, identifying connections among the road networks and rail networks of operational areas, generating time tables as well as routes for bus taking into consideration factors which could affect predefined schedule.

The transportation should be managed in accordance to the requirement of passengers and the current situation of the country has made traveling through public transport sceptical. There has to be certain traits that the government needs to follow which we will be mentioning in our survey given below. We will be designing a Web-application for administrators in order to manage the system.

The management system will have following factors:

·   Web- application for administrator: this will allow administrator to manage the complete system.

   It will be consisting of:

   1. Registration / login page: here the administrator will register / login he will be verified by government record such as offer letter / transfer letter.

   2. Time table management: administrator can observe the time table and can request for changes such as change in particular route.

   3. Notification: administrators will receive notifications about any changes that have been made by other administrator or any changes that are done in scheduling

- **Dynamic time table generation:** The time table will be generated dynamically using an "algorithm" and offering administrators to make decisions regarding number of operating buses, waiting time for passengers and adding a containment zone.

- **Generating routes for bus vehicles or making adjustments in the current one.**

Novelty / Uniqueness:

- **Notification: Administrators will get notified of changes made**

- **Self-adapting: The time table will be self-adapting so that depending on previous results delays it can help in improving efficiency**

- **Clash free: The system will be used in such a way that there will be no clashes in arrival or departure time, so that there is no crowding and social distance is maintained. There won't be any transport vehicle leaving at same time from same place, they will have minimum gap of 15 mins**

- **User side application: We further plan to extend this idea and design a user side application so that pre booking can be done and time table can be scheduled based on requirements.**
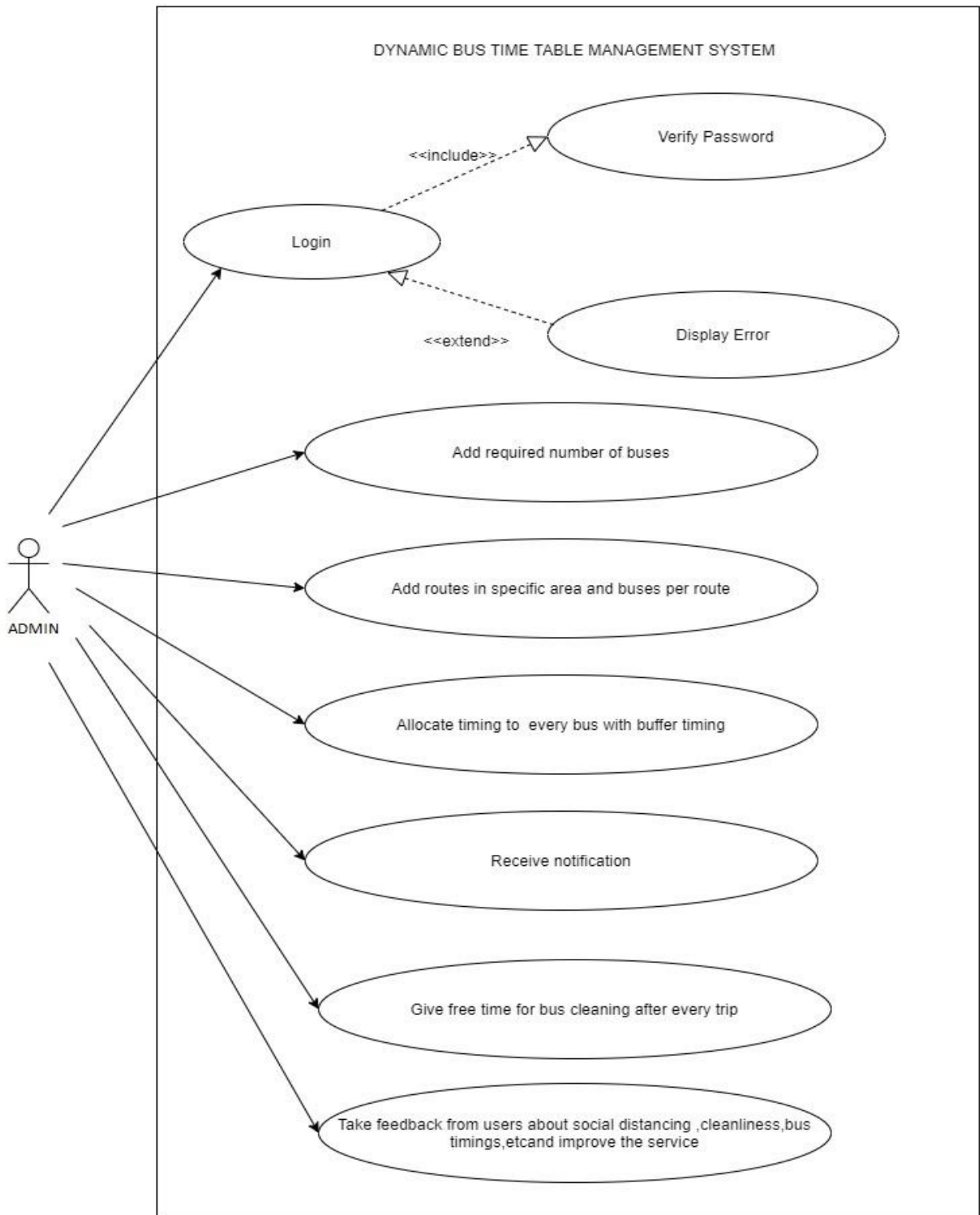
Business / Social Impact:

· **Crowding will be avoided and social distancing will be maintained as the time table will be planned according to the consideration that one place cannot accommodate more than 5 vehicles at a time insource and each destination will be timed with an interval of 30 mins.**

· **Data regarding transport will be maintained so that it can be used later on, the travel route and time of travel will be maintained in record so that it can be further used for analysis.**

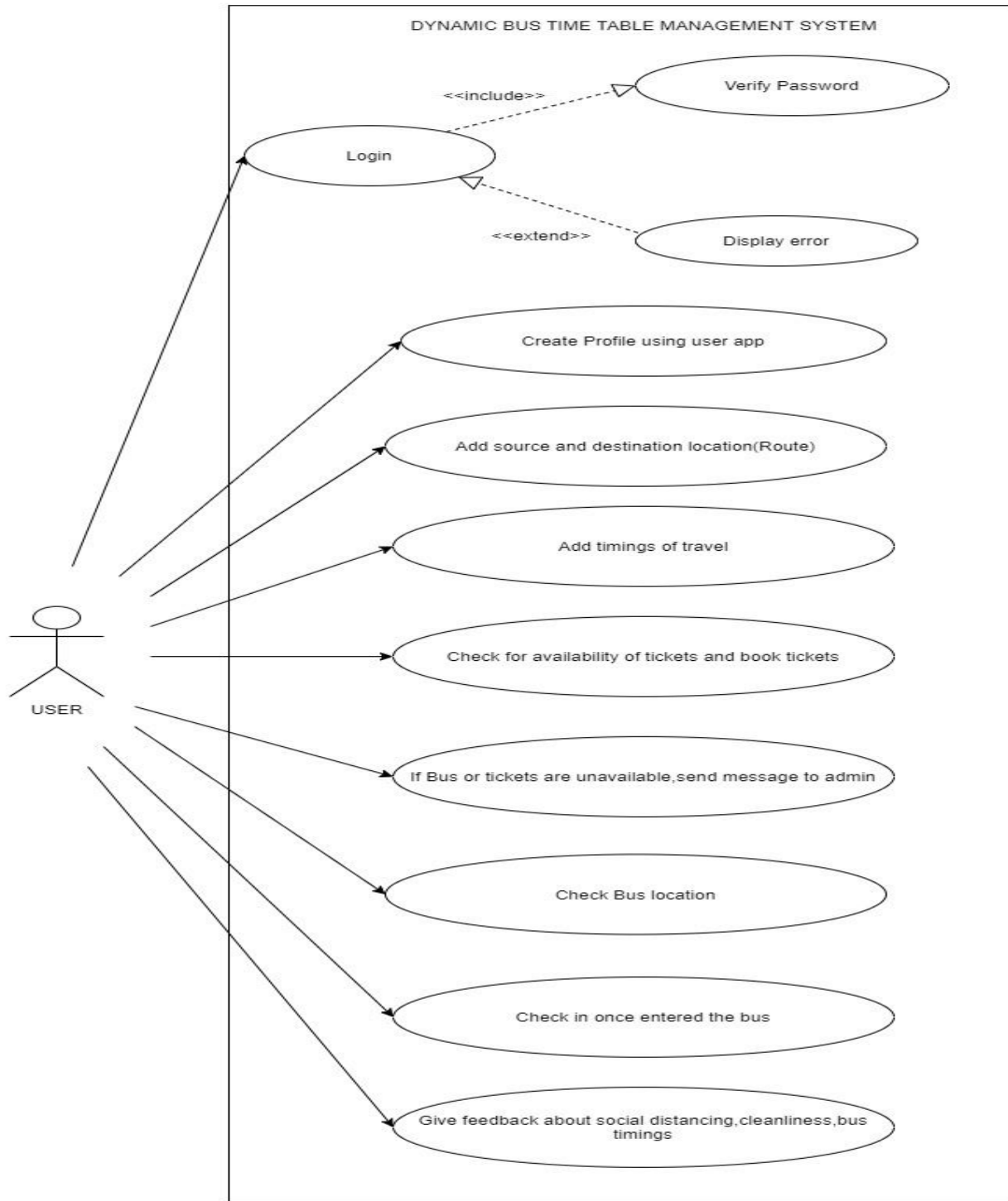· **This system will reduce the manual work and hence increase the efficiency.**

Technology Stack:

- Django MongoDB Engine: for database management, it will store details about admins, buses, stations in the database at the server side.

- Gunicorn :- It is a Python Web Server Gateway Interface HTTP server. It is a pre-fork worker model, ported from Ruby's Unicorn project.

- Algorithms used:-

  - Q learning algorithm:-Is a model-free reinforcement learning algorithm
  - The data will be loaded from the JSON file and will be allocated to the appropriate structure.

- Packages used:-

  - NetworkX:- Its a python package which will be used to design routes as edges and station as vertices points
  - Matplotlib:-Matplotlib is a plotting library for the Python programming language and its numerical mathematics extension NumPy, it will be used to design the map of the routes.
  - Numpy:-NumPy is a library for the Python programming language, adding support for large, multi-dimensional arrays and matrices, along with a large collection of high-level mathematical functions to operate on these arrays. This package will be used to store dataset for the routes in the dataframe like matrices for getting specific values

ADMIN SIDE USE CASE DIAGRAM

DYNAMIC BUS TIME TABLE MANAGEMENT SYSTEM

Verify Password

<<include>>

Login

<<extend>>

Display Error

Add required number of buses

Add routes in specific area and buses per route

Allocate timing to every bus with buffer timing

Receive notification

Give free time for bus cleaning after every trip

Take feedback from users about social distancing ,cleanliness,bus timings,etcand improve the service

ADMIN

USER SIDE USE CASE DIAGRAM

DYNAMIC BUS TIME TABLE MANAGEMENT SYSTEM

<<include>>

Verify Password

Login

<<extend>>

Display error

Create Profile using user app

Add source and destination location(Route)

Add timings of travel

Check for availability of tickets and book tickets

If Bus or tickets are unavailable,send message to admin

Check Bus location

Check in once entered the bus

Give feedback about social distancing,cleanliness,bus timings

USER

Proposal based on Survey :

- **First we need to consider the regular passengers based on passes they can be managed by using separate vehicles.**
- **Next thing to consider is the max traffic hours are in morning and evening bcoz people go to office and schools, then noon time is a bit free.**
- **Bus or train can be divided into 2 parts: 1st is regular passengers and 2nd is irregular so that social distance is maintained, they don't have to come in contact with the conductor and seats can be managed accordingly 2nd is irregular passenger.**
- **Overcrowding of transport vehicles should be strictly prohibited.**
- **We have to take in consideration the capacity of each main station and schedule the transportation based on that not over crowding and also take into consideration not to lose efficiency.**
- **Sanitation of the bus should be done at each station, one person will be in the vehicle, at one stop the person cleans the interior and gets down at the next stop, this needs to be done at alternate stops.**
- **At stations proper markings should be done for people waiting and unnecessary roaming of people should be restricted.**

TEAM MEMBERS:-

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