DEAKIN UNIVERSITY

SIT764/782 - CAPSTONE PROJECT

**Data Science team - Technical document**

EV ADOPTION TOOLS - CHAMELEON

## Introduction

The Data Science Team for the EV Adoption Tool (EVAT) project at Chameleon is responsible for analysing data and developing and integrating advanced data-driven features that enhance the functionality and user experience of the EVAT mobile app. This technical document provides a comprehensive overview of the backend services, data models, and cloud infrastructure implemented by the Data Science Team.

The main goals of the Data Science Team of EVAT team in T3/2024 are to:

1. **Develop Core Features**: Provide insights and recommendations within the EVAT app, including optimal charging station suggestions, and user behaviour analytics.
2. **Ensure Seamless Backend Integration**: Collaborate closely with the Mobile App Team to integrate data science models and APIs into the app’s architecture, ensuring robust communication between the backend and frontend components.
3. **Maintain High Scalability and Reliability**: Deploy backend services to a cloud environment that ensures high availability, security, and scalability.

This document serves as a guide for current team members and a knowledge base for future contributors, providing detailed explanations of the models, API endpoints, data pipelines, and deployment processes.

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## Tech Stack and Tools

### Project Management

* In this project, we use MS Planner to manage and allocate tasks between members to keep track of the progress of the project
* Link to MS Planner: [Link to MS Planner](https://planner.cloud.microsoft/deakin365.onmicrosoft.com/en-US/Home/Planner/#/plantaskboard?groupId=e3287a01-07dd-4a7a-bb27-b8bb1ac221e8&planId=QPo8FDS_RkiZwLZ2yyNy7MgAEK4j)

### Google Maps Cloud Platform

* We will integrate various advanced API services from the Google Maps Cloud Platform into our app.
* GCP services are available for Capstone projects, and access requests must be submitted to our Company Director.

### Version Control

* Team GitHub Repository: [GitHub repository](https://github.com/Chameleon-company/EVAT-Data-Science)
* GitHub instructions: [GitHub Instructions link](https://deakin365.sharepoint.com/:w:/s/Chameleon2/Eb2lea-O_w5BoPklFoTAmKgBYT-bqgW96X7irpmPXieuxQ?e=JPCiFa)

### Programming language

The main programming language in the project repo is Python

* IDE: You can use Google Colab, Jupiter, etc based on your preference
* Other tools: PowerBI

### Database

* NoSQL database: MongoDB
* Database description: [Database description](https://deakin365.sharepoint.com/:b:/s/Chameleon2/EVRGVte1Q_tJo8oQYOePngQBqeaond-PacIbEZG3gM0-oA?e=XCajod)
* NOTE: The database link in the database description needs to be corrected (I can't fix it as this has been done by another in the previous semester). Please use the link mongodb+srv://EVAT:<password-in-the-doc>@cluster0.5axoq.mongodb.net/ instead

### Deployment

* Docker Hub: Store Docker image
* AWS: The current backend is deployed on AWS but should be migrated to GCP this semester (Gonna updated soon)

## Instruction to run code backend

Down below are the command lines for the terminal

**Step 1: Clone repository**

|  |
| --- |
| git clone git@github.com:Chameleon-company/EVAT-Data-Science.git |

**Step 2: Change the directory to the folder EVAT-DATA-Science you just clone**

|  |
| --- |
| cd <folder-you-store-the-code-repository> |

**Step 3: Add file .env in your root repository**

|  |
| --- |
| GOOGLE\_MAP\_API\_KEY=AIzaSyDbfaYzyw\_\_K8paspxDS6c7Pw5VP6q\_R48 DATABASE\_URL=mongodb+srv://EVAT:EVAT123@cluster0.5axoq.mongodb.net/ |

**Step 4: Change the directory to folder main in folder EVAT-DATA-Science**

|  |
| --- |
| cd main |

**Step 5: Install dependencies**

|  |
| --- |
| pip install -r requirements.txt |

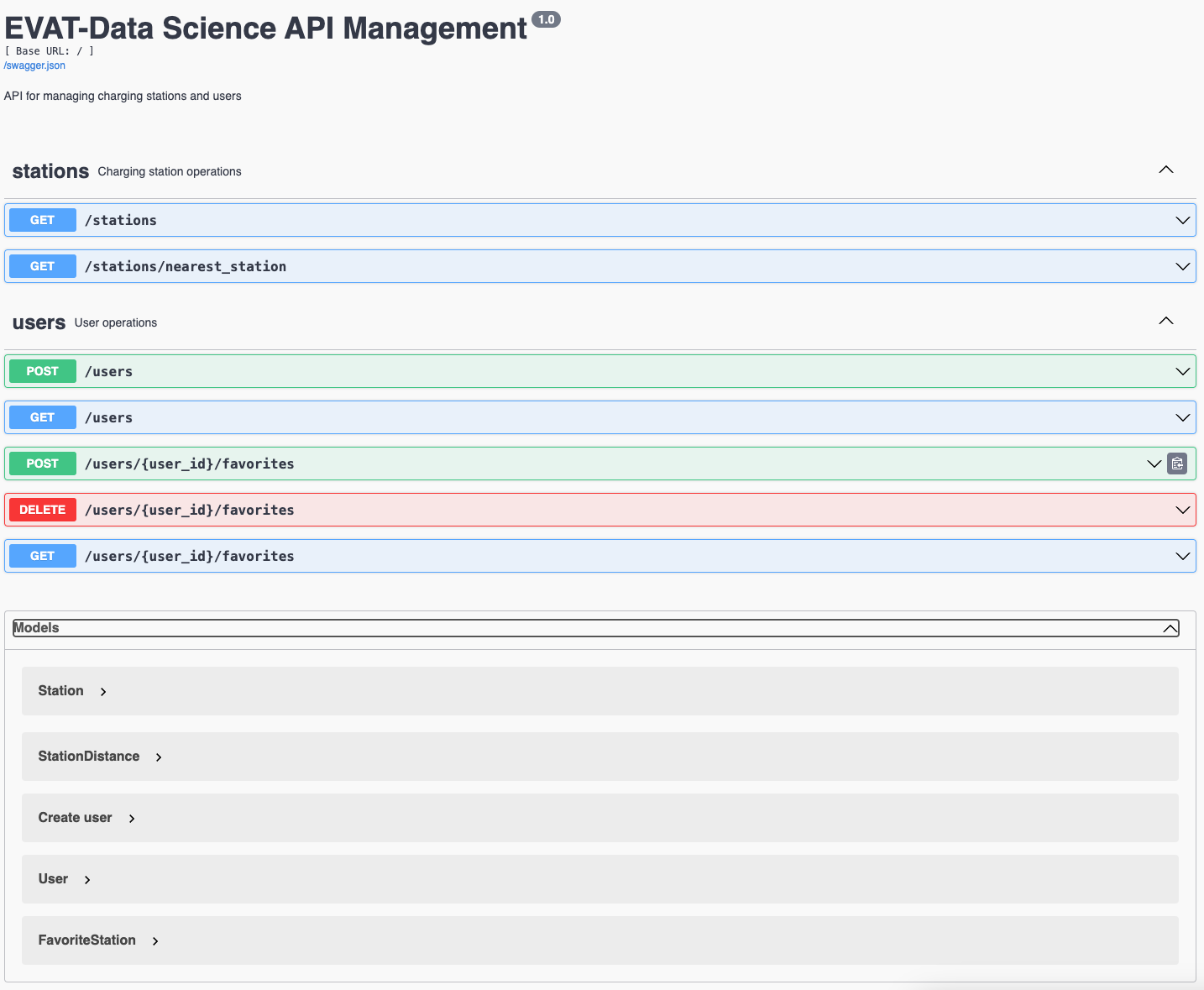
**Step 6: Make sure that your MongoDB server is running**

**Step 7: To run the application on a local computer**

|  |
| --- |
| flask run |

## Callable APIs

The Data Science team’s backend has been integrated with **Swagger** for API documentation. A preview is shown in the image below.

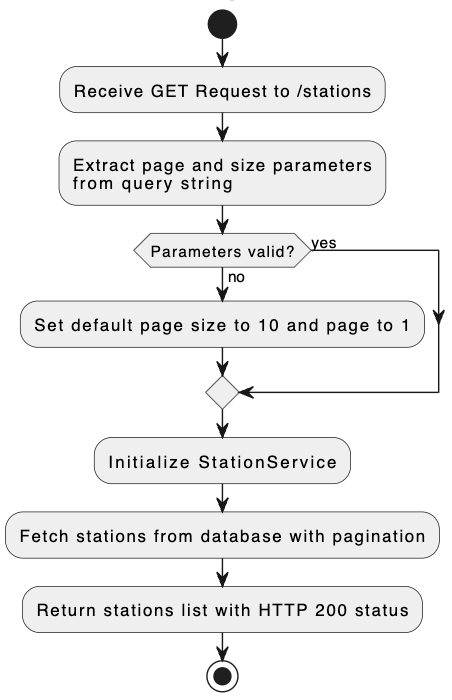


You can use the link below to view the API documentation, including details on how each API works, parameters, request bodies, and test the available endpoints.

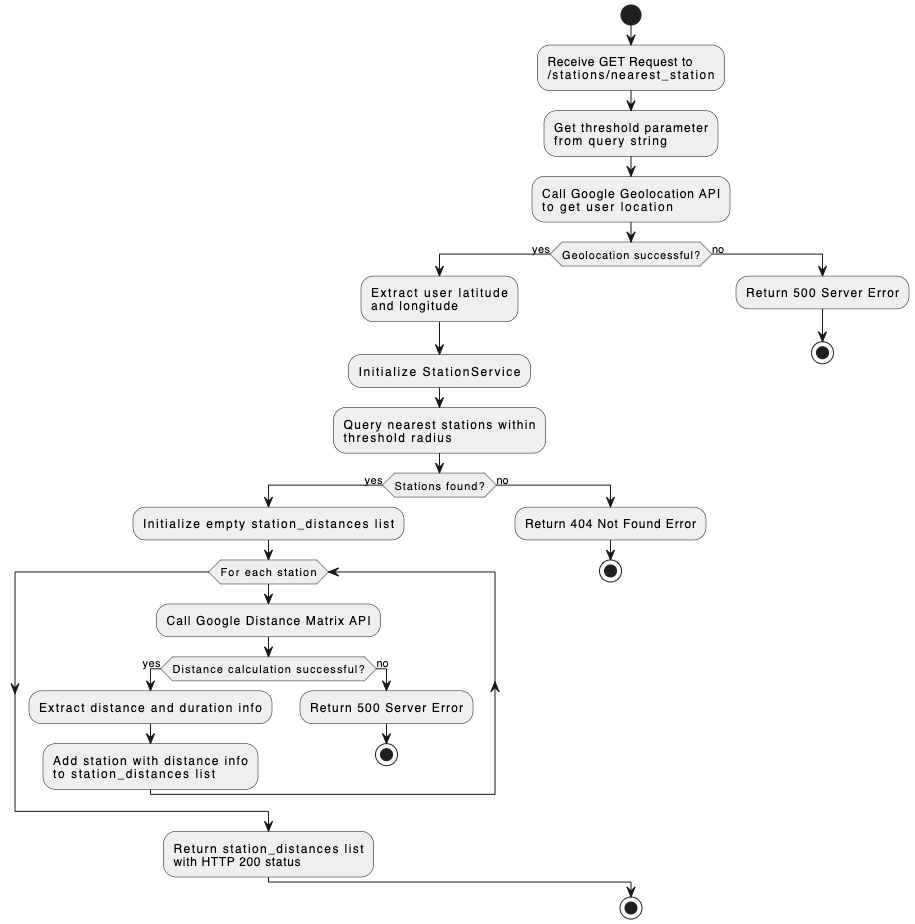
Link: [Online Swagger Link](http://54.206.74.135:5000/)

## Data flow

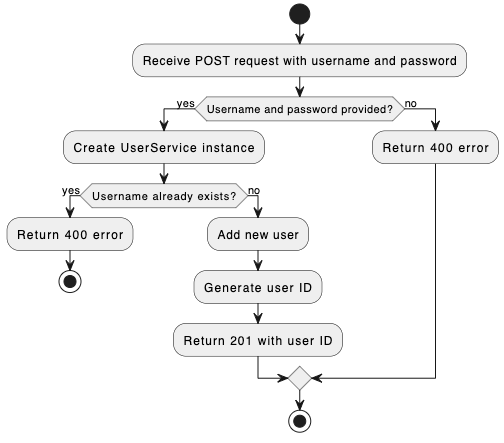
### GET /stations (Get all available stations):



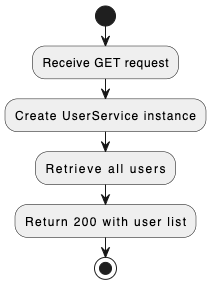
### GET /stations/nearest\_station (Find Nearest Stations):



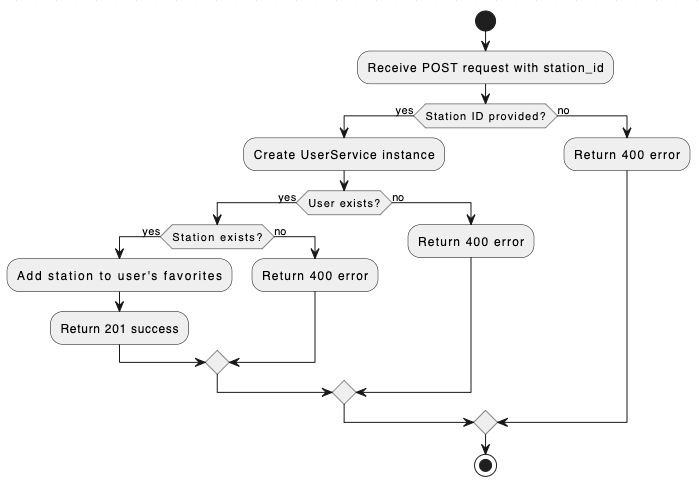
### POST /users (Create User):



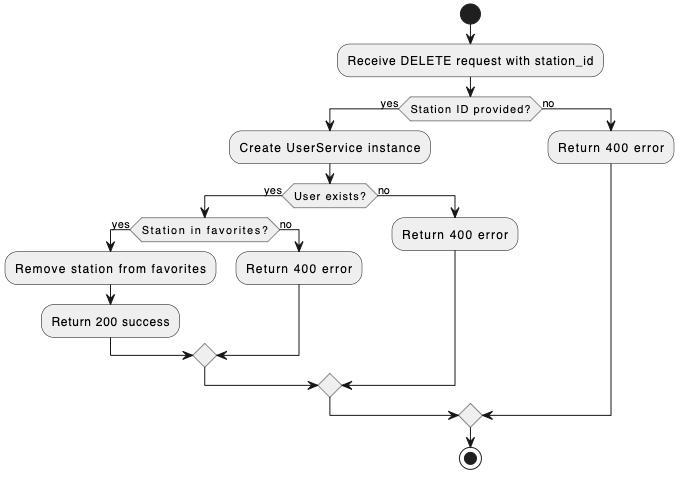
### GET /users (List Users):



### POST /users/{user\_id}/favorites (Add Favorite Station):



### DELETE /users/{user\_id}/favorites (Remove Favorite Station)



### GET /users/{user\_id}/favorites (Get Favorite Stations)

