Deakin University

Capstone Team Project (A)

OnTrack Submission

Company Objectives and Structure

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Chameleon

Task 2.1 P – Company Objectives and Structure

Executive Summary

Our Mission

Given the complexity of energy application needs today, IoT systems are being designed to address a wide variety of existing problems.

At Chameleon, our mission is to research, create, test, document and deploy IoT-based solutions to enhance life through the application of smart city technologies. This includes the building of smarter cities, homes, transportation, and energy management systems.

Our Structure

Chameleon is structured into two main divisions, focusing on strategic areas of importance:

City of Melbourne Open Data Project

The City of Melbourne Open Data partners with The City of Melbourne to support knowledge expansion and application development among businesses, researchers and software developers. Using an educational platform 'The Melbourne Open Playground' (MOP) explores the potential applications of Open Data, aligning its initiatives with Melbourne's Smart City strategies.

Electric Vehicle Adoption Tools (EVAT)

The EV Adoption Tools project is dedicated to promoting the increased adoption of Electric Vehicles (EVs) in Australia. This initiative supports the reduction of fossil fuel dependence, decreases greenhouse gas emissions, and positively impacts the environment. To achieve this goal, EVAT project, which includes both the Data Science team and the Mobile App team, will work together to analyse and summarise EV data from across Australia. We will use this information to create a product that delivers a mobile app with features like EV charger identification and route navigation tailored to user needs. This app will provide a better and more convenient experience for EV drivers, making it easier for them to use electric vehicles. Ultimately, it will encourage more people to switch to EVs for a cleaner, greener future.

Leadership Team

Company Director: Dr Farah Farizi

Electric Vehicle Adoption Tools Project

Leaders: John Collins, Hue Minh Nguyen, Sonam Chewang Dorji, Matthew James Abbott

City of Melbourne Open Data Project

Data Science:

Leaders: Supratim Dobhal, Cjay Basa, Ananya Krishnan, Nishant Umesh Khamkar, Ratanakmoni Slot (Ryan), Randi Tamasha Gunasekara Henadeerage Dona, Kushani Imanthi Ranasinghe

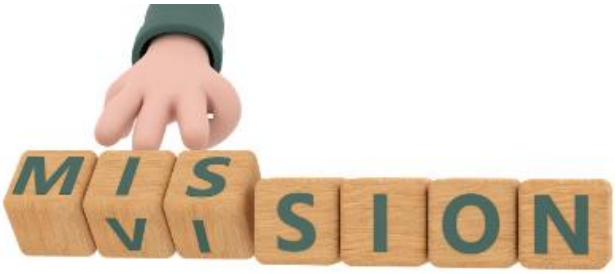
Web Development:

Leaders: Arman Bakhtiariasl

Artificial Intelligence:

Leaders: Khoi Nguyen Bui, Logan Guilding, Alex Truong, Kaimon De Bruijne

Company Structure



At Chameleon, our mission is to harness the power of IoT technology to create and implement smart city solutions that are not only efficient and sustainable but also significantly enhance energy management, transportation systems, and overall urban living.

Director (T3 2024)
Dr Farah Farizi
PhD in Virtual Reality Experience

Product Owner

Mentors

Leadership teams

CHAMELEON
FOR OUR SMARTER WORLD

DEAKIN
UNIVERSITY AUSTRALIA

Melbourne Open Data

EV- Adoption Tool's

Data Science

Web Development

Artificial intelligence

Data science team

Mobile app team

Projects Overview

EVAT (Electric Vehicle Adoption Tools) Project

Overview

The global demand shift toward adopting electric mobility holds immense promise for reducing emissions, displacing oil consumption, and moving our energy mix toward sustainability. EV users, industry players, and policy makers all play vital roles in this transformative journey. The EV Adoption Tools project was initiated with the objective of bringing a more convenient and user-friendly experience for drivers, ultimately promoting the widespread adoption of Electric Vehicles (EVs) in Australia.

Long Term Goal

By developing innovative tools and strategies to support electrical drivers and promote the use of electrical vehicles in Australia, the project seeks to address key barriers to EV adoption, thereby contributing to a reduction in fossil fuel dependency, mitigation of greenhouse gas emissions, and fostering a positive environmental impact on both local and global scales.

Goals & Objectives

EVAT is designed to simplify and enhance the electric vehicle experience. Here's how:

- Informed Decisions: Access real-time data on charging stations, their availability and pricing.
- Optimized Charging: Find the most convenient and cost-effective charging locations.
- Route Planning: Plan your journeys with confidence, accounting for charging stops and range anxiety.
- Community Insights: Connect with other EV users, share experiences, and learn from the community.
- Policy Impact: Provide valuable data to policymakers to support the growth of EV infrastructure and incentives.
- Favorite Stations: Mark and save your Favorite charging stations for easy access during future trips.

By leveraging technology and data, EVAT empowers individuals and businesses to embrace electric mobility with ease and confidence.

> The Problem: EV have a limited travel range and need to recharge. There are a growing but limited EV stations/Charge Points. This Impacts how far the EV owners can drive before recharging. It also EV Owners & Drivers that want to undertake long than EV range journeys.
>
> Our Solution: EVAT A software solution which helps the EV owners & drivers, search, find and navigate to desired EV stations/charge points within Vehicle range, displaying location and routing information on a map.

Trimester 3 Deliverables:

By focusing on the following goals and objectives, we aim to follow agile methodology to deliver the following during this intensive trimester and set a strong foundation for future students to build upon:

User-Friendly & Interactive Map User Interface:

- App Displays Map with location of chargers using advanced custom markers.
- App can provide a navigation route from current location to various EV stations all over Australia.
- App will incorporate a search function capable of searching stations.

Working Demonstration: Interactive App Functionality available to Product Owner/Users for acceptance and testing

- Deliver a working showcase of the integrated piece of app under development by a combined effort of both data science and app team, properly surfacing user-centric data with frontend, backend, and data science components.
- Data Visualisation achieved through, interoperable & aligned data structures supporting the product owners/users desired functionality/user stories:
- Maintaining user seamless experience and deliver end-user value, by developing strategies to bridge the gap between leveraging economical batch processed localised/cloud data bases over costly API calls.

Promote active alignment and collaboration between the teams of:

- AI/Data Science data aggregation and enrichment from multiple data sources to create a database, for the purposed of data visualisation.
- - Data Science Wrapper Module: Implementing a module that allows the mobile app to call Python scripts would significantly enhance functionality.
- Create documentation and best practices that can be utilized by upcoming students in the next trimester to continue this work effectively.

Empowering Team Growth

- To foster a supportive and enriching experience for new team members, we will align their tasks with their career aspirations. By providing opportunities to work on projects that challenge their skills and expose them to real-world scenarios, we aim to:
- Upskill and Develop: Provide a supportive environment for team members to take ownership of their work. ensuring everyone has the chance to contribute meaningfully and develop professionally.

EVAT Project Members:

Name	Student ID	UG/PG	J/S	Team	Lead
MATTHEW JAMES ABBOTT	224908311	UG	J	App	Yes
JOHN COLLINS	223617689	PG	S	Data science	Yes
HUE MINH NGUYEN	2220466717	PG	S	App & Data Science	Yes
YUVRAJ KAPOOR	221219875	UG	J	App	No
MD MOBASSHER NOMANI	222499162	UG	J		No

YASH ANAND	221219875	UG	J	App	No
DARCY LAMBRICK	220266142	UG	J	App	No
ADESH VITTHALRAO PATIL	222514075	UG	J	Data Science	No
TALAL JAMIL	222309402		J		No
JING KANG	223765611	UG	J	App	No
SONAM CHEWANG DORJI	222575318	UG	S	App	Yes

City of Melbourne Open Data Project – Melbourne Open Playground (MOP)

Overview

Since 2014, the City of Melbourne has been at the forefront of Open Data in Australia. In partnership with Deakin, they promote the increased use of their Open Data by businesses, researchers, and developers. As a key component of their smart cities strategy, the Melbourne Open Data Playground (MOP) website will showcase MOP's operations, intelligent data analysis, security details and use cases that align with its goals and objectives.

Goals and Objectives

The project's objective is to develop an educational platform cantered on practical applications of open data, designed for diverse stakeholders such as industry experts, government agencies, and academic scholars. The long-term goals include mining and tracking the City of Melbourne's open data, offering innovative solutions to the city's challenges through data analysis and AI techniques, increasing data usage rates, and supporting urban smart strategies.

Trimester 3 Aims

The Data Science team will work towards its goal to develop data driven IoT-based use cases that align towards the Smart City strategy for the City of Melbourne in three key areas – Business Activity, Transport and Safety, Environment and Wellbeing. The team will aim to create a set of use cases that are well reviewed and ready to be published. Additionally, we will prepare a few use cases as backlog for the upcoming trimester while repointing APIs of older use cases using API v2.1. Now that we have migrated from Trello to Microsoft Planner, the team will use it more to enhance our efficiency in terms of project management, task allocation, and collaboration.

The primary goal of our web development team is to integrate our website with user cases supplied by the Data Science team, enabling easy access through a sophisticated database solution. Additionally, we aim to deploy, rigorously test, and ultimately host the City of Melbourne's website. Our efforts will also extend to enhancing the website's design, framework, and features, ensuring a seamless and engaging user experience.

And finally, the emerging Artificial Intelligence team, now expanded to the Artificial Intelligence and Internet of Things Team, will continue to work novel AI-integral applications that align with Chameleon's smart city vision of technologies that facilitate for greener and more sustainable living. Continuing the projects started in T2 2024, the AI + IoT team will work on 4 projects, Traffic Analysis, Chat Bot (NLP), Computer Vision and Health Behaviour. Some of these still require a lot of work to be valuable additions to the company and other are being expanded and improved from an already functional base.

Deliverables

Data Science Team

- Actively use Microsoft Planner for better project management and collaboration.
- Prepare for the release of use cases that are analysed and are ready to publish.
- Create a set of 13 new use cases to be completed by the end of this trimester.
- Prepare additional use cases as backlog for next trimester.
- Updating the legacy data, documentations and APIs.

- Maintaining and improving the GitHub file system and various channels on MS Teams.

Website Development Team

- Publish all completed tasks on Planner.
- Conduct testing for the website.
- Work in conjunction with AI team to add more features to the website.
- Perform CI/CD pipeline tests on the website.
- Host the completed the website on a webserver (GCP, Azure).
- Add and refine the existing functions of the website.
- Ensure the website is responsive across various platforms for seamless user experience on desktop, tablet, and mobile devices.

Artificial Intelligence + Internet of Things Team

- Continue working on the 4 projects from T2: Traffic Analysis, Computer Vision, Chat Both (NLP) and Health Behaviour.
- Health Behaviour aims to create a dashboard through which users can view individual suburbs or Melbourne's overall health across many social indicators and their predicted values for the coming years.
- Laid the foundation for the Melbourne Public Transportation Chatbot. Implemented 14 use cases for Melbourne Train, including a Web Chat UI. Expanding the Chatbot's coverage to include tram and bus schedules, map visualization, and providing route information that combines train, tram, and bus options.
- Finished outstanding cards on the Planner.
- Create documentation for possible areas for expansion.

Melbourne Open Data Project Team Members

Data Science Team

Name	Student ID	UG/PG	J/S	Team	Leader
Supratim Dobhal	220205268	PG	Junior	DataSci	Yes
Cjay Basa	220044216	UG	Junior	DataSci	Yes
Poojith Girish	223112581	PG	Junior	DataSci	No
Dhruvil Jayesh Mehta	223767196	PG	Junior	DataSci	No
Soham Niket Tamhane	223739584	PG	Junior	DataSci	No
Nishant Umesh Khamkar	223068381	PG	Junior	DataSci	Yes
Ananya Krishnan	222625051	PG	Junior	DataSci	Yes
Sabih Ul Hassan	221429583	UG	Senior	DataSci	No
Sabri Serkan Gulluoglu	217249723	PG	Senior	DataSci	No
Taehwan Jung	223239943	PG	Senior	DataSci	No
Ahmed Awad A Aldhaheri	219256667	PG	Senior	DataSci	No
Mengkheang Neak	222104203	PG	Senior	DataSci	No
Ratanakmoni Slot (Ryan)	222146996	PG	Senior	DataSci	Yes
Kushani Imanthi Ranasinghe	223251652	PG	Senior	DataSci	Yes

Randi Tamasha Gunasekara Henadeerage Dona	222470203	UG	Senior	DataSci	Yes

Artificial Intelligence and Internet of Things Team

Name	Student ID	UG/PG	J/S	Team	Leader
Alex Truong	220213034	PG	Senior	AI	Yes
Anisha Raj	222558616	PG	Junior	AI	No
Awanish Kumar Gupta	223447668	PG	Junior	AI	No
Chathurni Ratwatte	222398572	UG	Junior	AI	No
Chittatosh Patil	220341714	PG	Junior	AI	No
Esha Nagi	223609446	PG	Junior	AI	No
Ethan Jason Longmire	222369928	UG	Senior	AI	No
Huda Abbasi	222221214	UG	Junior	AI	No
Jubal Arun Kumar	222221214	UG	Junior	AI	No
Kaimon De Bruijne	221287183	UG	Senior	AI	Yes
Khoi Nguyen Bui	222515797	UG	Senior	AI	Yes
Lixin Wang	223327667	UG	Junior	AI	No
Logan Guilding	220589655	PG	Senior	AI	Yes
Michael Andrew Tortely	221444531	UG	Senior	AI	No
Ross Parkinson	220624975	PG	Senior	AI	No
Stefan Cucos	214397647	PG	Junior	AI	No

Web Development:

NAME	STUDENT ID	UG/PG	J/S	TEAM	LEADER
Johnny Vo	222088626	UG	Junior	WEBDEV	No
Arman Bakhtiariasl	220492498	UG	Junior	WEBDEV	Yes
Tyler Sheaf	221154888	UG	Senior	WEBDEV	No
Phuc Dat Tran	222134337	UG	Senior	WEBDEV	No
Syed Saif Ali Abidi	223090772	PG	Junior	WEBDEV	No
Manoj Kumar Bogineni	223817296	PG	Junior	WEBDEV	No
Niwanthi Edirisinghe Arachchilage	223558537	PG	Junior	WEBDEV	No
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Gloria Chemutai Kiplagat	223452112	PG	Junior	WEBDEV	No
Muhammad Jahanzaib Khan	223739038	PG	Senior	WEBDEV	No

Ben Tran	222134337	UG	Senior	WEBDEV	No
Hashini Madushani Nanayakkara Geeganage	223021831	PG	Junior	WEBDEV	No
Rahul Sehrawat	222465258	PG	Junior	WEBDEV	No