Deakin University

Capstone Team Project (A)

OnTrack Submission

Company Progress Report

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December 2, 2024

Chameleon

Task 4.1 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.

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

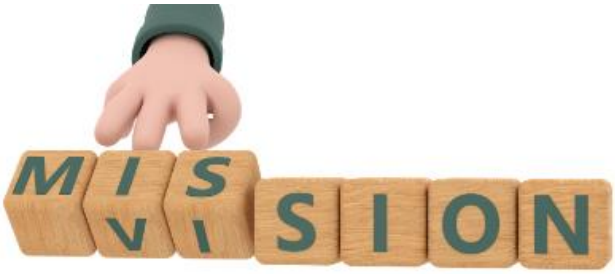
Web Development:

Leaders: Arman Bakhtiariasl, Phuc Dat Tran

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.

Mid-Term Project Update

App Development Team:

- Frontend:
  - The team has established a dedicated repository for front-end development, building upon the progress made last trimester. We have enhanced the map tab with several key improvements, resulting in four pages under development: login signup, Map, Trip Planner, Save, and Me.
  - We are also transforming the prototype created last trimester into functional React Native screens. These screens are highly interactive and designed with a user-centric approach.
  - **Ongoing Progress:** Our team members are working on different aspects of the project, all aiming for the project's success and its successful deployment by the next trimester.

- Backend:
  - **Security Enhancements: A** new repository is set up, with user registration (hashed passwords) completed. JWT token encryption and role-based access control are progressing, aiming for completion by Week 5.
  - **Feature Integration:** APIs for displaying charging stations, nearest station searches, and Favorites are ready, with Mobile App integration expected by the end of Week 5.
  - **Communication & Collaboration:** While there have been more meetings between backend Mobile/App members and the Data Science team as compared to trimester 2 2024, further improvements are needed. The team will continue to facilitate better communication through meetings to ensure alignment and smooth collaboration between the teams.

Progress update for each EVAT member

Name	Student ID	Team	Progress update week 1-4
TALAL JAMIL	222309402	-	N/A
JOHN COLLINS	223617689	Data science	N/A
ISHINI BHAGYA	s223075053	Data science	N/A
MD MOBASSHER NOMANI	222499162	App	N/A
YASH ANAND	221219875	App	N/A

ADESH VITTHALRAO PATIL	222514075	Data Science	I collaborated with John to determine the tasks for the trimester and address gaps in the EV Station dataset caused by missing data from the previous work. To resolve this, I scraped data using OpenChargeMap and Overpass APIs and enriched the EV Station Data Model with fields like AvgChargingDuration and PeakHours. I set up MongoDB connectivity, performed CRUD operations using Python and mongosh, and established a robust data pipeline. Additionally, I developed a basic heatmap in Power BI to visualize EV station density, which requires further refinement. My focus has been on filling data gaps, enhancing the data model, and improving project deliverables.
HUE MINH NGU YEN	2220466717	App & Data Science	I established a dedicated backend infrastructure for the Mobile/App team of the EVAT project, implementing a robust three-tier MVC architecture using NodeJS, Typescript, and ExpressJS. I designed and implemented a secure authentication system, along with user registration and login functionalities, and configured MongoDB database integration to ensure secure data storage. In terms of documentation, I created comprehensive technical resources, including API documentation with Swagger, detailed onboarding documents for new team members, and a technical stack and instructions to facilitate cross-team collaboration. I also participate in project organisation by setting up communication channels via Teams chat and organising the repository structure. Additionally, I actively participated in multiple cross-functional meetings, showcasing my project management and team collaboration skills.

YUVRAJ KAPOOR	221219875	App	The first security feature for the application, JWT token implementation, has been completed. I've written the code to handle the generation and validation of JWT tokens for user authentication. Upon login, the server issues a token that must be included in subsequent requests to access protected routes. The implementation includes setting a secret key and token expiration for added security. I've tested the feature to ensure proper functionality across the relevant endpoints.
DARCY LAMBRICK	220266142	App	I completed the profile screen and saved stations screen for the app, I used designs that my team has created and turned the designs into real screens in the app. I have updated the nav bar based on the designs and set up routing navigation for everything. I added a basic create account and login screens with navigation between them. This was done with the intention of setting up the API for users. I have also spent my time trying to help other team members with their development.
JING KANG	223765611	App	I redesigned Figma, and completed the development of three pages, I then needed to iterate and work with the back-end team to complete the development.
SONAM CHEWANG DORJI	222575318	App	I've been actively driving our project from the start. I onboarded new members, presented our company vision, and created an onboarding checklist. This included key resources, SWOT analysis, and a review of past achievements to guide new members. I restructured the planner board, aligning it with trimester goals, and assigned initial sprint tasks. I

			actively participated in product owner meetings. My leadership includes guiding the frontend team in coding the app prototype and ensuring successful setup of development environments. I've also shown initiative in company leadership, submitting key documents and co-hosting meetings with detailed record-keeping. I significantly contributed to the "Trip Planner", implementing interactive features for location input and leveraging Google Cloud Platform's for accurate route calculation. I actively participated in team discussions, provided constructive feedback, and contributed to project documentation. I adjusted technical priorities based on the Project Director's feedback. My contributions demonstrate a commitment to leadership and technical excellence, ensuring the project's continued success.

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.

Mid Trimester Updates

Data Science Team:

- Successfully transitioned to Microsoft Planner for task allocation, progress tracking, and collaboration, streamlining team workflows and enhancing transparency.
- Maintained regular updates in Microsoft Planner, including detailed backlog tracking to ensure all tasks are on schedule.
- Progress on Use Cases:

- Out of 13 targeted new use cases, 12 have been successfully created and are currently in progress.
- Actively working on 17 use cases, categorized as follows:
  - ❖ Business and Activities: 5 use cases
  - ❖ Environment and Wellbeing: 8 use cases
  - ❖ Transport and Safety: 4 use cases
- Archived outdated documents and reorganized GitHub repositories for improved file management and accessibility.
- Regular updates made to MS Teams channels to facilitate effective communication and collaboration among team members.
- Preparing backlog use cases for the next trimester, ensuring a strong pipeline of projects for the future.
- Aiming to publish thoroughly reviewed and polished use cases by the end of the trimester to maintain quality standards.

AI + IoT Team:

- Got all team members assigned to a project in the Microsoft Planner.
- Currently working on 3 Use Cases:
  - ❖ Chat Bot (NLP)
  - ❖ Computer Vision
  - ❖ Health Behaviour
- Health Behaviour has completed data cleaning and sorting for the chosen topics and has begun to create dashboards for visualisation and prediction.
- Begun to connect all the Use Cases via a website so that all projects can be viewed and interacted with.
- All projects intend to continue as planned into the end of this trimester.

Melbourne Open Data Project Team Members

Data Science Team

Name	Student ID	Contributions week 1-4
Ahmed Awad A Aldhaheri	219256667	I contributed to enhancing the alignment between tree planting schedules and water flow routes by focusing on data integration, cleaning, and preprocessing. This involved handling missing geospatial data, standardizing coordinate formats, and merging datasets based on spatial proximity. I conducted geospatial and temporal analyses, using interactive maps to visualize planting zones and their relationship with critical water flow paths, as well as bar charts to illustrate planting schedule distributions. Additionally, I identified high-priority zones based on proximity and schedule urgency, recommending a focus on areas slated for planting in "Years 1-4." Technically, I managed my contributions through a dedicated GitHub branch, where I committed code updates, pushed changes, and submitted pull requests to the master branch. I participated in code reviews, ensured all updates were well-documented, and actively collaborated to maintain a transparent workflow. Regular communication with my mentor helped me align my efforts with project objectives.
Ananya Krishnan	222625051	My technical contribution is towards the Open Space Fitness Optimisation, where my first use case is about locating the ideal spot for exercising and recommending enhancements to widespread this culture (exercising). Currently, I have analysed the high-usage spots for the fitness -training based-on-pedestrian-count. This week (week-4) commenced on working with other factors to include in the above analysis and proceeding

		further, that is I am re-structuring the code and refactoring it as-I-move-ahead. In near future (week-5), planning to start with recommendations and report generations for the same. With reference to leadership, I have reviewed company's document; acted as minutes author two times and facilitator once; assisted my teammates, whenever they reached out to me; reviewed my peer's code before approval; I am into collaborative problem-solving; and raised common queries and concerns actively on communication channel. This week, I am involved with company's document, which is planned to be consolidated today (28-11-2024).
Cjay Basa	220044216	This trimester, I analysed two datasets to predict business activity for cafes and restaurants in Melbourne. I cleaned and merged data on seating capacity and employment density, identifying patterns linking employment sectors to customer foot traffic. I created visualisations, including bar and pie charts, to highlight trends in business density and seating arrangements, providing insights for business owners and urban planners. Additionally, I collaborated with two teammates to resolve a critical issue impacting most of the team. I chaired team and leadership meetings, recorded minutes, developed a meeting agenda template now in use, and created two MSTeams chats to improve team collaboration. I contributed to the company report, renamed a third of the use case folders and files, and added fifty percent more use cases to Use_Case_Summary.md with file links and data collection methods in GitHub for quick access. Additionally, I reviewed and provided feedback on teammate's pull requests.
Dhruvil Jayesh Mehta	223767196	I contributed with use-case by improving tasks like cleaning and pre-processing data, aligning the employment and housing datasets so they could be analysed in a useful way. To do this, I had to use mean interpolation to fill in missing housing price data, keep important job data, and make sure that all datasets had the same geographical areas. I combined job data at the ANZSIC level to get industry-specific information. I also normalised housing and employment data so that they could

		be compared correctly. I fixed problems with mapping by checking geographical maps between datasets by hand to fix errors. I did some exploratory data analysis (EDA) as well, making scatter plots and histograms to find patterns in the data about jobs and housing prices. I managed these contributions via a dedicated GitHub branch. I committed code changes, pushed updates, and submitted pull requests to the master branch.
Gloria Chem Kiplagat	223452112	Over the past three weeks, I contributed to the Real Estate Market Analysis and Forecasting use case. I began by familiarizing myself with the GitHub repository and project documentation, cloning the repository, and downloading datasets for initial exploration. I participated in weekly standup meetings, sharing updates and obtaining feedback. My contributions focused on data preparation, including cleaning and processing datasets to ensure consistent coordinates, numerical conversions, and addressing missing values. I conducted exploratory data analysis with visualizations such as histograms, pie charts, and correlation heatmaps to highlight trends in building heights and bedroom mixes. Using K-means clustering, I identified key investment hotspots and created an interactive heatmap to display development distributions across Melbourne. Lastly, I designed a basic forecasting model leveraging historical growth rates to predict development trends over the next five years, offering data-driven insights for urban planning and investment strategies.
Kushani Imanthi Ranasinghe	223251652	I have made significant contributions to the MOP Data Science team through both technical and leadership responsibilities. On the technical side, I successfully completed a use case titled "Analysing the Impact of Time, Weather, and Traffic on Bike and Car Usage Patterns." This involved data preprocessing, identifying key patterns, deriving actionable insights, and validating results through visualizations and statistical measures. I documented my findings with detailed interpretations and finalized the use case with clear and actionable conclusions. In my role as a Senior Leader, I managed Teams

		files within the 'City of Melbourne' and 'Chameleon Leadership' channels. This included organizing and archiving past trimester folders, creating new folders for the current trimester, and ensuring all leadership documents were properly stored and easily accessible for reference. These contributions reflect my dedication to delivering high-quality outcomes, fostering team collaboration, and maintaining organizational excellence, ensuring the team remains on track to achieve the defined goals.
Mengkheang Neak	222104203	For my technical contribution I worked on a use case by analyzing customer service requests, environmental resources, and planned capital works data. I cleaned and prepared the datasets, looked through trends like seasonal request patterns, and created visualizations to understand any specific category activities. I also performed a correlation analysis across the datasets to identify any inefficiencies and give advice that are reasonable. I completed the use case by offering a conclusion and practical advice on optimizing resource management to improve efficiency. On the leadership side, I focused on reviewing my teammates' GitHub pull requests. I provided feedback to help them improve their work, pointed out areas for any improvement, and approved pull requests once they met the project's standards.
Nishant Umesh Khamkar	223068381	For my technical contribution, I analyzed open datasets from the City of Melbourne to understand bike usage patterns and optimize route planning. I performed data cleaning, feature engineering, and EDA to create meaningful insights. I implemented and evaluated multiple predictive models, identifying Gradient Boosting as the most effective with an RMSE of 55.71. Key insights, such as the impact of route type and utilization score on bike counts, were derived to support infrastructure planning As part of my leadership contributions, I supported my peers by helping them cloning the repository, and ensuring the tasks proceeds smoothly. Additionally, I reviewed Git pull requests for my peers and providing them with constructive feedback to improve code quality and maintain project standards. Further I

		coordinated in the team meeting, Additionally, I represented the team during a meeting, presenting a progress report that highlighted our collective achievements and addressed areas needing focus.
Poojith Girish	223112581	My efforts to the project thus far have been concentrated on data preparation, analysis, and visualizations to improve Melbourne's urban green space accessibility. To ensure data quality for analysis, I have successfully loaded and cleaned several datasets, including tree species, tree canopies, and contributions from open spaces. I fixed data types, cleaned missing values, and converted the data into GeoDataFrames for spatial analysis using Pandas and GeoPandas. I created a graphic representation of Melbourne's tree distribution to pinpoint regions lacking enough green space. In the end, my work has contributed to the city's environmental sustainability goals by helping to establish the framework for identifying areas that require more tree planting. I've also worked with the team to resolve GitHub problems, add to the repository, and guarantee efficient project management. Moving forward, I will continue refining the analysis, exploring trends in tree diversity, and providing actionable insights.
Randi Tamasha Gunasekara Henadeerage Dona	222470203	For my technical contributions, I worked on a use case named 'Accessibility analysis' which provides a transparency about the facilities available for people with accessibility needs in Melbourne. I used three datasets from the Melbourne Open Data Portal, retrieved through APIs. I cleaned and prepared the data for analysis and visualized the current accessibility facilities on maps and different charts. I also did a proximity analysis and based on those insights; I provided recommendations to improve accessibility infrastructure in the future. In my leadership role, I organized the documentation folder in data science folder in GitHub. I structured it clearly, ensuring that the same files in different formats and with similar names were well-arranged for easy access. I also reviewed pull requests from team members to ensure their contributions aligned with the project requirements. This helped maintain a

		conflict-free workflow and ensured no issues affected the master branch.
Ratanakmoni Slot	222146996	My use case focuses on identifying heat-activity hotspots in Melbourne to inform strategic cooling solutions. I analyzed pedestrian and microclimate data to understand patterns of activity during extreme heat. Starting with data cleaning and preprocessing, I explored trends in temperature and pedestrian activity. Focusing on summer months, I identified the hottest day each year and filtered for times when temperatures exceeded 30°C. Using Folium, I visualized temperature and pedestrian hotspots on an interactive map, highlighting key areas for intervention. In terms of leadership contribution, I have been coordinating Data Science team meetings for the past two weeks. I actively work with other members to address GitHub issues, ensuring collaborative problem-solving. Additionally, I assist junior team members in improving their skills and upskilling as they develop their own use cases.
Sabih Ul Hassan	221429583	I have actively contributed to the optimization of urban traffic and parking analysis by focusing on data integration, cleaning, and preprocessing tasks. This included resolving inconsistencies, handling missing values, and standardizing datasets for effective analysis. I conducted in-depth geospatial and temporal analyses to identify high-congestion parking zones and traffic bottlenecks in Melbourne, utilizing tools such as Folium and Matplotlib to create detailed maps and visualizations. I further explored predictive modelling, developing a Random Forest regression model to forecast congestion trends and identify key influencing factors. On the leadership side, I mentored team members, including new contributors, by guiding them through project workflows, resolving GitHub conflicts, and conducting an explanation session on pull requests and code reviews. I reviewed and approved multiple pull requests, provided constructive feedback. I regularly participated in team meetings, set agendas, and maintained communication with team members to ensure alignment with project goals.

Sabri Serkan Gulluoglu	217249723	For my technical contribution, I have worked on the parking slot occupancy detection use case. In my work, I have covered several subjects, which include the analysis of user behaviour on parking. The work involved peak usage patterns, parking status analysis, user movement trends, and spatial analysis which includes clustering parking locations. To support these analyses, I've also developed SQL queries to extract relevant data. However, my major achievement is utilizing digital data processing platforms in Python environment. More specifically, what I have done is to apply Apache Spark for the effective analysis of huge data sets. I am currently working on comparing performance for Apache Spark versus standard Python environment which will focus mainly on CPU as well as memory use for further enhanced analysis. Having made this contribution with using a widely used digital data processing tool has advanced the project to a new level.
Soham Niket Tamhane	223739584	Over the past few weeks, the technical contribution given by me was in the domain containing multi-climate sensor data and tree canopies data which will give me the result of due to which kinds of trees the heat is reduced in the area and in turn it will help in increasing the population. I have cleaned the data, and visualization was processed and would give the result on the map locating areas which will show the regions of less heat and more population involvement. The project has progressed to 40 percent and in the coming weeks it will be close to completion.
Supratim Dobhal	220205268	From a technical standpoint, I have created my own use case- mapping graffiti and illegal waste dumping hotspots by using the pedestrian traffic data, service requests and development activity. I have used four datasets, loaded them using API before cleaning and preprocessing. Further I delved into the data, deriving the summary statistics and performing exploratory data analysis and visualizations. I plan to merge these four datasets to perform feature engineering and predictive modelling. I also took the initiative to indulge myself in leadership activities. I contributed to the Company Report for the Data Science and Web

		Development teams, resolved Git cloning issue and created error handling document for the team, assisted teammates with commits and pushes. Additionally, I reviewed certain pull requests and leadership tasks, while providing a positive and constructive feedback, completed leadership task to archive unused files on GitHub, hosted leadership meetings, organized team meetings and took minutes.
Taehwan Jung	223239943	This trimester, I created a new use case and am conducting the analysis. My focus has been on creating clear and easy-to-understand visualizations. To achieve this, I have dedicated considerable time to preprocessing tasks, including handling missing values, matching datasets, and converting data types. Additionally, I successfully merged all the work completed so far. For the remainder of the trimester, I plan to extract insights through visualization and carry out additional analysis using machine learning algorithms. Apart from the use case, I assisted teammates with cloning repositories using Git and GitHub. I also volunteered as a pull request reviewer and reviewed several requests. During the reviews, I focused on minimizing conflicts and ensuring no issues arose in the main branch.

Artificial Intelligence and Internet of Things Team

Name	Student ID	Contributions week 1-4
Alex Truong	220213034	With the addition of new team members, the Chatbot team has expanded its scope to include tram and bus modes, as well as two previously unimplemented use cases from the train mode in Phase 1. Six new use cases have been introduced, focusing on real-time updates and station-specific information: Nearest Tram and Bus Stations: Suggests the closest stations based on the user's location. Real-time Updates: Provides live status updates for tram and bus routes.

		Comprehensive Real-time Updates: Covers route delays, disruptions, and trip-related alerts. Real-time Station Information: Offers details such as operating hours and service alerts. This brings the total use cases to 21. From the implementation progress, I have successfully developed and integrated four use cases into Rasa, including Tram and Bus Stations Map and Real-time Updates. Two use cases—Schedule Information for Tram and Bus are in progress. Foundational methods for PTV APIs have also been developed to enhance the chatbot's integration capabilities.
Anisha Raj	222558616	I contributed to the health behaviour project under the AI + IoT team by creating a data pipeline to process and integrate six years of survey data into meaningful insights and visualizations. My work involved fetching data using APIs, cleaning, and integrating this data into an interactive dashboard using Python, Flask, and Plotly. The dashboard will be helpful to visualize food security trends across different demographics and includes a feature for predicting future trends using ML. Additionally, I implemented dynamic filtering options for users and enabled the export of visualizations for easy sharing. Beyond the technical contributions, I created a documentation on API data fetching and plan to develop a guide or video walkthrough to ensure that the processes I implemented are accessible and easy for others to build upon in the future.
Awanish Kumar Gupta	223447668	I am contributing to our team's chatbot project by integrating real-time traffic data using the TomTom Traffic API to enhance route planning and travel recommendations. My responsibilities will include implementing geocoding functions to convert user-provided locations into latitude and longitude, querying live traffic data for routes, and calculating traffic-aware travel times. I will optimize the chatbot's ability to provide alternate routes, ensuring users receive the fastest or least congested options. And will integrate this with map visualization. My efforts will improve the chatbot's functionality by enabling it to provide accurate, traffic-aware recommendations, increasing its utility for users navigating. I am also creating documentation for using the TomTom API effectively.

Chathurni Ratwatte	222398572	I contributed to the health behaviour project under the AI + IoT team by creating a data pipeline to process and integrate six years of survey data into meaningful insights and visualizations. Using Python, HTML, CSS, and JavaScript, along with tools like Flask, Dash, Folium, Pandas, NumPy, Plotly, and Bootstrap, I built a user-friendly web application with a dashboard, map, and data viewer. I cleaned and combined six years of wellbeing data (2018–2023), fixing inconsistencies and filling gaps using statistical methods like interpolation. The dashboard shows trends across topics, age groups, gender, and suburbs, while the map highlights geographic patterns with heatmaps and markers. I also added predictive analytics, using regression models to forecast wellbeing trends for 2024–2025, helping identify possible future changes. To make the platform easy to use and maintain, I created clear documentation, including a user guide, setup steps, and tutorials, so future teams can quickly understand and improve the system.
Esha Nagi	223609446	N/A
Ethan Jason Longmuir	222369928	I started off with the intention to design a webpage for the Vehicle Detection AI. After having a meeting with another team member, we started working on a website for the whole AI team. Over the past few weeks, I've created a help button for the Vehicle Detection AI, a collapsable sidebar, a footer, a button linking straight to the detection AI and a gradient background.
Huda Abbasi	222221214	I contributed to the health behaviour project under the AI and IoT team by creating various methods to sort and structure given datasets into a format that can be used for further analysis and predictions. Using the sorted data, I created an interactive map highlighting the overall percentage of health in various suburbs across Melbourne from the year 2018-2023, using the folium package. The health percentage of each year is displayed, with red markers indicating the lowest year and a green marker highlighting the year with the highest overall health for each suburb. Moving forward, predictions using linear regression are to be made to forecast the overall health for the next two years. This interactive display will be integrated into a html page using Flask. I have further documented the various use cases of the folium packages a short tutorial for those interested in advanced visualisation of Geospatial data.

Jubal Arun Kumar	221514619	I am a part of the chatbot team. I have made technical contributions, by working on the tram routing aspect of the chatbot. I have created a Jupyter notebook file, that is not connected with Rasa where the names of the stops are extracted from the user input, tram trips between the two of them are identified and a map is generated that includes walking and tram routing. I have also integrated this use case to the rasa project, but it still needs to improve on for more efficiency and accuracy
Kaimon De Bruijne	22128718	I have worked as a leader with the AI + IoT team, specifically for the health behaviour project. Created a dashboard using python, html and flask to view data on the perceptions of safety within Melbourne, on public transport and in neighbourhoods for both day and night. The dashboard not only shows historical data from the past 6 years but also a prediction of the next 2 years. I created a video tutorial on how to set up flask to connect python code to a html frontend and I have also contributed significantly to assisting and providing guidance to team members in general.
Khoi Nguyen Bui	222515797	In fact, I am leading several initiatives on the Vehicle Classification use case as a team lead to improve the way traffic management and road safety are coordinated. To help authorities in traffic flow, I developed a vehicle accident detection system, and then an overspeed detection model capturing and storing data about offending vehicles for analysis. My team is further developing an interactive website that will make vehicle classification accessible, including identification of the type of vehicle, speed, and count, and sending an email in case of over speeding. These innovations illustrate the practical applications of AI: empowering users, supporting smarter traffic management solutions.
Lixin Wang	223327667	Over the past few weeks, I've contributed significantly to our project's progress. Initially, I established the foundation by forking and cloning the repository, setting up the development environment, and running initial tests for vehicle classification and speed prediction. My key contributions include: 1. SAHI Implementation: I successfully implemented the SAHI technique, improving detection of small vehicles by segmenting images and predicting each piece individually. This led to enhanced accuracy in challenging scenarios. 2. Model Upgrade: I upgraded our model to YOLOv11, fine-tuning it on our dataset for improved stability and precision in close-range vehicle detection. 3. Collaborative Sharing: I actively shared my best-

		performing model and fine-tuning code through pull requests, fostering collaboration and collective knowledge within the team. My work has significantly advanced our model's capabilities and laid the groundwork for further development.
Logan Guilding	220589655	N/A
Michael Andrew Tortely	221444531	I have worked as the lead of a new project we have be calling the 'Collective Project', which has been working on the design and production of a centralised flask app which plans to bring and showcase all the students work within the AI + IoT team in one place. I have been focusing on back-end which is primarily finalised as we have the working prototype up and running, and now I am cleaning up the code/problem solving the team members problems when they arise. I have also created documentation for the app which outlines a step-by-step tutorial for future students to be able integrate their flask app projects into the collective app quite easily. Currently reaching out to other team leaders for project specific information they would like displayed on their respective projects 'main page'.
Ross Parkinson	220624975	Working to deliver Retrieval Augmented Generation (RAG) with a Llama3.2 model to ask questions of the transport data in natural language, then return relevant data that can be used within the current framework bot framework, to plot locations and path on maps. This involves breaking up the data into chunks vectorizing it, then storing the data in a specialised database that is specifically designed to store large vectors, from the we create a query that queries the vector store, and retrieves relevant info based on cosine similarity, the revant node it then used as context to feed into the LLM prompt as context. Have to say that this has been much more challenging than originally anticipated.

Stefan Cucos (Cocos Cucos)	214397647	Over the past few weeks, I've made solid progress on the project. I've set up the development environment, resolved some tricky dependency issues, and got Rasa up and running for chatbot development. I also created a local Git repository to manage version control and collaborated with the team to allocate tasks and plan our next steps. Currently, I'm working on adding accessibility features to the chatbot, like checking wheelchair-accessible routes, using live data from the PTV API. I've also tested some basic chatbot functionality, like handling route disruptions and stop-specific queries, and everything is coming together well. On top of that, I'm completing a course on deploying advanced chatbots on Facebook and Telegram with Rasa, which has been helpful in improving my skills. Next, I'll be focusing on deploying the chatbot server, running more tests, and building solutions for MM_05 and REQ_1

Web Development team:

Name	Student ID	Contributions week 1-4
Syed Saif Ali Abidi	S223090772	joint the MOP team, attended all meetings, and aligned with project goals. (week 1) Assigned dark mode prototype/implementation tasks and analysed designs (week 2). Resolved Figma access issue with mentor and Arman's help, then updated progress on the homepage (week 3-4). Completed dark mode prototypes for the homepage, About Us, Contact Us, and FAQ pages also gather feedback and complete remaining pages this

		week and will took remarks from Arman (week 3-4). Explored Figma tools for linking pages, hover effect, grouping elements and creating interactive components to enhance design consistency (week 3-4).
Kema Sanka Srinath Dissanayake	S223188749	* Engaged in active communication with team members to finalize the redesign approach for the project, ensuring alignment on key design elements and functionality. * Initiated the design process for the "Log In" and "Sign Up" pages, incorporating feedback and design guidelines to ensure a cohesive user experience across these critical entry points to the platform.
Tyler Sheaf	S221154888	*I have engaged with all meetings and communication with my team members for my given tasks. *I have helped with team members to utilise GitHub repository to run local host. I have also used this to trail fixing the tailwind CSS on the contact us page. *I have done the wireframe designs for both Privacy policy and licence page. I have also implemented these designs into light mode, this allows the web development team to implement the changes needed.
Arman Bakhtiariasl	220492498	In the first 4 weeks of capstone project, I volunteered for team leader position. I submitted all my on-track tasks with on time. I attended all the leader meetings and team meetings. I helped some students in setting up the project on their system. I'm also working with Tyler Sheaf on dark light mode function and working on rollback function. Also, I heled Nehanjali in completing 2.2 group assignment.
Hashini Gunathilaka	s223495239	For the last four weeks, I have discussed with my team members about my task which is “Redesign web page for the Contact Us page”.

		Currently, I am in the process of designing web page for the “Contact Us” page using Figma tool.
Muhammad Jahanzaib Khan	S223729028	I actively contributed to the MOP WebDev Project by implementing and testing the Contact Page functionality while collaborating with Tyler Sheaf and Ben Tran. I attended all team meetings to stay aligned with project goals and engaged in a 1-hour session with Tyler to discuss task requirements and challenges. During the local setup process, I encountered technical issues, which I resolved with support from both Tyler and Arman Bakhtiariasl. Working closely with Ben Tran, who added tasks to the project checklist, I ensured smooth progress on the Contact Page functionality. Additionally, I proactively improved the user experience by identifying and resolving a UI issue beyond the original scope.
Niwanthi Edirisinghe	S223558537	During the first four weeks of my Capstone Project, I attended almost every daily stand up where we discussed what we were working on, the problems we encountered, and our progress. I also maintained continuous updates with my mentor, my leads, and the senior team members so that I could fully understand and align with what was expected of me. Throughout this period, I have successfully established the project environment on my local machine, ensuring that all tools and dependencies were configured correctly for uninterrupted development. In addition, I took the responsibility to "upload use cases into the database." For this, I studied the task description very well and thoroughly assessed the existing codebase to figure out the configuration and necessary implementation patterns.

Manoj Kumar Bogineni	S223817296	I gone thru the project documentation to understand the objectives, and deliverables of the project. I attended the team and 1-1 mentor meetings to discuss about the project and tasks. I learned Next.js primary framework to contribute effectively to the development tasks. Started working on Home page case study render task. I completed the project setup and able to run it on my machine. I found few formatting issues in case study JSON files and fixed those now. There is no JSON file for "T2 2024/Urban_Growth_and_Transit_Planning_for_Melbourne" case study. I updated the code to render all case studies available under "READY TO PUBLISH" folder. Need to fix UI issues.
Arman Bakhtiariasl	220492498	In the first 4 weeks of capstone project, I volunteered for team leader position. I submitted all my on-track tasks with on time. I attended all the leader meetings and team meetings. I helped some students in setting up the project on their system. I'm also working with Tyler Sheaf on dark light mode function and working on rollback function. Also, I helped Nehanjali in completing 2.2 group assignment.
Phuc Dat Tran	222134337	In the 4 weeks of capstone project, I volunteered for team leader position. I submitted all my on-track tasks on time. I attended all the team meetings and hosted a few of them. Helping students to get their work together and guide some of the team members on their progress.
Rahul Sehrawat	222465258	For the last four weeks, I have discussed with my team members about my task which is “Redesign web page”.

		Currently, I am designing a web page using the Figma tool. I have been attending all the meeting and communicating actively in my team.
Aung Phone Myint	2232248467	I actively participating in team meeting, actively reach out for work in web development, improving web UI design and ensure proper design align with my team leader requirement
Hashini Madushani Nanayakkara Geeganage	223021831	I Added new Use cases from data science team to website dashboard, and actively joining team meeting to give updates on my work.