**Meeting Title**: Week 2 Team Meeting  
**Date**: 31 May 2025  
**Time**: 11am – 3pm  
**Location**: In-person

**Attendees**:

* Yanling Chen
* Yibing Guo
* Xinnan Mu
* Zijian Xu

### **Purpose of the Meeting**

The objective of this meeting was to discuss the requirement analysis of the project. And to discuss the project by dividing it into modules. This meeting will also assign each group member the task of detailed analyses of the requirements of the specified modules.

### **Group Discussion Summary**

* During the discussion in the meeting, we divided the project into four modules based on the project objectives and delivery requirements, which are front-end module, back-end module, sumo traffic simulation module and AI and algorithm module.
* The meeting discussed how to realize a visual operation platform that integrates AI control and manual intervention capabilities. Users can use the system to view the status of traffic lights at various intersections in the city in real time and keep abreast of the current AI-controlled signal strategies. When congestion or abnormal conditions are detected, the system will highlight the corresponding road sections through icons or colours, and provide AI-generated control suggestions based on current traffic conditions (such as extending the red light time in a certain direction). Users can choose to accept or reject the suggestions and manually adjust the traffic light parameters such as light colour, delay, intersection direction, etc. through the manual intervention module. At the same time, the chart analysis module provides multi-dimensional data visualization including traffic flow, queue length, and traffic delay. Users can also manually adjust the current mode to hybrid mode or full AI automatic mode.
* The meeting also discussed the backend requirement design. The system adopts a microservice architecture and is expected to support modular services. A key focus of the discussion was the interaction between the AI module and the SUMO simulation module. It was confirmed that their capabilities will be exposed as standard HTTP endpoints via an interface service (such as Flask or FastAPI) to enable unified backend access. In addition, the system should support an automatic triggering mechanism for special traffic events (such as accidents or parades), allowing such events to be randomly generated at defined time intervals and to dynamically influence the simulation process and traffic signal behaviour.
* During the meeting, we clarified the system's data flow and algorithm design. Traffic data is extracted from the SUMO simulation via the TraCI interface by the backend, which then passes the data to the algorithm modules. Two main algorithms are involved in this project: a bottleneck detection algorithm and a traffic light control algorithm. The bottleneck detection uses a decision tree classifier implemented with Scikit-learn to identify congested road segments based on traffic features. The traffic light control module uses Proximal Policy Optimization (PPO), a reinforcement learning method implemented with RLlib, to dynamically adjust signal phases and optimize traffic flow.
* This meeting also discussed the sumo traffic simulation design. This system will build a city traffic road network based on OpenStreetMap and SUMO. It supports the configuration of traffic rules to achieve the real city traffic environment modelling. And the system should support the definition of multiple types of vehicles and traffic flow configuration. It can also simulate the traffic density according to the set time period with reproducibility. In particular, the system should support the automatic triggering of special traffic events through the back-end interface, and dynamically influence traffic flow and signal light behaviour. In addition, the signal control should support the TraCI real-time control interface, allowing the AI module or manual operation to adjust the signal logic. The module should also support the modelling of pedestrian traffic and human-vehicle interaction to meet the co-simulation needs of multiple traffic entities.

### **Agreed Actions**

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| **Task** | **Responsible Member** | **Due Date** |
| Detail front-end module requirements | Zijian Xu | 2 June 2025 |
| Detail back-end module requirements | Xinnan Mu | 2 June 2025 |
| Draw UI wireframes | Zijian Xu and Yibing Guo | 2 June 2025 |
| Detail sumo traffic simulation module requirements | Yanling Chen | 2 June 2025 |
| Detail AI and algorithm module requirements | Yibing Guo | 2 June 2025 |
| Complete Meeting Minute | Yanling Chen | 1 June 2025 |

### **Next Steps**

* Having group meeting on 2 June
* Further discussion of project requirements
* Integrating the requirements analysis of each module to form a requirements analysis report for the entire project
* Confirming the speaker for the Show-and-Tell Presentation on 3 June