SINGAPORE INSTITUTE OF TECHNOLOGY

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Applied Learning experiences to better prepare our graduates for the future of transportation

Abstract

This paper presents various applied learning activities designed and implemented as part of the curriculum in the **SIT Computer Engineering (CEG)** programme (previously known as the Telematics (Intelligent Transportation System)). The programme offers specialization in **intelligent transportation**.

The learning activities are aimed to engage students in active and reflective learning allowing students to develop beyond in-class disciplinary skills.

Introduction

TLM3004 System and Software Engineering module is co-designed and co-taught with industry practitioner from the automotive industry.

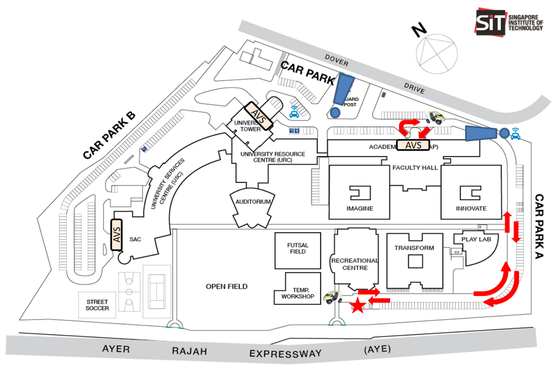
Part of the assessments in the module are based on real-life automotive industry case studies. Students are exposed to the latest **intelligent transportation technologies**, for example Autonomous Vehicle (AV) and autonomous robots.

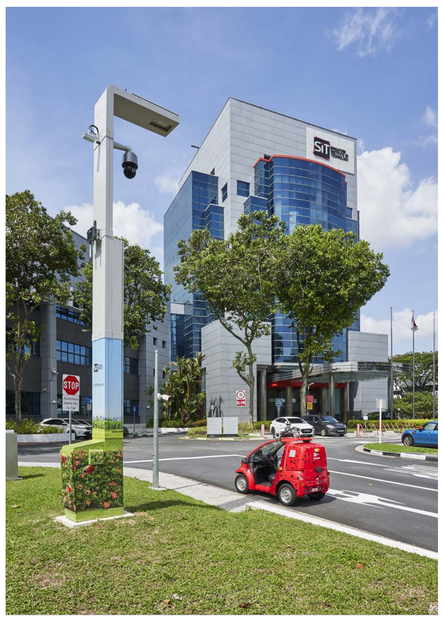
In-House Demonstrations

In previous runs of the module, students were exposed to Autonomous Vehicle (AV) technologies through in-house demonstration of SIT's very own AV – **SIT Electric Autonomous Driving (SEAD**).

Demonstration includes explanation of how the AV functions as an integrated system containing various sub-components, followed by a live demonstration of how the AV operates on a pre-mapped route in SIT@Dover.

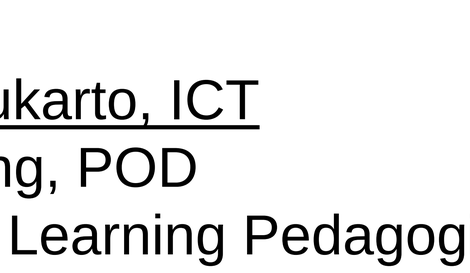
The AV deployment on campus is complemented by two **Smart Lamp Post (SLP)** deployed at critical junctions along the AV route. The SLP provides smart lighting and sensor data collection that can be used to help the AV in its navigation.





Experiental Site Visit

To allow students to understand how AVs are incorporated into Singapore's transportation landscape, students take part in an *experiential site visit* to Gardens By The Bay to observe **Auto Rider**, an autonomous vehicle operated by ***Willers Ptd Ltd.***



Students are introduced to technical details such as sensors and various in-built features, and gain insights in operationalizing AV commercial service, including its daily operation to safety to security, as well as works and preparation behind the scene.

Students also get to experience first-hand riding the AV around the Gardens By The Bay and better appreciate the challenges and constraints of running an AV on public road.

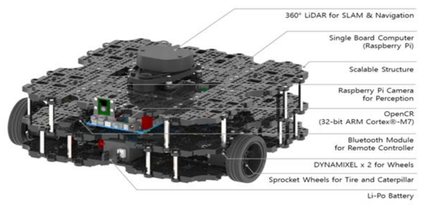
Student feedback was overall very positive, especially as many have never experience riding an AV nor truly appreciate the details of running AV on public road.

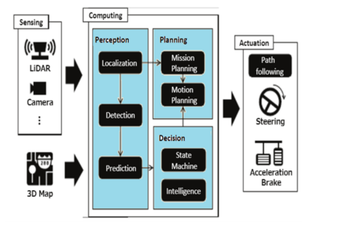
Hands-On Practical Lab Sessions

To complement the knowledge regarding real-life deployment of AV on the road, students engage in a hands-on practical lab session.

Students are guided in modifying the operating software, known as *Robotic Operating System (ROS)* which dictate the AV's movement.

A mini robot called Turtlebot3 Waffle Pi, a small two-wheeled robot that is used to simulate the deployment of an actual AV. Students experiment in sending 'messages' to the AV to toggle sensors parameters like speed, camera angle and range of sensors.





Conclusion

Through these applied learning activities, students will be able to assimilate the relevance of their classroom knowledge to real-world applications, and are better prepared for the ever changing landscape of transportation in Singapore