# Smart Autonomous Vehicle

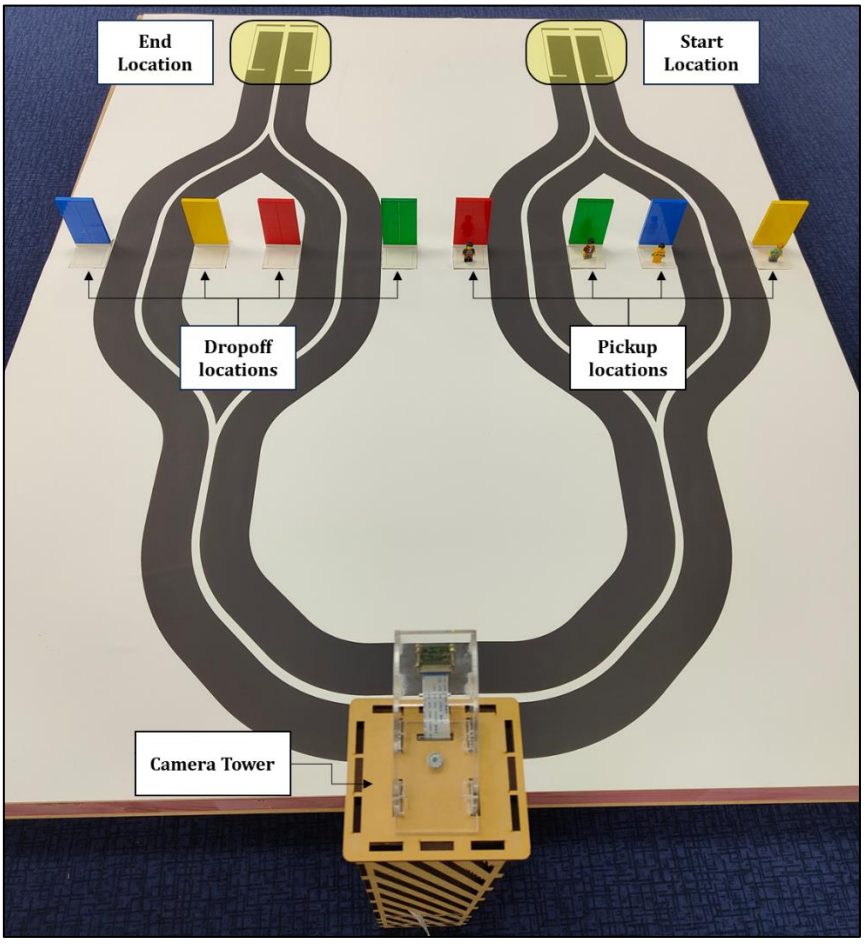
## Overview

Mechatronics/Electrical engineers often solve real-world problems by devising innovative solutions that would take existing technology to the next level or by developing completely new technology; albeit limited by a range of physical real-world constraints. This project-based-learning (PBL) paper is designed to give you a first-hand experience of such a situation.

## Smart autonomous vehicles

You, along with your team is required to design, fabricate, and program a Smart Autonomous Vehicle (SAV) that accomplishes the outlined task below.

The layout you are to work with is a mock 'smart city'. The track laid out represents real-world road networks which diverge and converge at certain points. Each fork at a junction leads to specific 'streets'. There is a camera tower in place, that represents a network of monitoring cameras in this 'smart city', representing a conceptual 'smart city network'. There are certain pick-up and drop-off points along the track, with potential 'customers' represented by Lego™ Minifigure™. (See figure below for reference)




Your task is to develop a SAV – specifically a smart taxi, that can not only start from home position and navigate the streets (using the white line as a guide) but at the same time be 'smart' enough

to identify the appropriate fork to take at a junction, pick up the correct customer who hailed the taxi, drop off the customer at the correct location and come to a stop at the finish line.

The customer to be picked up, indicated by the colour of their pick-up and drop-off points, will be provided to each team during the pre-race and final events randomly to ensure realization of a fully Smart, autonomous vehicle.

You are to design a suitable hardware (SAV chassis/frame, mechanism to pick up the customer), deploy appropriate sensors, design circuit layouts for hardware-electronic interfacing and code the suitable logic and wireless communication to introduce full autonomy to the vehicle.

The detailed SAV rules will be outlined in the Rules document uploaded under the design project resources folder on Moodle.

The rules document will be a running document that would be updated based on student queries on rules clarifications arise. Notifications will be made to the students as this document is updated to ensure no one falls behind.

## Teamwork

As this project is a team-based project with MT to EE students at approximately 1:1, the team should be made of 2 MT students and 2 EE students in each team. Please ensure that you get yourself familiar with the rest of the class during the first few lectures as you would be forming teams during the Thursday's lab/workshop session.