

# **SURGE Mid-Term Abstract**

## **Estimation of Kinematic Parameters from Instrumented Vehicle**

This project aims to estimate kinematic parameters from instrumented vehicles by leveraging advanced techniques in object detection and analysis of LiDAR data. The primary focus has been on developing and implementing models such as PointPillars and SECOND using MATLAB and Python programming languages. These models have been employed to detect and track objects using the LiDAR data captured from the instrumented vehicle.

The utilisation of the KITTI dataset has played a crucial role in this project, providing a diverse and realistic set of scenarios for testing and data pre-processing. Currently the data is being studied for better transformation of the data collected by our own instrumented vehicles. By processing the LiDAR data through the developed models, we can accurately identify objects in the vehicle's surroundings, including pedestrians, vehicles, and other obstacles.

The ultimate goal of this project is to utilise the obtained kinematic parameters to analyse driver behaviour in the context of automated vehicles. By estimating the motion characteristics of various objects, we aim to gain insights into the behaviour and intentions of drivers, which can be valuable for enhancing the safety and efficiency of autonomous driving systems.

This abstract provides a concise overview of the work conducted thus far, highlighting the application of PointPillars and SECOND models for object detection using LiDAR data. The utilisation of the KITTI dataset demonstrates the practicality and effectiveness of the developed methodologies. Moving forward, the project intends to further analyse the obtained kinematic parameters to gain deeper insights into driver behaviour in automated vehicles.