Cone Color Detection using LiDAR camera Fusion

OUR PROJECT

Formula Electric Belgium is a student-run electric race team which competes in Formula Student, the world's largest competition for engineering students. We aim to push the limits of performance, innovation and sustainability within electric racing every year, which is only possible with the help of our Thesis students. These pioneers are responsible for performance-defining innovations within the team, and we would love for you to join our team of highly ambitious and motivated engineers. As a Thesis student, you will research, design, prototype and test your innovations alongside the full-time members which make sure the team pushes itself and the car to new heights.

AIM AND OBJECTIVE

The aim of this master's thesis is to design and implement a robust cone color detection system for a Driverless Formula Student car by fusing LiDAR and camera data, enabling reliable perception under varying environmental and lighting conditions.

Objectives
- Develop a sensor fusion pipeline combining LiDAR point clouds and camera images
- Implement hardware synchronization between the LiDAR and camera
- Use LiDAR data for accurate cone localization and distance estimation
- Use camera data for cone color classification (blue/yellow)
- Evaluate system performance in real-world Formula Student scenarios (changing light, partial occlusions, noise)
- Optimize the solution for real-time execution on hardware with limited compute .

PROFILE

- Analytical mindset with good problem-solving skills
- Ability to work independently while collaborating within a multidisciplinary team
- Background in computer vision
- Basic knowledge of C++

Bonus: Experience with ROS2

RETURNS

- Unique experience within a racing team
- Genuine work experience to carry with you into your career
- Exposure to cutting edge technology and software

INTERESTED?

Send us your contact details and field of interest to

recruitment@formulaelectric.be