Project Proposal 2

Sign Detection using Neural Networks

Industry Partner: Robotics Masters Limited

Location of Partner: North Sydney

URL for Partner: https://roboticsmasters.co

Contact Person:

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Allow taken by multi groups: YES

Specific requirements/skills:

Interest in robotics and autonomous vehicles. Skills in Programming (Python preferred), Linux, Unity and interest in TensorFlow/Keras.

Project Outline:

Autonomous Vehicle Tech involves many different aspects of Software, Computer Vision, AI, Hardware, Electrical, VR, AR, IoT, and embedded computing.

If you are interested in being prepared for industry jobs the best place to learn the methods is to get involved and start experimenting with the technologies by seeking out where the most community support and development is happening.

The goal of this project is for students to walk away with a serious understanding of Artificial Intelligence (AI) technologies associated with autonomous vehicles, so they can develop and apply them to real-world roles post university.

For this project we will be asking students to implement both a real world and simulated world traffic sign detection algorithms using TensorFlow 2.

The Project – Implement Sign Detection using TensorFlow

We are moving closer to autonomous cars and drones every day and finding new ways of using AI in the real world in other applications (fighting pandemics, object classification).

Students will be looking at existing techniques and creating new software solutions to detect a number of pre-defined traffic signs using Neural Networks (TensorFlow). Teams will look at different technologies and come up with a solution that is reliable and efficient.   This will involve data collection and cleaning. TensorFlow 2 is recognised as one of the preferred libraries for completing AI tasks.

Teams will be using the Donkey Car Platform to test their algorithms and solutions on Jetson Nanos. The Donkey Car Platform includes both a physical hardware stack and a simulator built using Unity. Students are expected to initially test solutions in Unity, adding new parts as needed and later on the physical hardware.

At the end of the project, the teams will compete in a challenge course and prove that their algorithms are effective.

Students will work directly with the Robotics Masters Team and be able to gain valuable industry knowledge.

Hardware will be supplied. Meetings will take place over Zoom, twice a week between clients and students. All other communication will be via email.

Ideally 2 teams of 3 or 4 students each will be involved.

Reference Material/Links

Donkey Car: https://github.com/autorope/DonkeyCar

Simulator: https://github.com/tawnkramer/gym-donkeycar

Simulator (Unity): https://github.com/tawnkramer/sdsandbox

Tensorflow Classification: https://www.tensorflow.org/tutorials/keras/classification