Find project descriptions and company descriptions below. Students, please read this carefully, especially the sections that describe the desirable qualities and experiences for the student team for each project.

ADASTEC

ADASTEC delivers the most advanced Level 4 automation platform for full-size buses and coaches currently available. ***The goal of the project*** is to create safer and more comfortable trips for passengers and making trips more efficient for the electric automated buses with the fusion of V2X communication and deep learning-based methods for the recognition of traffic lights. The scope of the project is to get familiar with V2X communication-based and deep learning-based traffic light recognition methods, comparing, fusing, and integrating them to an autonomous bus. Camera sensor data, V2X messages, and HD maps will be fused. Project results will be tested both on the test track and on the bus deployed in Michigan.

Students with computer science and electrical engineering backgrounds would be great fits. There will be a focus on machine learning, AI, Python, C++, and ROS.

Mentors: Dr. Ali Peker, CEO & Dr. Kerem Par, CTO

Deepen AI

Deepen AI builds tools that use artificial intelligence to help autonomous systems to reliably understand and safely interact with the real world. Deepen enables consistent data curation, labeling and validation for autonomous vehicles, robots, drones, etc. ***The goal of this project*** will be to create a smart intersection utilizing multiple lidar sensors. The software for the lidar sensors will be proprietary software provided by the company. The ultimate deliverable of this project will be to integrate multiple lidar signals together (sensor fusion) to create a full 360 degree view of the intersection for incoming traffic and to package that information to be accessible via Amazon Web Services (AWS).

Students with computer science backgrounds with strong Python programming and AWS should find this a great opportunity. Any experience with sensor fusion is very desirable. Additionally, students from any discipline that have experience with LIDAR would be great fits, particularly with a mechanical background for integration of sensors.

Mentor: Nicola Croce, TPM

P3Mobility

P3Mobility partners with local governments to deploy smart infrastructure that increases safety, mobility, and sustainability. Their proprietary software platform facilitates the revenue generation necessary to finance smart road and connected vehicle services. They license their platform to insurance companies, public jurisdictions and/or fleet operators. ***The goal of this project*** will be to fuse the basic safety messages (BSMs) from vehicles with sensor data from smart intersections, translating this information into actionable safety data in realtime for both vehicle operators and insurance providers that assess driving risk based on vehicle and environment dynamics.

Students with backgrounds and experience in C++, data mining, data statistics, and analysis would find this to be a great fit. Any experience with computer vision is also a plus as well as any experience with vehicle dynamics. Upper level EECS courses are desirable. Applicable courses are EECS 476, EECS 453, EECS 484, EECS 442, EECS 504, EECS 542, ME 542, ME 568, but not required.

Mentor: Martin Nathanson, CTO

XenomatiX

XenomatiX is the first company to offer true solid state lidar sensors based on a multi-beam lasers concept and risk-free, scalable, semiconductor technology. XenomatiX' sensors are known for their unique concept using mature technology components. Additionally, XenomatiX produces software that can decipher objects from lidar point clouds based on material and other means, a potential game-changer for vehicle applications. ***The goal of this project*** will be to integrate a LiDAR system in an existing serial production vehicle demonstrating modularity and integrability of the latest generation of LiDAR and testing and validating the results running object detection and classification algorithms.

Students experienced in working with LiDAR would do well with this project. Portions of this project will be very hands-on and mechanically-driven to design and build hardware. Also, students with computer science backgrounds and any experience in labelling datasets would do well here to help train neural networks.

Mentors: Rodrigo Royo, Application Engineer & Jacopo Alaimo, Sales and Business Development

Baraja Lidar

Baraja is a deep technology company that has reinvented LiDAR for self-driving vehicles. Their Spectrum-ScanTM platform uses patented technology to set new benchmarks for precision, range and reliability. ***This project is to*** validate the Baraja LIDAR range tests at real-life distances. The end goal would be to have in-field results that are verified against Baraja Manufacturing test data. Students would take LIDAR range measurements at various distance increments up to 250m from various Lambertian targets and verify the internal model against in-field results.

Students with experience working with LiDAR, whether it's integration or testing experience or simply understanding how it works, will do well with this project. No specific major is requested here, but an interest in mechatronics and systems engineering is preferred.

Mentors: William Persampieri, Field Application Engineering Team Lead & Jim Kane, VP Engineering - Automotive and Head of Product

Gatik AI

Gatik, the leader in autonomous middle mile logistics, delivers goods safely and efficiently using its fleet of light & medium duty trucks. The company focuses on short-haul, business-to-business (B2B) logistics for the retail industry, enabling its customers to optimize their hub-and-spoke supply chain operations, enhance inventory pooling across multiple locations, reduce labor costs and meet an unprecedented demand for contactless delivery. ***The project aims to*** make significant advances in long-range 3D object detection and tracking for autonomous vehicles, i.e. beyond 120 meters and out to 200+ m in front of the vehicle. With Gatik's support in the generation of an accurately labelled, long-range dataset for both detection and tracking, the student team will evaluate the state of the art detection and tracking methods for autonomous driving in terms of their ability to operate on HD images and long-range lidar, and will investigate the specific challenges of occlusion, nighttime and adverse weather where possible.

Students with backgrounds in electrical engineering (controls and robotics with ROS), computer science (AI, machine learning, mobile software dev.) and mechanical engineering (machine vision, systems integration) should apply. Bonus if you've taken EECS 463, EECS 462, EECS 438, and have C, C++, and Python experience.

Mentors: Dharmateja Kadem, Senior Software Engineer & Brian McLean, Head of Hardware