Research Recap

Labeling Roads with Different Types of Automated Driving Functional Requirements using Machine Learning

Purpose: The project aimed to label roads with different types of automated driving functional requirements to more safely deploy automated vehicles in communities by regarding road types, geometries, lighting facilities, and human behaviors. Using datasets from Pittsburgh city streets, researchers analyzed and identified roads where collisions are most likely to occur and share results with automated vehicle (AV) manufacturers to facilitate a successful AV deployment.

Approach: The project team used the Argoverse Tracking Dataset, a public data set maintained by Argo AI, which contains Pittsburgh traffic information, to develop a framework for identifying typical driving scenarios. Onboard sensors like lidars and cameras captured the information in the dataset including the location, type, and bounding box of surrounding objects. Researchers used the data and machine learning techniques to analyze the data and visualize scenarios.

Key Findings: The team analyzed the risk levels of streets in different regions in Pittsburgh. They labeled each risk level with a clustered scenario number.

These findings resulted in a street level risk heat map, which visualizes the results of the analysis.

Conclusion: Matching different levels of automated vehicles with various street risk levels may be able to help improve traffic efficiency, reduce the probability that catastrophes happen and avoid traffic congestion.

The visualization tool, the risk heat map, can help the public to get a visual look at the complexity of the local roads. It also serves as a reference for the autonomous companies to develop strategies to test and deploy their autonomous vehicles with safety considered.

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Project Record:
- https://ppms.cit.cmu.edu/projects/detail/291

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