

CAREER: High Integrity Navigation for Autonomous Vehicles

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Challenge:

Quantify trust in vision-based navigation for autonomous vehicles

Solution:

- Train a deep **neural network** (DNN) to estimate position error and its covariance matrix from camera image and local map
- Characterize uncertainty using a Gaussian mixture model
- Compute protection levels as a probabilistic upper bound on position error

Scientific Impact:

Provide an approach to quantify neural network uncertainty, and use the uncertainty to compute trust in the system

Broader Impact:

- Quantify and improve trust for deep learning
- Benefit autonomous driving industry
- Integrate research in “AA275: Navigation for Autonomous Systems” course
- Engage under-represented undergrads in research

