2021 NSF CYBER-PHYSICAL SYSTEMS PRINCIPAL INVESTIGATORS' MEETING

Challenge:

Quantify trust in visionbased navigation for autonomous vehicles

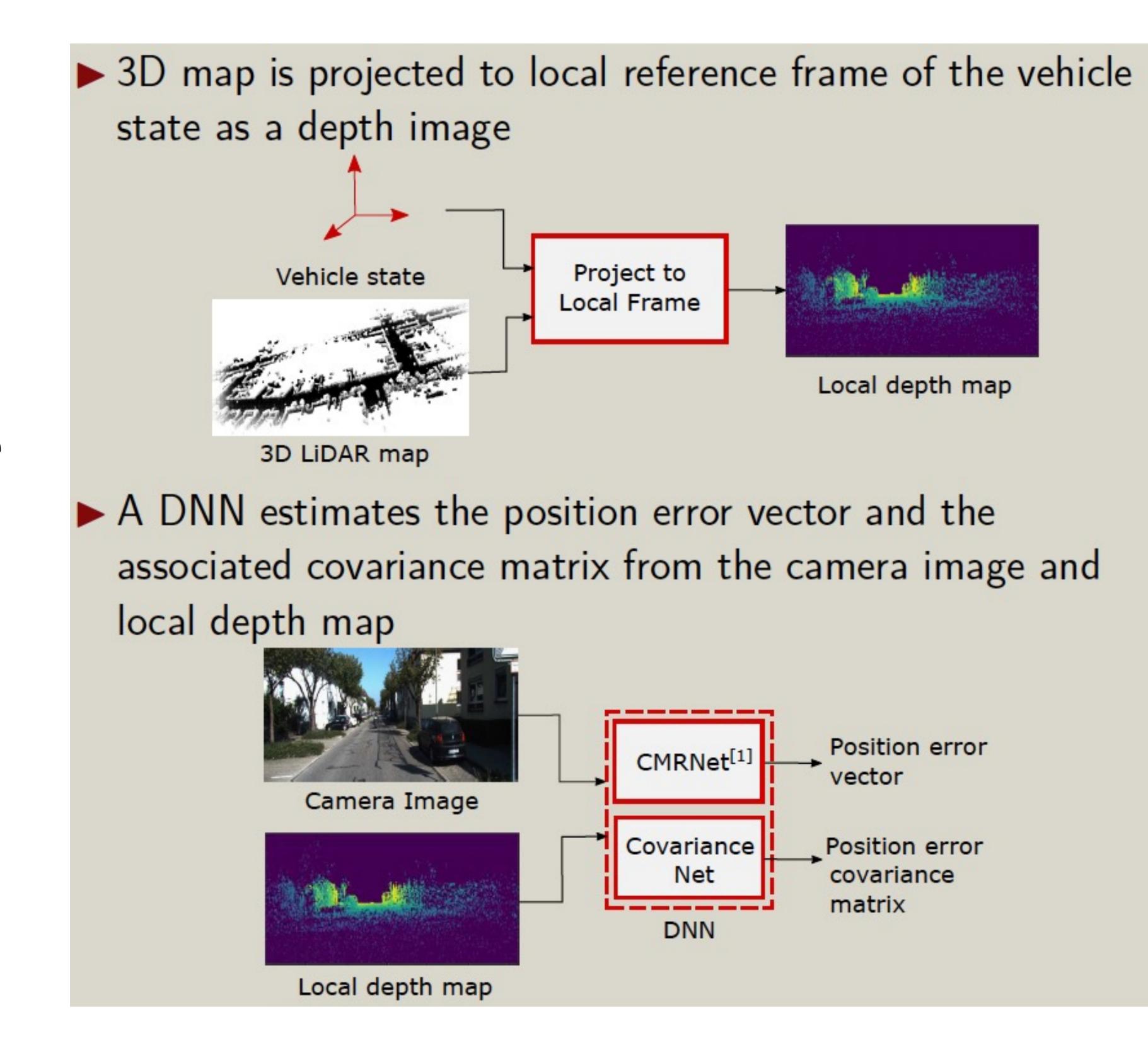
Solution:

- •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

#2006162, Grace Gao, Stanford University (gracegao@Stanford.edu)



CAREER: High Integrity Navigation for Autonomous Vehicles #2006162, Award date: Dec 16, 2019 Grace Gao, Stanford University



Scientific Impact:

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

Broader Impact:

- course

•Quantify and improve trust for deep learning

•Benefit autonomous driving industry

 Integrate research in "AA275: Navigation for Autonomous Systems"

 Engage under-represented undergrads in research