CAREER: Towards Reliable and Optimized Data-Driven Cyber-Physical Systems using Human-Centric Sensing

- Dong Wang
- University of Notre Dame
- dwang5@nd.edu
- https://www3.nd.edu/~sslab/

- CNS-1845639

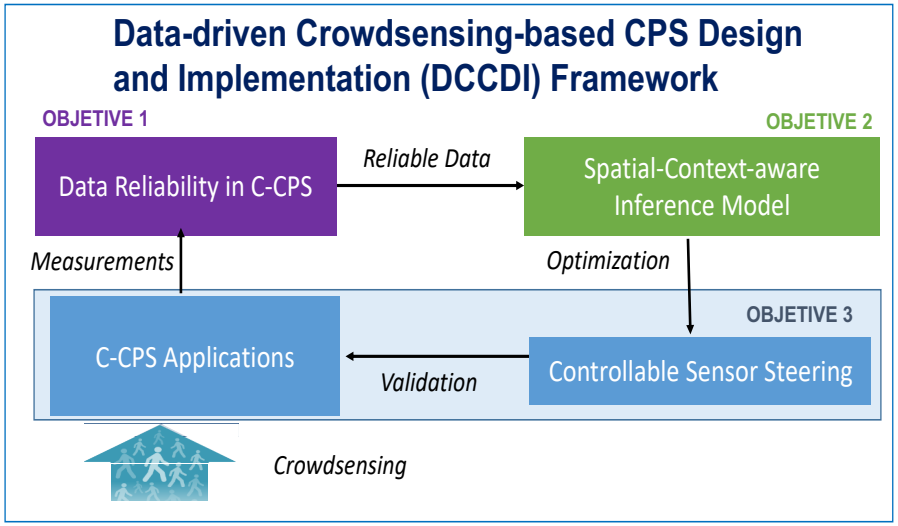
- [Poster Time and Location]

Description

Incorporate crowdsensing as a reliable and controllable component in a closed-loop CPS

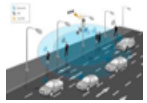
Goals of This Project :

- Develop an estimation theoretical approach to address the data reliability issue of using unreliable human sensors
- Develop a principled crowd steering scheme to accurately model humans as actuators and steer them towards the optimization objective of the applications
- Validate the proposed framework through different types of crowdsensing based CPS (C-CPS) applications



Disaster Damage Assessment

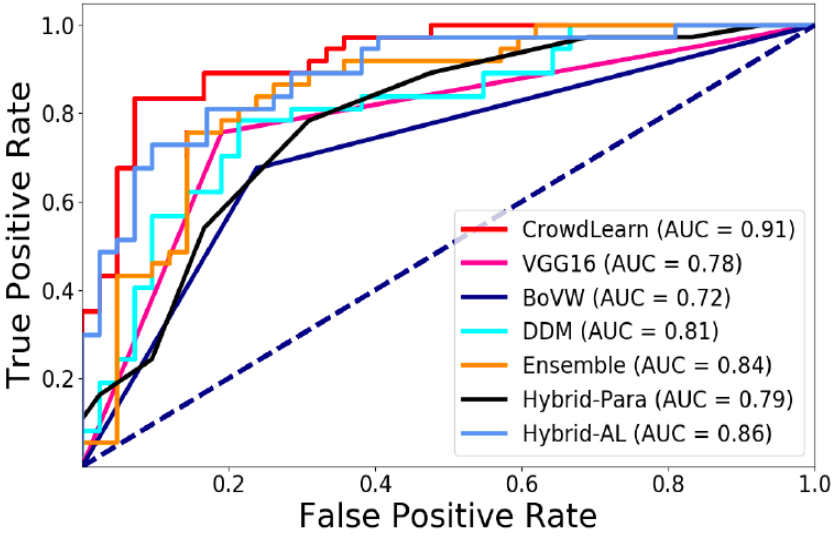
Smart Water Sensing

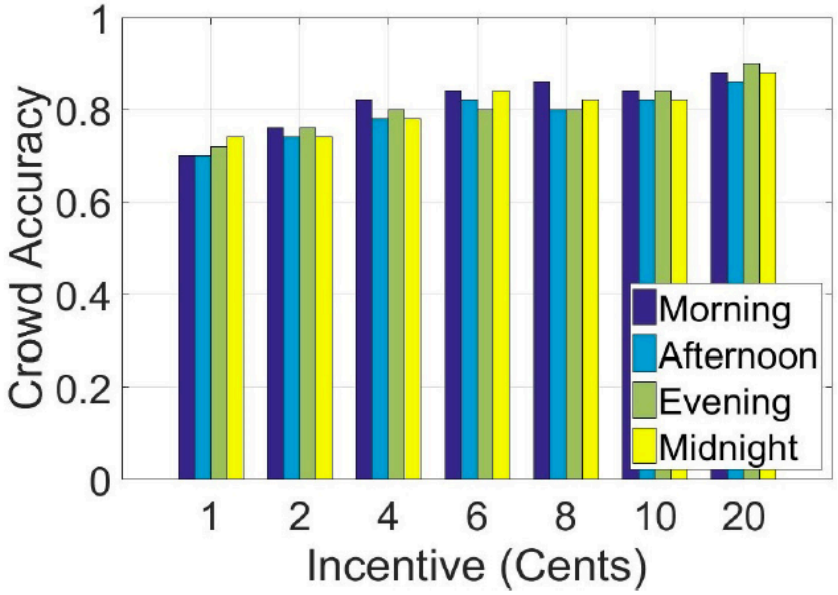


Intelligent Transportation

Findings

- Designed and conducted experiments in a disaster damage assessment (DSA) application on Amazon MTurk for the C-CPS paradigm
- Crowd (human-centric) sensing clearly improves the accuracy of the damage assessment results (by 10% in AUC under ROC curve than pure AI models)
- Incentive affects the quality of crowd input/feedback, but it may not be the only control factor
- Explore more context information (e.g., time context, task context) for optimization and interaction between algorithms and crowd.





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