

CPS: Medium: Smart Tracking Systems for Safe Interactions Between Scooters and Road Vehicles

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<https://lsec.umn.edu/EScooters>

Objective:

Development of smart tracking systems on scooters for ensuring safe and smooth interaction with vehicles and pedestrians.

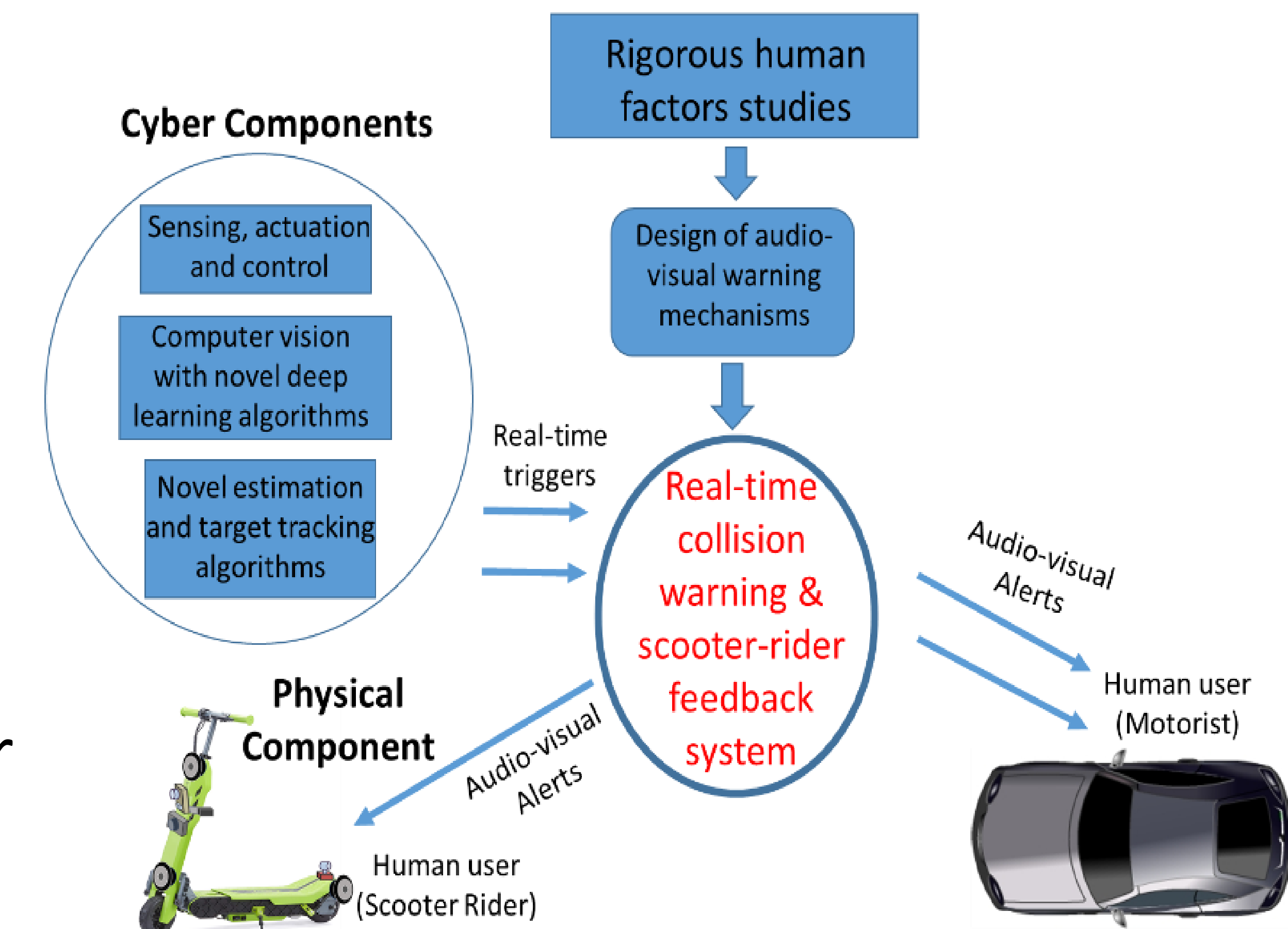


Challenges:

- Need to use inexpensive sensors and yet achieve reliable tracking of all vehicles.
- Complex urban traffic scenarios.
- Robust handling of snow, rain and low lighting needed.
- Significant human-in-the-loop operation in which both vehicle drivers and scooter rider need to respond effectively.

Solution:

- Novel estimation algorithms for object tracking.
- Robust recognition with computer vision using nonlinear modeling of low-complexity structures in both clean and corrupted data.
- Active sensing systems.
- Visual cues of biological motion on the scooter to improve localization by motorists.



Broader Impact:

- Safety of vulnerable transportation users.
- Hands-on high school activities.
- Technology commercialization.
- Project started only 4 months ago – First high school activity is planned for June 2021.

Scientific Impact:

- Estimation algorithms for nonlinear systems.
- Human-in-the-loop operation.
- Deep learning based robust recognition techniques in computer vision.