

## Road Debris Detection and Positioning with Connected Vehicle Technology

**R**esearchers at the University of South Florida have developed a method and algorithm to detect the location of debris and unexpected objects on roads using basic safety message data and connected vehicle technology.

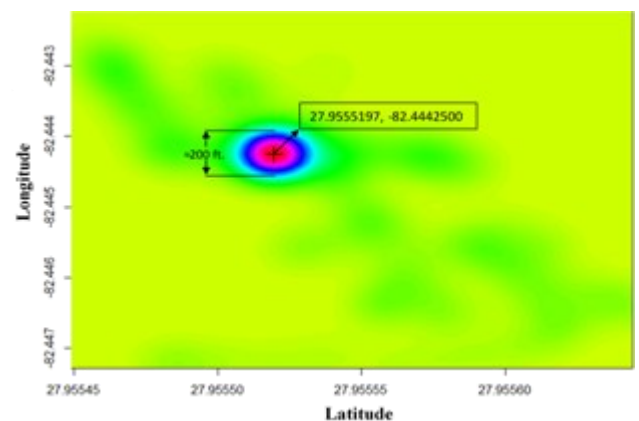
Roadway debris and other unexpected obstructions, such as surface damage, can lead to significant traffic delays, or worse, crashes. Currently, unexpected roadway debris are handled by relying on drivers' self reporting (e.g., through local maintenance departments or third-party smartphone applications), which is inefficient and unsafe as it may lead to distracted driving. In addition, pinpointing the exact debris location can be challenging and adds to delays between notifications and actual removal from the responsible transportation agency. What is needed is an efficient and safe method to detect and position debris and other unexpected obstructions and timely notify fellow travelers and authorities.

With this in mind, University of South Florida inventors designed an algorithm that detects and accurately positions unwanted objects and unexpected obstructions such as debris on road segments. The algorithm runs at Road Side Units /municipal data centers and utilizes the kinematic information and coordinates of Connected Vehicles, which is readily being transmitted as Basic Safety Messages. The algorithm has the potential of reducing the time and money spent by highway patrols and agencies to identify and remove debris from the road, spot-fix surface problems, as well as the risk of crashes caused by drivers' swerving behavior to avoid debris on the road. The developed technique is also applicable to foreign object debris detection and removal from airport runways, which is a topic of significant interest in aviation industry.

### ADVANTAGES:

- Feasible, safe and low-cost
- Uses standard Basic Safety Messages, applicable to current systems
- Only requires software-level changes at road side units / municipal data centers
- 95% true positives, location precise to <4 ft. in initial tests
- Can also be used to detect crash locations

*A Safe, Accurate and Precise Server-Side Algorithm Requiring No Hardware Changes*



*Density Heat Map Showing the Coordinates of a Traffic Cone Used as Road Debris for Testing*

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