

Multimodal-AI based Roadway Hazard Identification and Warning using Onboard
Smartphones with Cloud-based Fusion

Technology Transfer Activities

by

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TECHNOLOGY TRANSFER ACTIVITIES

1 Outputs

1.1 Output #1

M. Bhosale, L. Guo, G. Comert and Y. Jia, "On-Board Smartphone-Based Road Hazard Detection with Cloud-Based Fusion," *Vehicles*, 2023, vol. 5, no. 2, pp. 565-582. (**Cover Page Article**)

1.2 Output #2

A podium presentation, "*Multimodal-AI based Roadway Hazard Identification and Warning using Onboard Smartphones with Cloud-based Fusion*" was given by Longxiang Guo at the 7th Annual UTC Conference for the Southeastern Region on Mar. 24, 2022, in Boca Raton, Florida.

1.3 Output #2

A poster presentation, "*Multimodal-AI based Roadway Hazard Identification and Warning using Onboard Smartphones with Cloud-based Fusion*" was given by Mayuresh Bhosale at the 6th Annual Fall Conference for Center for Connected Multimodal Mobility on Nov. 4, 2022, in Columbia, SC.

1.4 Output #4

A dataset on road hazards has been created.

2 Outcomes

2.1 Outcome #1

Increased understanding of road hazard detection using smartphones and cloud-based services.

2.2 Outcome #2

Improved processes and technology to monitor road hazards more efficiently and cost-effectively.

2 Outcome #3

Studied and validated road hazard data from the simulation platform and its similarity to the real world. Generated a solution to a cost-effective and time-efficient method for data collection and deep learning model validation.

3 Impacts

3.1 Impact #1

Reduce road hazard monitoring costs by providing a cost-effective way with a minimum investment of equipment and labor. Improve the safety of transportation systems, especially the multimodal connected and automated transportation systems, by providing timely needed road condition monitoring.

3.2 Impact #2

The project has involved and trained one postdoc, two graduate students at Clemson University, two undergraduate students at Benedict College, and one high school student.

3.3 Impact #3

The SCDOT has shown interest in this project and indicates potential applications of the outcomes to support their missions.

3.4 Impact #4

The work has been disseminated through presentation and publication. It was presented at the 7th Annual UTC Conference for the Southeastern Region on Mar. 24 and 25, 2022, in Boca Raton, Florida. It has also been published entitled “*On-Board Smartphone-Based Road Hazard Detection with Cloud-Based Fusion,*” in the Journal of Vehicles and the paper is selected as the cover page article.