**Research Project Title**

RES2023-24: Informed Safety, Mobility, and Driver Comfort Enhancement Practices for Work Zones: Learnings from High-Fidelity Data

**Purpose of the Project**

Work zones have long been cited as a potential cause of road fatalities and traffic delays. Despite substantial research aimed at enhancing safety and mobility around work zones, it remains a source of concern for society. Given that supplying a sufficient degree of safety, mobility, and comfort to a vehicle on the road is the minimum necessary, it is vital to guarantee that drivers are adequately provided with these services throughout their journey. However, work zones have a deleterious effect on mobility, safety, and comfort, evidenced by the ever-increasing frequency of crashes and delays. To address this concern, a proper evaluation of the various vehicle dynamics as they pass different work zone elements, and their potentially detrimental consequences is necessary. In recent times, vehicles are equipped with various devices and have the potential to collect high-fidelity data on individual vehicle actions as they pass through various work zones. Such data sets can be used to enhance safety around the work zone.

**Scope and Significance**

It is worth noting that maximizing the efficiency of work zones requires a thorough understanding of various vehicle dynamics, driver behavior, and unsafe events that occur near a work zone. This study aims to provide critical insight into the above features by collecting microscopic level vehicle trajectory data and proposing performance measures to quantify safety, mobility, and driver comfort.

**Expected Outcomes**

Following lists the critical research deliverables:

* Provide a set of case studies, including various performance measures used to quantify traffic safety, mobility, and driver comfort in work zones.
* Collection of precise vehicle location, speed, acceleration, and heading data through use of multiple onboard sensors. From the traffic videos from onboard cameras, data related to surrounding traffic, such as spacing with the neighboring vehicle, relative/ average speed of neighboring vehicles, and offset distance from work zone boundary, will be extracted. The data will be provided to TDOT in a usable format.
* Recommendations to prevent or mitigate any evasive actions taken to avoid potential crash events based on interaction patterns of vehicles.
* Robust information on correlation in the occurrence of hard braking with the absence vs. presence of queue warning systems, smart work zones, or other advanced work zone strategies.
* Best performance measures that quantify work zone safety, mobility, and driver comfort.

**Time Period**

October 2022 – October 2023

**Contact Information**

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