

# Worker-in-the-loop Real-time Safety System for Short-duration Highway Work Zones

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## Introduction

Highway work zones are among most **hazardous** working environments.

In **2016** alone, **158000** crashes, **42000** injuries, and **687** fatalities were recorded in the nation.

The **lack** of **predictive** safety systems are to blame.

## Problem

- **Reactive** safety systems in the current practice of highway work zones
- **Untimely** and often **overdue** warnings to workers that limits their capability in showing proper response
- **Safety** risks from different origins with different natures

## Scientific Impact

- **Next generation** of Personal Protective Equipment (**PPEs**) in workforce
- **Smart** workplace in other disciplines
- **Worker-centered** User Experience Design
- **Human-centered** Artificial Intelligence

## AI-enabled Augmented Reality and Wearable Technology for Predictive Safety System

### AI Pillar

Designing **accurate** and **efficient** AI models for predicting **intrusions** and identifying other **critical risk causing features** such as **speed** from traffic in real-time

### IoT Pillar

Implementing a **scalable** IoT infrastructure that connect the back-end to the front-end of the system for **efficient** messaging in real-time **with respect** to the **context** of highway work zones

### User Experience Pillar

Designing **customized** and **context-aware** UX/UI for workers to **increase** their **situational awareness** with **minimal impact** on their **performance** while **meeting** their **unique** needs

## Who will care?

- Federal and states agencies such as Departments of Transportations (**DOTs**)
- Highway construction and maintenance industry

## Education and Outreach

- Close collaboration with highway workers community, and local industry
- Engaging undergraduate students through senior design projects

## Potential Impacts

- Improving the overall health and well-being of highway workers
- Safety of future workforce