Preventing Traffic Accidents Involving Right-Turn-On-Red at Intersections With Edge AI

Jang, Yoon (School: Oxford High School)

Fatal accidents involving right-turning vehicles on red lights with pedestrians crossing at intersections emphasizes the need for an accurate and reliable way of alerting drivers and pedestrians. Recent advancements in AI-powered computer vision technology on edge devices offer a great opportunity to solve this public road safety problem by providing superior accuracy and speed compared to previously existing traditional methods. In this project, we present a collision detection system designed to prevent these traffic accidents by utilizing the latest AI object detection technology. Our novel collision detection algorithm utilizes the nearest distance calculation between vehicles and pedestrians detected from the latest AI neural network as well as motion vectors that tracks past movements and estimates future movements. The proposed solution is prototyped on the latest edge AI computing device, the NVIDIA Jetson Orin Nano development board, with real-world deployment in mind. Our experiments show that our system can predict potential collisions accurately in all cases if objects are detected by the AI model we used. This research demonstrates that AI-powered computer vision technology can help reduce accidents at intersections and improve road safety.

Awards Won: