

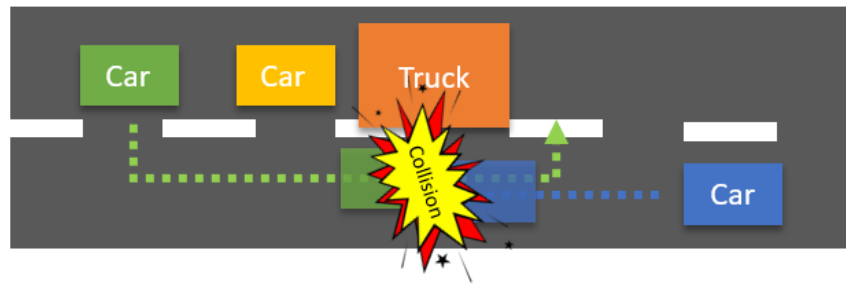
# Project Documentation

## **I. Problem Statement:**

Most accidents in India occur in single lane overtaking scenarios [1].

## **II. Causes for accidents while overtaking:**

- i. Low visibility due to piled up vehicles ahead of the driver
- ii. Incorrect judgments of the driver



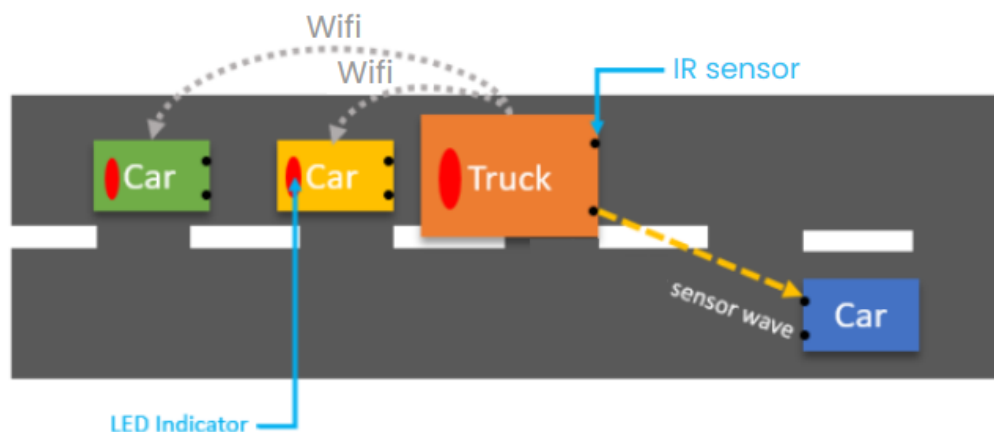
## **III. Existing Solution:**

There are several works that have been published to detect accidents such as [2], [3]. However, there are no reliable solutions to avoid/prevent these accidents and no commercial product as of today to address this problem.

## **IV. Proposed Solution:**

The problem of poor visibility and oncoming vehicle detection is a hard problem to solve. However, it can be readily tackled by collective information and information sharing between vehicles. While the vehicles that pile up behind other vehicles cannot reliably detect the oncoming vehicles, the vehicle in the front will have a clear line of sight of oncoming vehicles.

This can be detected using IR sensor modules that can detect the oncoming vehicle. The detection obtained by the vehicle in the front is now shared with the vehicles behind thereby alerting them to avoid overtaking at the moment. This information sharing can be accomplished using wifi that connects the Wemos boards. A red LED glows in each car, indicating them not to overtake. A green LED glows in each car, indicating that it is safe to overtake.




## V. Build of Materials [BOM]

- i. IR sensors
- ii. Wemos
- iii. Battery
- iv. RGB LED module

## VI. Related SDG Goals

*SDG 3: Good Health and Well-Being* – Aims to reduce road traffic injuries by preventing overtaking accidents through early detection and alerts.



*SDG 9: Industry, Innovation, and Infrastructure* – Promotes innovative, tech-driven vehicle communication systems to improve transport safety and infrastructure.

## **VII. The Logic Behind the Idea**

Sensor positions: One is placed at the right-diagonal-front. The second one is placed on the right side of the body near the rear end.

1. LEDs of Car1 and Car2 are initially set to GREEN.
2. When the diagonal sensor of Car1 detects a car from the opposite side, transmit a message such that LEDs of Car1 and Car2 are RED.
3. Both sensors remain RED. When the diagonal sensor of Car2 detects the opposite car (which would have come forward), the LED of Car1 turns GREEN while the LED of Car2 remains RED.
4. After the opposite car passes the side sensor of Car2, turn the LED of Car2 GREEN.
5. Repeat this logic.

## **VIII. The Code**

<https://github.com/harshubhasky/Over-Taking-Assistor.git>

# References

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[1]

<https://timesofindia.indiatimes.com/india/maximum-road-accidents-occur-when-overtaking/articleshow/48831373.cms>

[2] “Automatic Road Accident Detection using Ultrasonic Sensor”, Usman Khalil, Adnan Nasir, S.M. Khan, T. Javid, S.A. Raza, A. Siddiqui, 2018 IEEE 21st International Multi-Topic Conference (INMIC)

[3] “Intelligent Expeditious Accident Detection and Prevention System”, K P Sampooram, S Saranya, S Vigneshwaran, P Sofiarani, S Sarmitha, N Sarumathi, 2021 IOP Conference Series: Material Science Engineering. 1059 012012