

IoT-Based Wobbling Motion Detector for Vehicle Safety.

Aavishkar - Inter-University Research Convention
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Abstract

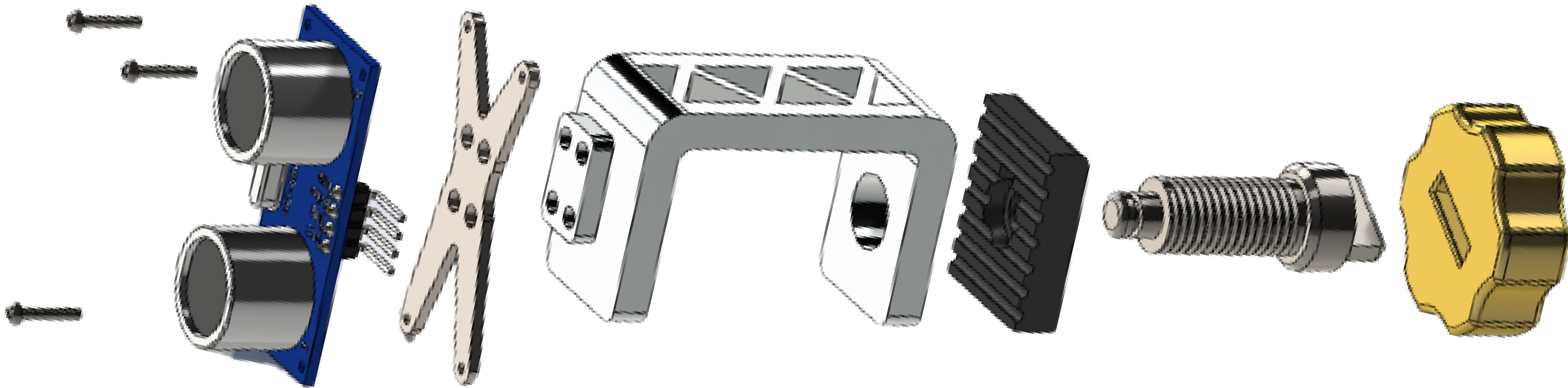
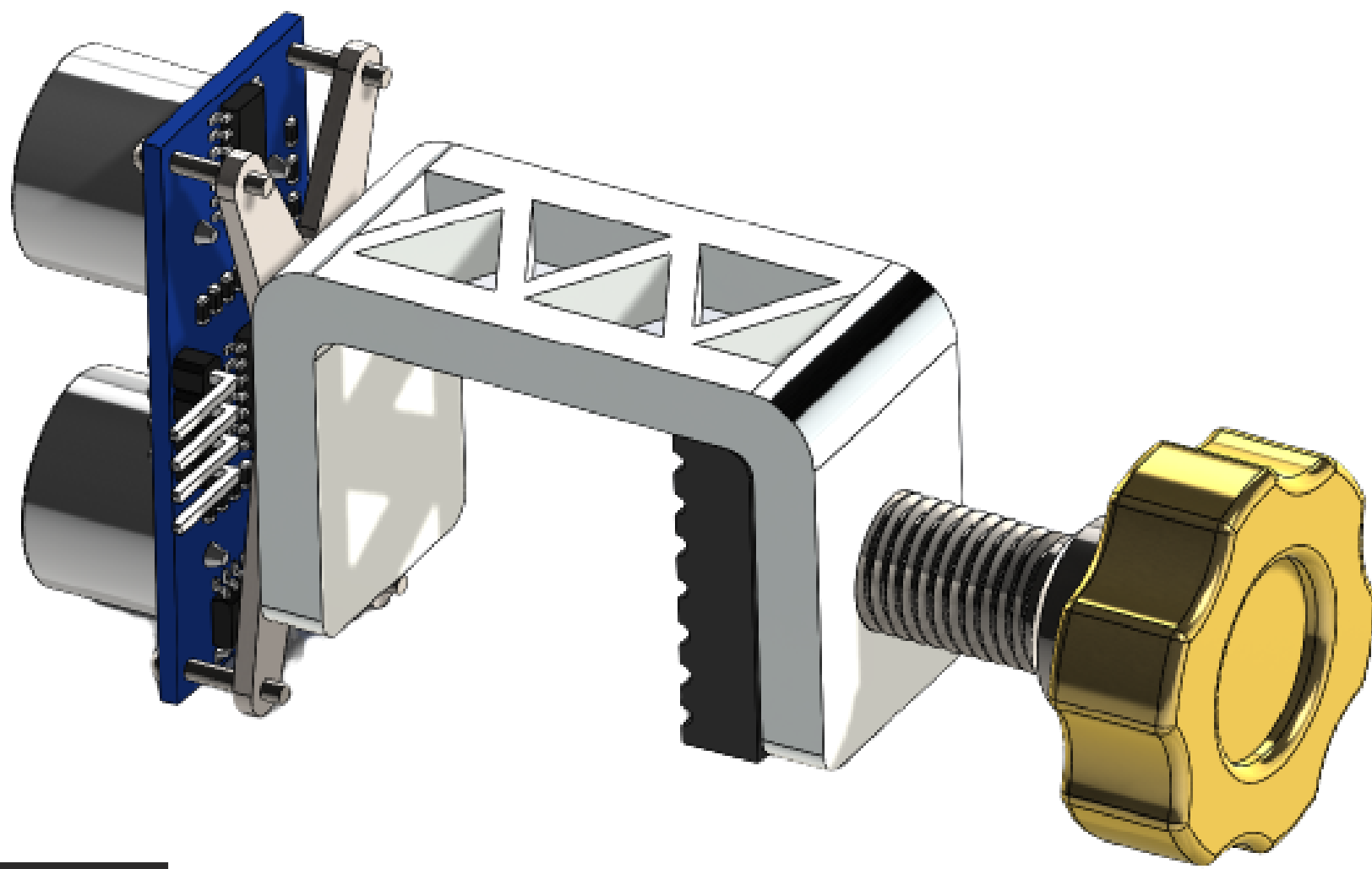
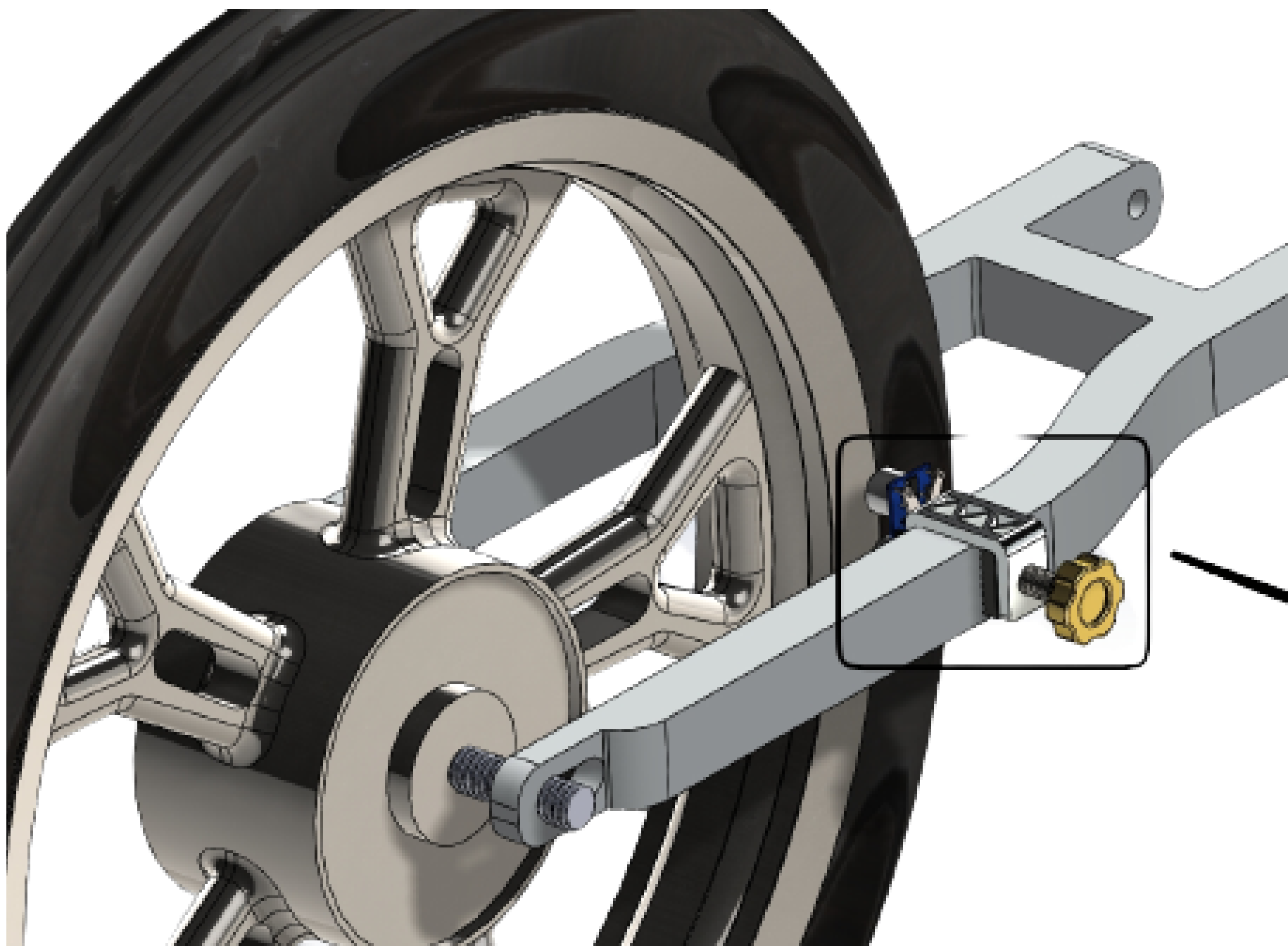
In an ever-evolving world of transportation, road safety remains a paramount concern. The "IoT Based Wobbling Motion Detector for Vehicle Safety" project addresses this concern by introducing an innovative system designed to enhance safety for both light and heavy-weight vehicles.

Objective

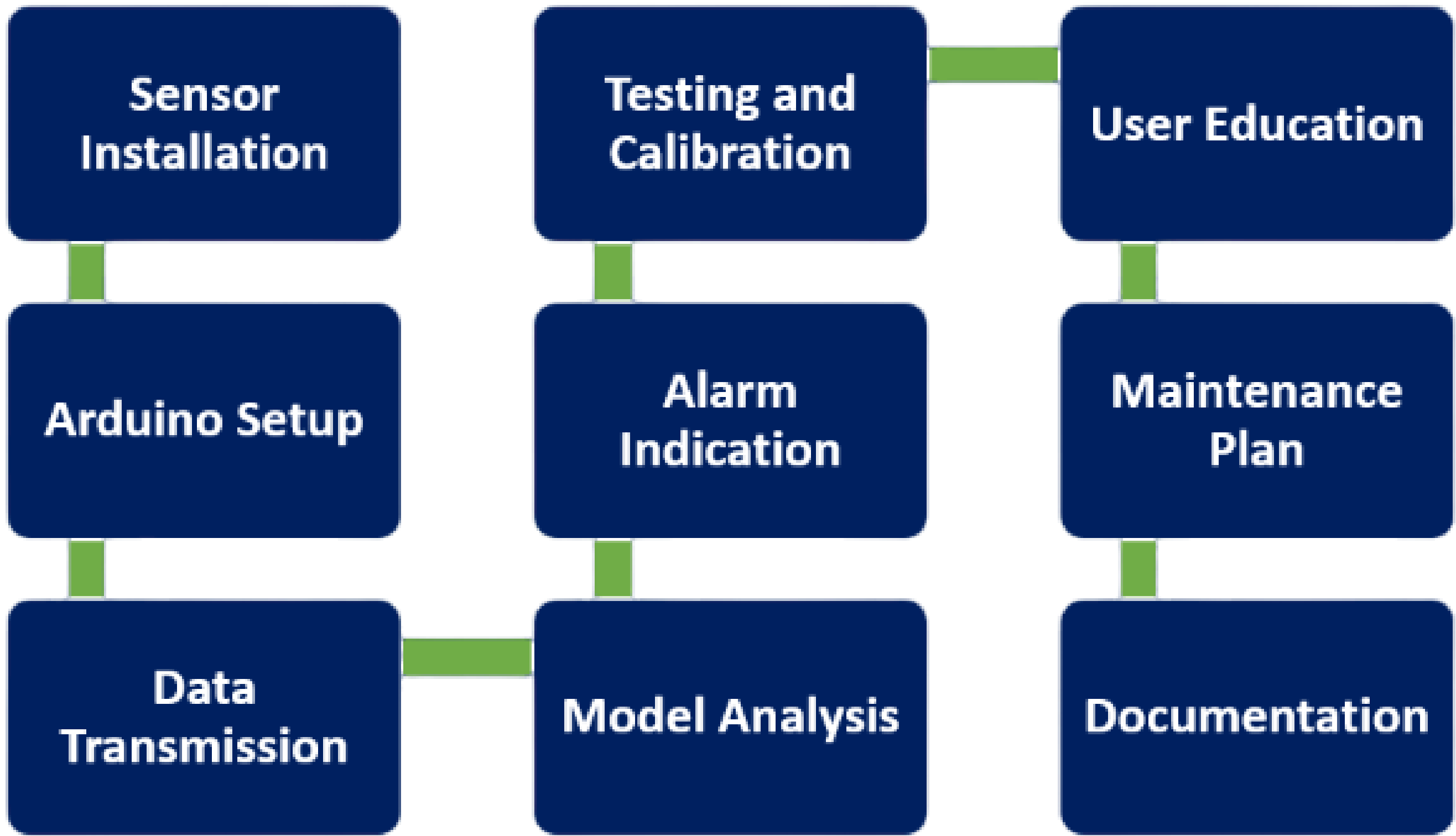
- **Detect Wheel Wobbling:** Develop a system for wheel wobble detection to enhance safety.
- **Mitigate Risks:** Implement measures to reduce wobble-related risks, improve efficiency, and enhance safety.
- **Utilize Technology:** Employ ultrasonic sensors and Arduino for real-time wobble detection.
- **Real-time Analysis:** Use Python for instant data analysis, enabling quick corrective actions.

Introduction

- **Purpose:** Enhance safety by monitoring wheel motion in motorcycles and light vehicles to prevent accidents.
- **Technology Solution:** Utilize IoT-based wobbling motion detection with ultrasonic sensors on the vehicle's frame.
- **Detection and Alert:** Activate microcontroller for visual driver alerts upon wobbling detection.
- **Safety Enhancement:** Reduce wheel wobbling risks in motorcycles and light vehicles for safer road travel.



Methodology



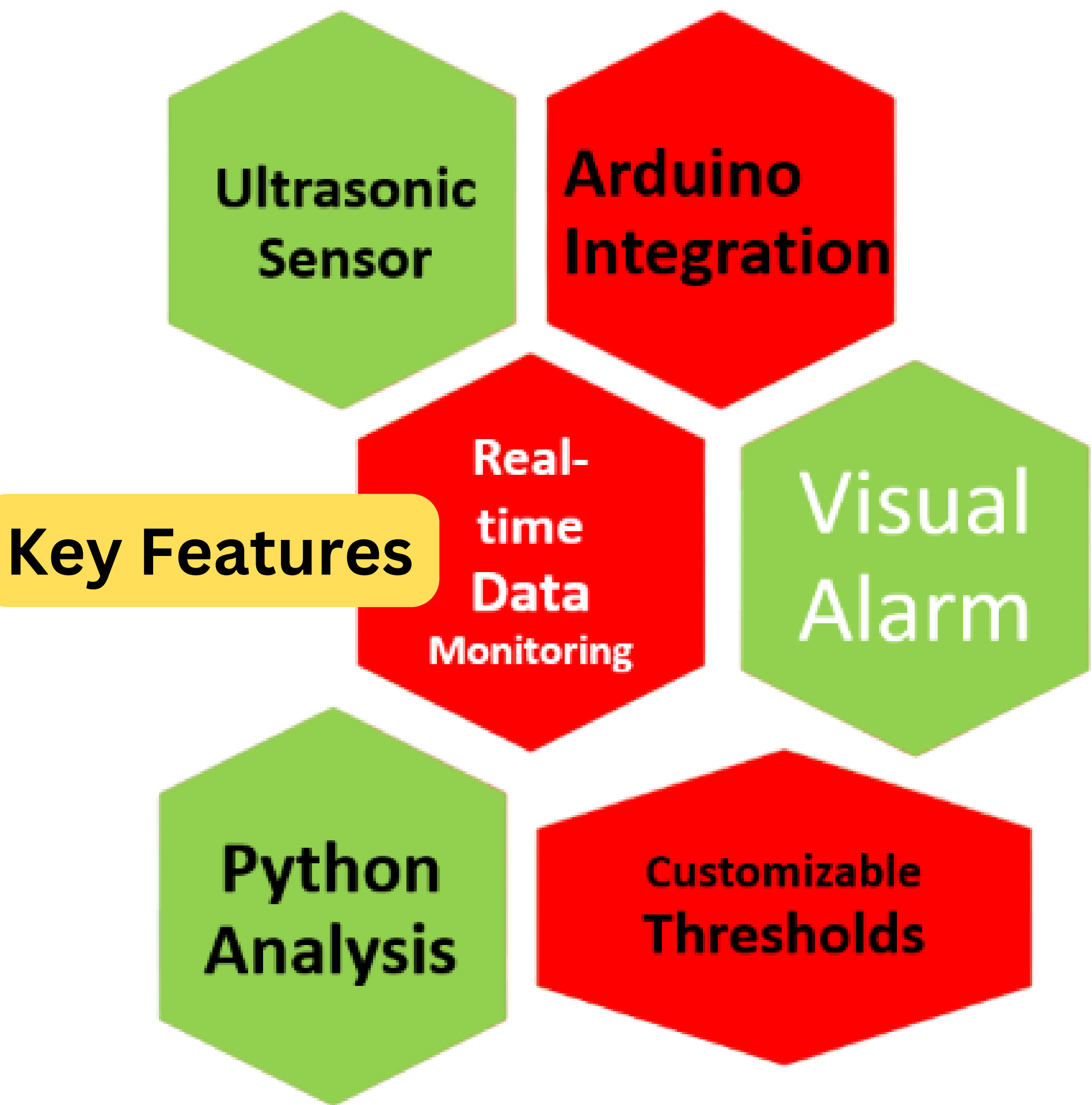
Advantages

- Enhanced Safety.
- Improved Efficiency.
- Cost Savings.
- Real-time Monitoring.
- User-friendly.
- Retrofit Kit.

Disadvantages

- Installation Complexity.
- False Alarms.
- Dependency on Power.
- Maintenance.

Key Features



Future scope

- **Mobile Application Integration:** Develop a mobile app that connects to the system, providing real-time wobbling data and maintenance recommendations on their smartphones.
- **Vehicle-to-Vehicle Communication (V2V):** Enable vehicles to share real-time wobbling data with nearby vehicles, creating a network of safety information sharing to prevent accidents.
- **Integration with Autonomous Vehicles:** As autonomous vehicles become more prevalent, integrate the system to provide data for effective autonomous decision-making algorithms.
- **Powertrain Accessibility:** The vehicle will automatically shut down in case of an emergency or high risk due to the wobbling motion of the wheel.

Conclusion

- **Objective Achieved:** Our project successfully addressed the risks associated with wheel wobbling, a critical threat to vehicle efficiency and passenger safety.
- **Robust System Design:** We developed a reliable system incorporating an ultrasonic sensor and Arduino, coupled with real-time Python data analysis, to achieve our objectives.
- **Versatile Application:** The "IoT-Based Wobbling Motion Detector for Vehicle Safety" project benefits both light and heavy-weight vehicles, making it a versatile and crucial safety innovation.