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Smart Traffic Lights for Detecting Emergency Vehicles Using Wireless Communication

- **Problem Statement ID - SIH1534**
- **Problem Statement Title - Student Innovation**
- **Theme - Transportation & Logistics**
- **PS Category - Hardware**
- **Team ID - 31784**
- **Team Name - TrafficCrew**

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Smart Signal Priority System for Multiple Emergency Vehicles Using Wireless Communication

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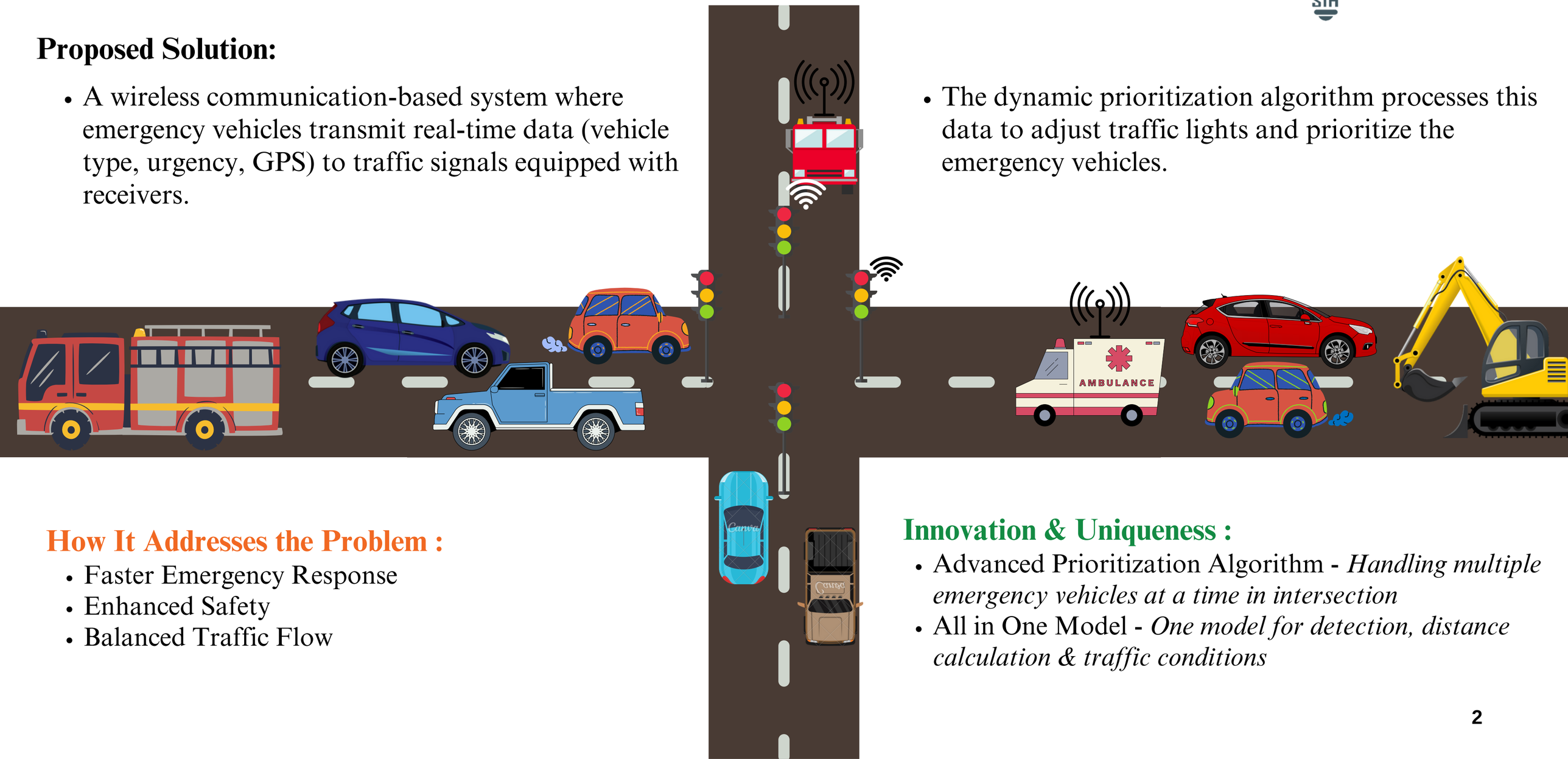
Proposed Solution:

- A wireless communication-based system where emergency vehicles transmit real-time data (vehicle type, urgency, GPS) to traffic signals equipped with receivers.
- The dynamic prioritization algorithm processes this data to adjust traffic lights and prioritize the emergency vehicles.



How It Addresses the Problem :

- Faster Emergency Response
- Enhanced Safety
- Balanced Traffic Flow

Innovation & Uniqueness :

- Advanced Prioritization Algorithm - *Handling multiple emergency vehicles at a time in intersection*
- All in One Model - *One model for detection, distance calculation & traffic conditions*

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TECHNICAL APPROACH

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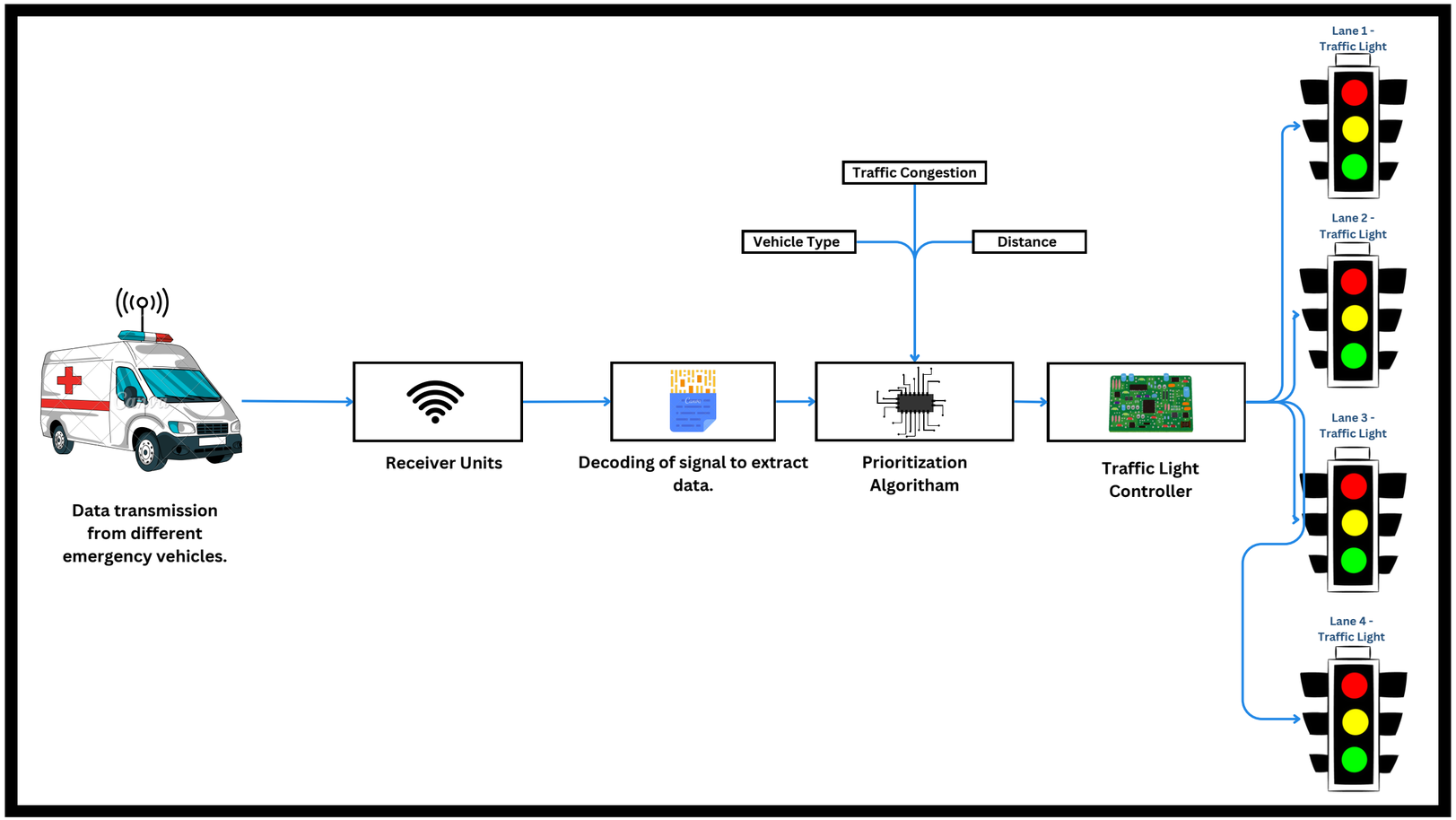
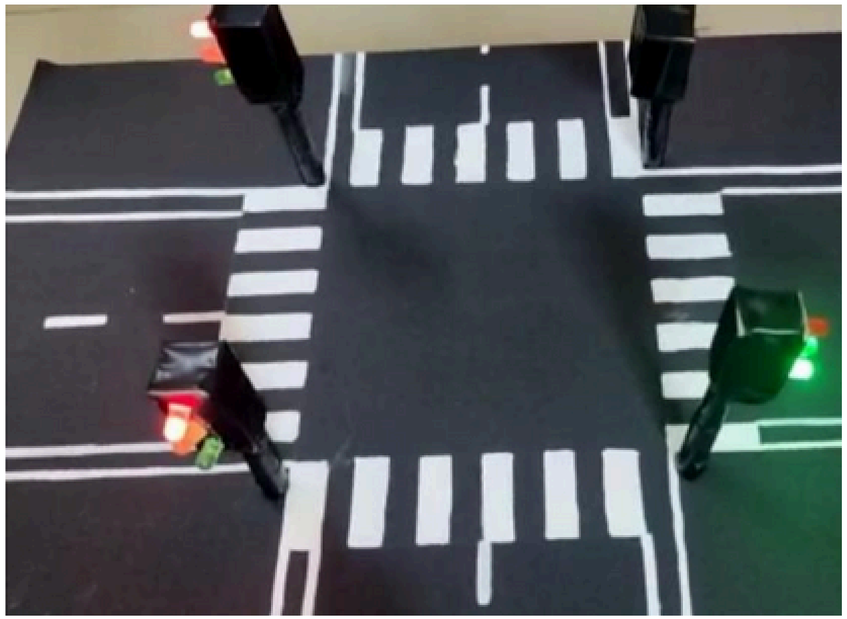
Systems Architecture :



Prototype :



Hardware Requirement :

GPU ARDUINO

Technology Stack :

PYTHON

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FEASIBILITY AND VIABILITY

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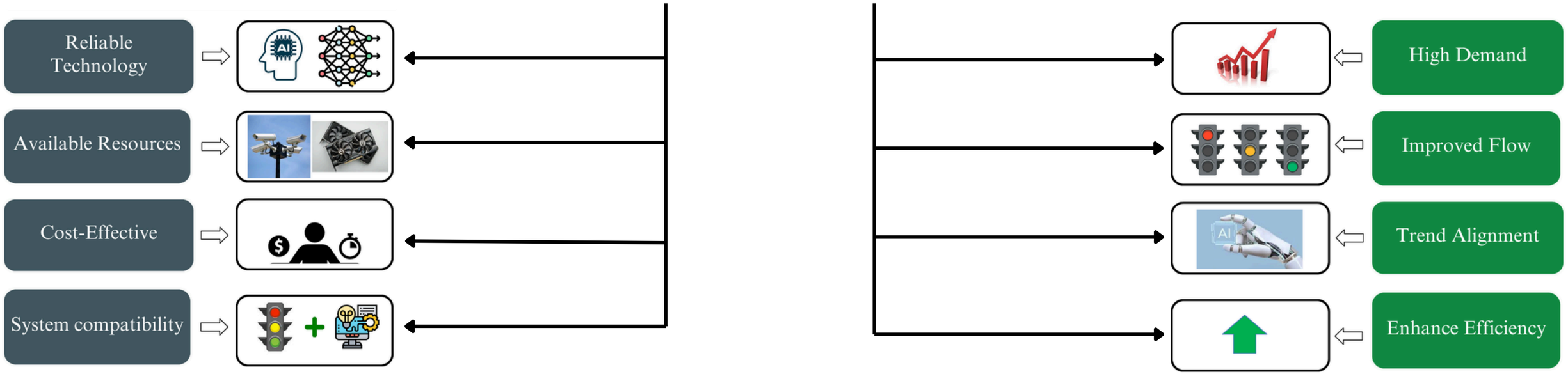
Analysis of Feasibility & Viability of our idea



Potential Challenges and Strategies to Overcome

Public Frustration
Minimize signal changes and consider citizen flow; raise awareness.

System Reliability
Use real-time data to improve accuracy and ensure backup systems work.

Driver Compliance
Educate drivers on responding correctly to emergency signals.

Data Privacy
Safeguard citizen data while training with real-time traffic information.

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IMPACT AND BENEFITS

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Potential Impact On :

- **Emergency Services** *faster...*

- **City Infrastructure** *better...*

- **General Public** *safer...*

- **Intersection Fatalities** *lesser...*

Benefits of the solution

SOCIAL

Increased safety for both emergency workers and everyday drivers

ECONOMIC

Reduced costs from fewer accidents and quicker emergency responses.

ENVIRONMENTAL

Less idling time for vehicles, leading to lower emissions and reduced fuel consumption

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RESEARCH AND REFERENCES

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[2] M. K. Kaleb and S. K. Saini, "Adaptive Traffic Signal Control System for Emergency Vehicles," *IEEE* Xplore.

[3] C. P. Mat, and J. C. Jeston, "Development of a Smart Signalization for Emergency Vehicles," *Sensors*, 2021.

[4] A. R. Gupta and B. R. Joshi, "Intelligent Traffic Control System for Emergency Vehicles Using RF Technology," *International Research Journal of Engineering and Technology (IRJET)*, vol. 7, no. 4, pp. 955-960, 2020.