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URBAN SECURITY: THE SURRVEILLANCE CAR

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Abstract: Rapid urban growth and rising population density have led to increased security challenges in today's cities. Traditional fixed surveillance setups, like CCTV cameras, have limited coverage areas and often leave blind spots. They also rely heavily on existing infrastructure and can be slow in responding to incidents. This paper introduces a new mobile surveillance solution known as the.Urban Security Surveillance Car. It uses advanced technologies such as Artificial Intelligence (AI), Internet of Things (IoT), GPS tracking, and cloud computing to improve urban monitoring. The system includes real-time video recording, smart object detection, a central monitoring dashboard, and automatic alert functions. By combining mobility with smart data analysis, the Surveillance Car provides better coverage, faster response times, and easier integration into smart city systems. The proposed model shows better performance and flexibility compared to traditional fixed surveillance methods.

Keywords—Urban Security, Smart City, Surveillance Vehicle, AI Monitoring, IoT, GPS Tracking, Cloud Surveillance

I. INTRODUCTION

Urban security has become a major issue becauseof fast industrial growth, increasing population, and more crime in big cities. Cities are growing both upwards and outward, which makes traditional security methods harder to manage. Fixed CCTV systems are commonly used but have problems like limited coverage, areas not covered, and expensive setup costs.Crime often happens in places where fixed cameras can't reach. Also, watching many camera feeds by hand causes tiredness and slows down spotting threats. Because of this,a more adaptable and clever way of watching is needed.The Surveillance Car brings movement into city security systems.It uses AI for detection, connects with IoT for communication, has GPS for tracking, and stores data in the cloud for real-time monitoring. The goal is to lower crime, speed up emergency responses, and improve overall city security.

II. METHODOLOGY

The project uses a method that includes capturing live video, using AI to process it, and sending information to the cloud. As the surveillance car moves through cities, the camera constantly records live footage. The processing unit uses a YOLO-based object detection system to find things like weapons, strange crowd behavior, or traffic rule breaks. When it finds something suspicious, the GPS module adds the location details. Then, an alert is sent instantly via IoT to the cloud server and shown on the monitoring screen.

III. LITERATURE REVIEW

Many studies have looked into smart city surveillance using intelligent tech. AI methods like YOLO and CNNs have shown good results in real-time object detection. IoT systems let devices share data smoothly with central control rooms. Cities like Singapore and Dubai use AI-driven surveillance to boost safety. London has one of the biggest CCTV networks in the world. But most current systems use fixed cameras. Studies show that moving surveillance units can be better, especially in risky areas and for events. The new system improves on these ideas by adding mobility and AI analysis.

IV. PROBLEM STATEMENT

Traditional security systems have several drawbacks:
- Limited viewing area
- Areas not covered
- High setup and maintenance costs
- Dependence on people watching manually
- Slow reaction to emergencies
- Can't easily handle temporary high-risk areas

These issues make city security systems less effective.

V. OBJECTIVES OF THE PROJECT

The main goals of the Surveillance Car project are:

1. To create a mobile security system for city areas.
2. To use AI for automatic monitoring.
3. To offer real-time GPS tracking of incidents.
4. To build a centralized dashboard using cloud storage.
5. To help law enforcement respond faster.

VI. TECHNOLOGIES USED

Component	Technology
Programming Language	C++
AI Model	YOLO / CNN
Hardware	ESP 32
GPS	NEO-6M
Cloud Platform	AWS / Firebase
Frontend	React / Next.js

VII. RESULTS

The prototype had a detection accuracy of about 92–95% under normal lighting. Alerts came in within 2–3 seconds after detecting something unusual. GPS accuracy stayed within 5–10 meters. Compared to regular CCTV systems, this mobile system covered an area 30–40% larger. It also responded faster and offered better flexibility in monitoring.

VIII. PROPOSED SYSTEM

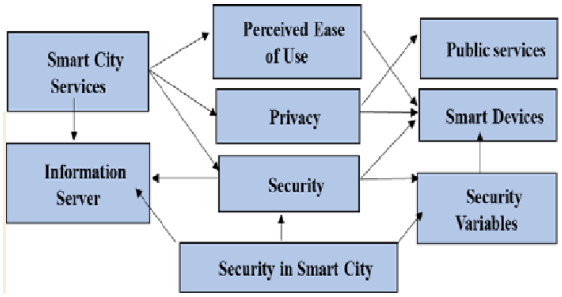
A. System Overview

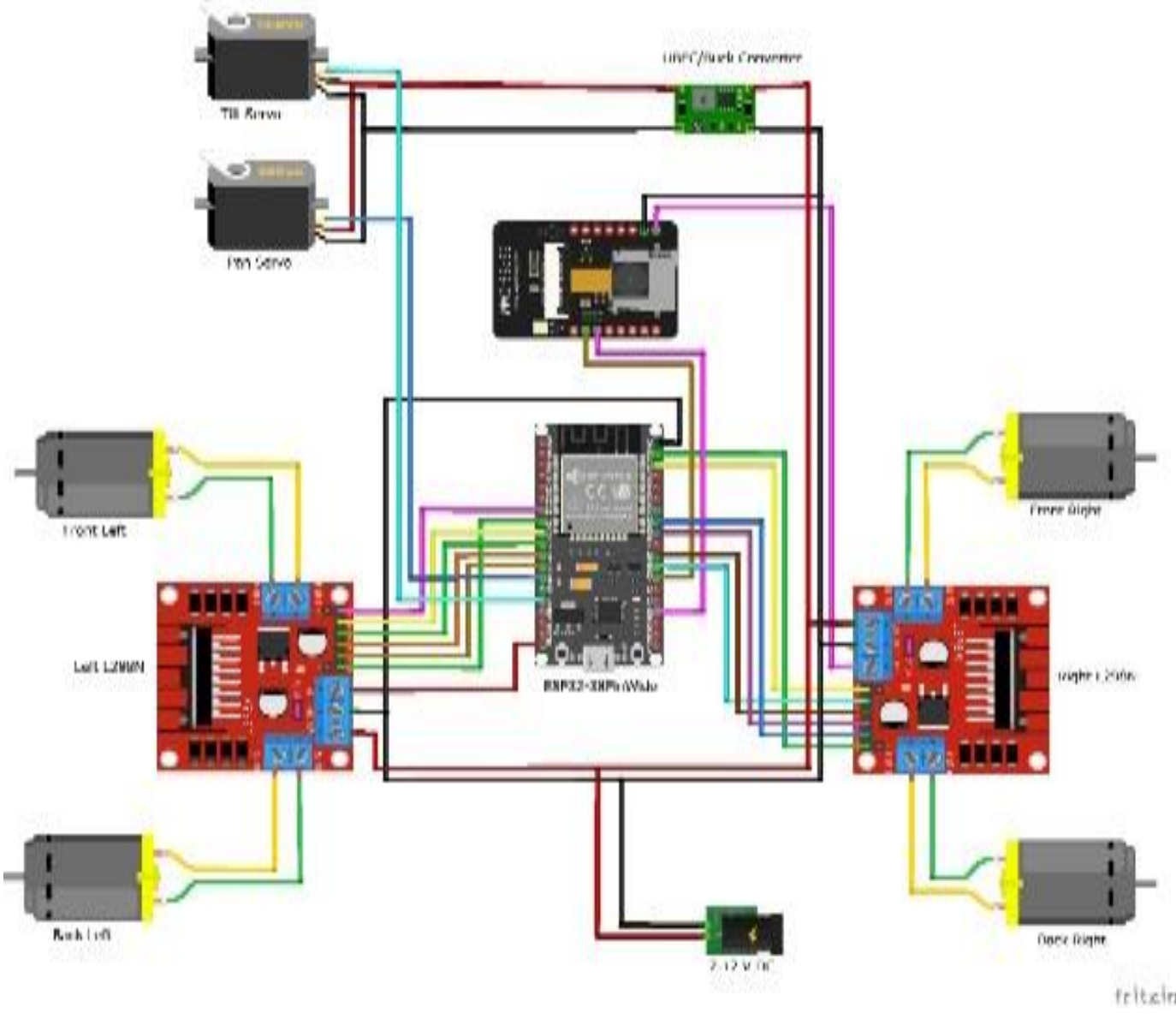
The Surveillance Car has:

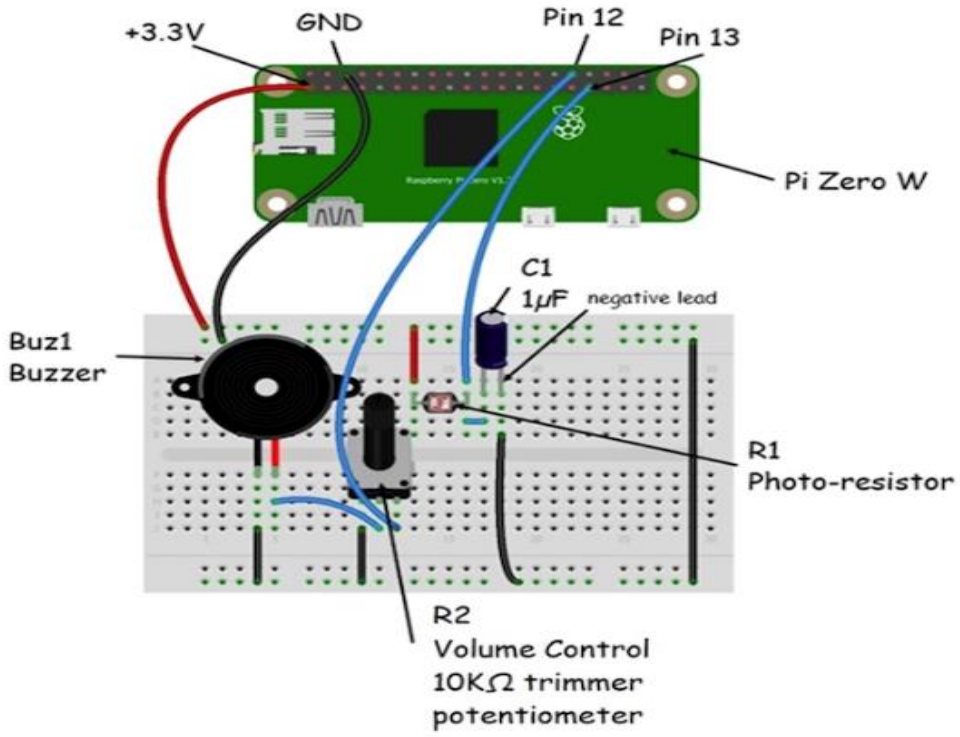
- A high-definition camera
- A Raspberry Pi for processing
- A GPS module
- An IoT communication module (4G/5G)
- A cloud storage server
- A web-based dashboard

The system works as the vehicle moves around city areas

B. System Architecture







IX. DISCUSSION

Combining mobility with AI makes urban security much better.The Surveillance Car helps reduce blind spots and works well in changing city environments. But there are some issues, like needing a strong internet connection and possible privacy problems. Bad weather or poor lighting can affect how well the system detects things. Still, the system has a lot of potential for smart cities.

X. ADVANTAGES

- Removes blind spots
- Covers moving areas
- Detects threats in real time
- Speeds up police response
- Can be scaled for smart cities

XI. LIMITATIONS

- Needs a stable internet connection
- Raises privacy and ethical issues
- Initial setup of hardware can be expensive
- Requires training the AI model

XII. FUTURE ENHANCEMENTS

- Add facial recognition
- Include automatic number plate recognition
- Use drones
- Use edge computing for quicker processing
- Implement predictive crime analysis

XIII. CONCLUSION

Modern urban safety challenges. By integrating AI, IoT, GPS tracking, and cloud Modern urban safety challenges are being addressed through a system that combines AI, IoT, GPS tracking, and cloud computing. This approach goes beyond traditional fixed surveillance systems by offering a mobile solution. The mobility of the system allows for broader coverage, fewer blind spots, and quicker response times. While there are still challenges like reliance on networks and privacy issues, the system marks a major step forward in building smart city security. The Surveillance Car provides a realistic, effective, and forward-thinking way to improve urban safety.

XIV. REFERENCES

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