iJRASET
International Journal For Research in
Applied Science and Engineering Technology

INTERNATIONAL JOURNAL FOR RESEARCH
IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 12 Issue: XII Month of publication: December 2024

DOI: https://doi.org/10.22214/ijraset.2024.65660

Review on Forest Monitoring Rover

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Abstract: Automation is the process to reduce the man power and the idea of automation is to provide a test run in an Atmega328p microcontroller-based system to monitor and control the production operation. The main objective of this project is to control the electric power wastage and take data logs from a motor and also to check the performance of an employee in industries. This system works on Atmega328p microcontroller so it requires low cost and gives efficient performance in unnecessary electric power wastage in power loom motors. All the system is designed on basis of Atmega328p microcontroller, proximity sensor and RFID. The system includes IoT design to observe worker performance online from anywhere in the world.
Keywords: Forest Monitoring, Wildlife Tracking, Enviromental sensor, Automated Surviellance, Remote Sensing

I. INTRODUCTION

Forests are vital ecosystems that play a crucial role in maintaining biodiversity, regulating climate, and supporting life on Earth. However, they face growing threats from human activities such as illegal logging, poaching, encroachment, and forest fires, all of which lead to the degradation of these essential environments. Traditional surveillance methods, including manual patrolling, satellite monitoring, and aerial surveillance, are often insufficient in providing real-time data and timely responses due to the challenges of accessibility, vast forested areas, and limited manpower. To address these limitations, the development of an autonomous Forest Surveillance Robot (FSR) presents an innovative solution for monitoring and safeguarding forest areas. Designed to operate independently or as part of a coordinated network, these robots can navigate through complex and often inaccessible terrains, continuously collecting environmental data and identifying potential threats. By leveraging advancements in robotics, artificial intelligence, and sensor technologies, the FSR aims to enhance the efficiency, precision, and speed of forest surveillance. The FSR is equipped with a range of sensors, including high-resolution cameras, thermal imaging, infrared sensors, and environmental monitoring tools.

II. LITERATURE SURVEY

The history of forest surveillance reflects the evolution of tools, methods, and technologies used to monitor and protect forests. Initially reliant on manual efforts, it has progressively integrated advanced technologies to address growing challenges like deforestation, poaching, and climate change.'

1) *Early Technological Innovations (Early to Mid-20th Century):*

Aerial Surveillance:In the 1920s and 1930s, airplanes were first used for forest fire detection and monitoring deforestation. Aerial surveys allowed broader coverage compared to ground-based methods.

2) *Automated Systems for Wildlife and Forest Protection*

Research has explored the use of drones and sensor networks to monitor large areas. Drones provide aerial views but are limited by battery life and cannot operate under dense canopies. Sensor networks, though effective in localized monitoring, lack mobility and are difficult to deploy in remote areas.

3) *Applications of AI in Forest Monitoring*

Studies highlight the integration of machine learning for analyzing patterns (e.g., illegal activities, animal movement) from video feeds and sensor data. These systems rely on training datasets to detect anomalies effectively.

4) *Satellite Technology (Late 20th Century)*

Landsat Satellites (1972): The launch of NASA's Landsat program revolutionized forest surveillance, allowing researchers to monitor deforestation, forest cover changes, and wildfires globally using remote sensing technology.

III. METHODOLOGY

A. *Planning and Research*
- Limited human resources for vast forest coverage.
- Local communities dependent on forests.
- Satellite communication for remote areas.

B. *System Design*
- Data Collection Layer: Tools for capturing environmental, visual, and acoustic data.
- Processing and Analysis Layer: Systems for data analysis, threat detection, and decision-making.
- Action and Response Layer: Mechanisms for alerting authorities and mitigating threats.

C. *Hardware Installation*
- Chassis and Locomotion System: Use durable materials (e.g., aluminum alloys or carbon fiber) for lightweight and rugged builds.
- Cameras: High-resolution RGB cameras for detailed imagery

D. *Software Development*
- *Cameras and Sensors*

Mount cameras and sensors at elevated positions for maximum coverage.
Ensure proper alignment of cameras to cover high-priority areas.

- *Power System*

Secure solar panels and connect them to battery systems.
Test the power supply for stability and efficiency.

E. *Data Analytics*
Monitor deforestation, wildlife activity, and human intrusions.
Detect early signs of forest fires or environmental degradation.

F. *Testing and quality assurance*
Camera & Sensor Functionality
Mobile Robot Navigation
Power Systems
Stress Testing (Endurance and Reliability)

IV. BLOCK DIAGRAM

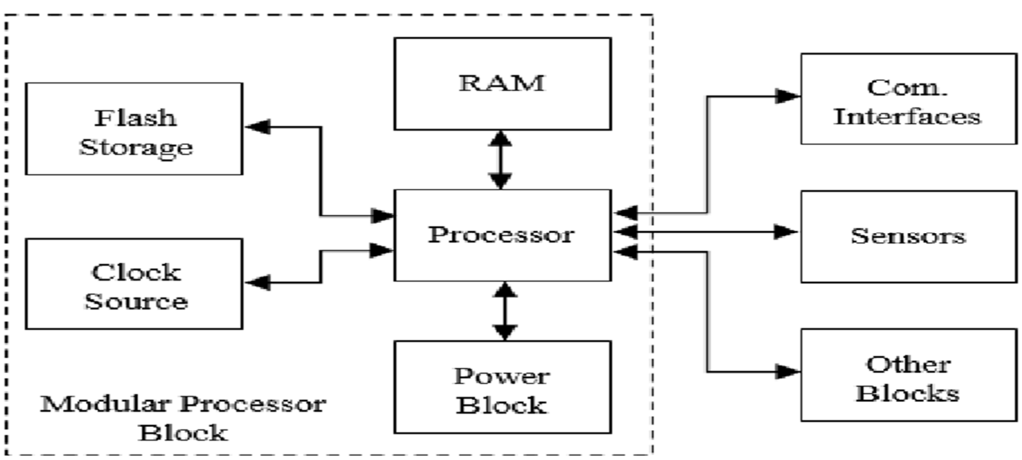


Fig: 3.1 Block Diagram Of_Smart Public Transport Bus

Trustworthiness in public transport is of great importance today. Citizens who use public buses waste a lot of time waiting for the bus at bus stop. In daily operation of a bus system, the movement of buses is affected by unknown conditions as the day progresses such as traffic or dispatching buses at irregular time from the depot. If people travelling by bus get exact location of bus and the count of passengers in bus it will increase the trustworthiness in the public transport. This project proposes a system to track public bus using GPS (Global bus. The location of bus, passengers count, bus status, bus number, bus routes, and bus timings can be accessed by public using IOT technology. All these details of particular bus are accessed by simply scanning QR code of link in smart phone. The QR code for each bus is attached to every bus stop.

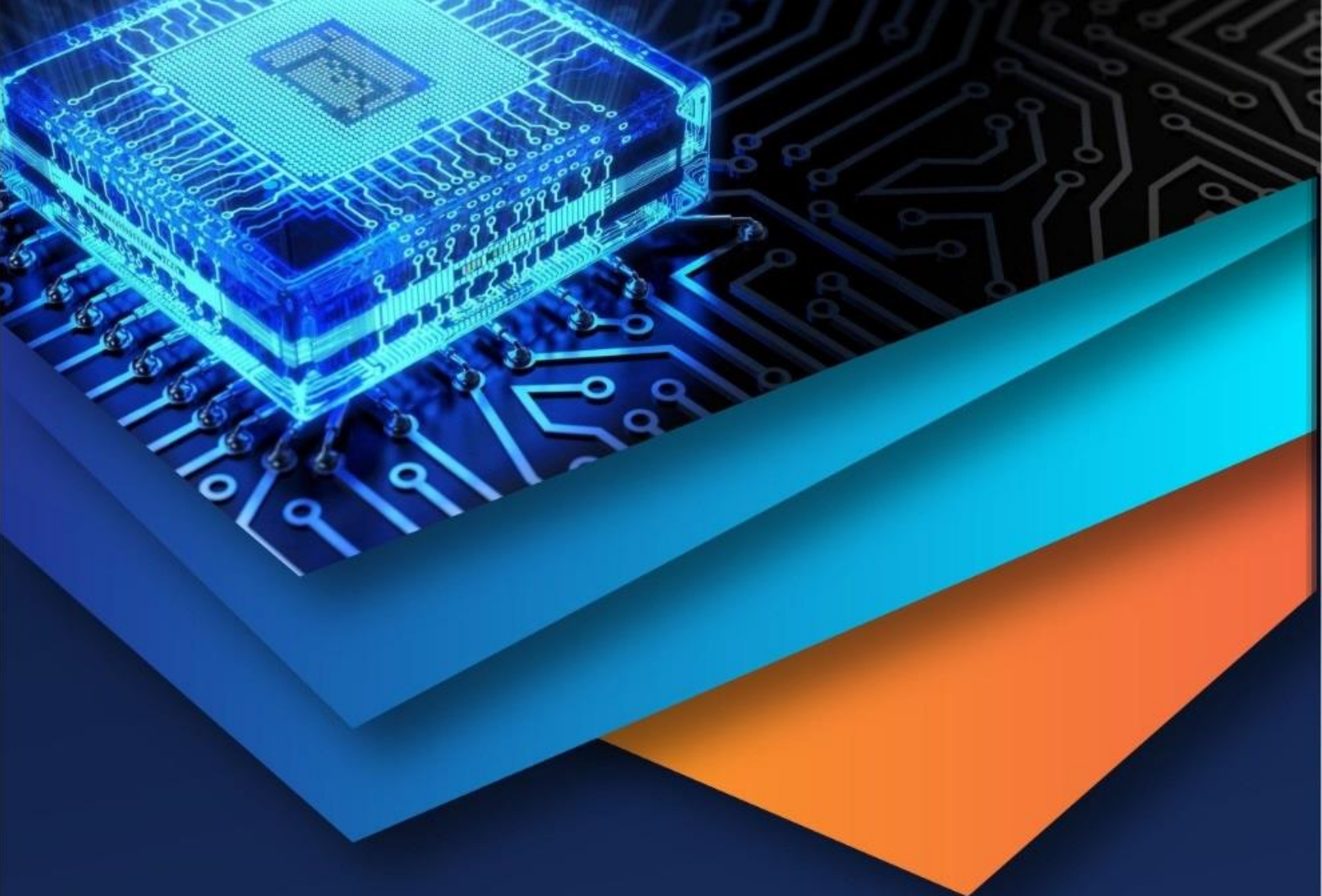
The system is placed on every bus. The system built around 8051 based microcontroller. GPS module is used to get the latitude and longitude that is position of bus. Microcontroller read the position continuously.IR sensors are placed at the entry and exit doors of bus to count the total number of passengers in the bus. The ignition of the bus is connected to microcontroller to get the status of bus that is whether bus is on or off. The GSM module is used to accesses wireless internet in the bus. Microcontroller sends all these details of bus continuously to a web page though internet connection. The web page also contains the details of bus like bus number, bus routes, bus timings which is manually uploaded by authority. Public access all these details of bus on visiting to that particular web page. For simplicity to access web page, the QR code of link of web page is attached to every bus stop.

V. CONCLUSIONS

In conclusion, implementing advanced forest surveillance systems, whether through human efforts or innovative technologies like autonomous robots, is critical for the sustainable management and protection of our forests. Effective surveillance ensures the preservation of biodiversity, deters illegal activities like poaching and deforestation, and provides early warnings for environmental threats such as wildfires. By leveraging cutting-edge tools and methods, we can significantly enhance our ability to monitor and protect these vital ecosystems, contributing to global conservation efforts and ensuring a healthy planet for future generations.

REFERENCES

[1] https://daneshtarapore.com/forest-swarm/
[2] https://www.researchgate.net/
[3] https://eos.com/products/forest-monitoring/



10.22214/IJRASET

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