PROJECT REPORT

Group-17

TITLE OF THE PROJECT

IOT BASED AUTOMATED INDUSTRY PROTECTION SYSTEM

ABSTRACT IDEA

The "IOT Based Automated Industry Protection System" is a Raspberry Pi-based embedded system designed to enhance warehouse safety and efficiency. It incorporates various sensors in four quadrants of the warehouse:

1. Flame detection with IR sensor triggers an App alert and activates a water sprinkler for fire prevention.

2. DHT11 sensor monitors temperature and humidity, activating exhaust fans when thresholds are exceeded to maintain optimal conditions.

3. LDR sensor senses low light levels, automatically illuminating the area to improve visibility and safety.

4. MQ-5 gas sensors detect leaks, activating exhaust fans and sending alerts to an app or website for quick response.

GROUP MEMBERS DETAILS

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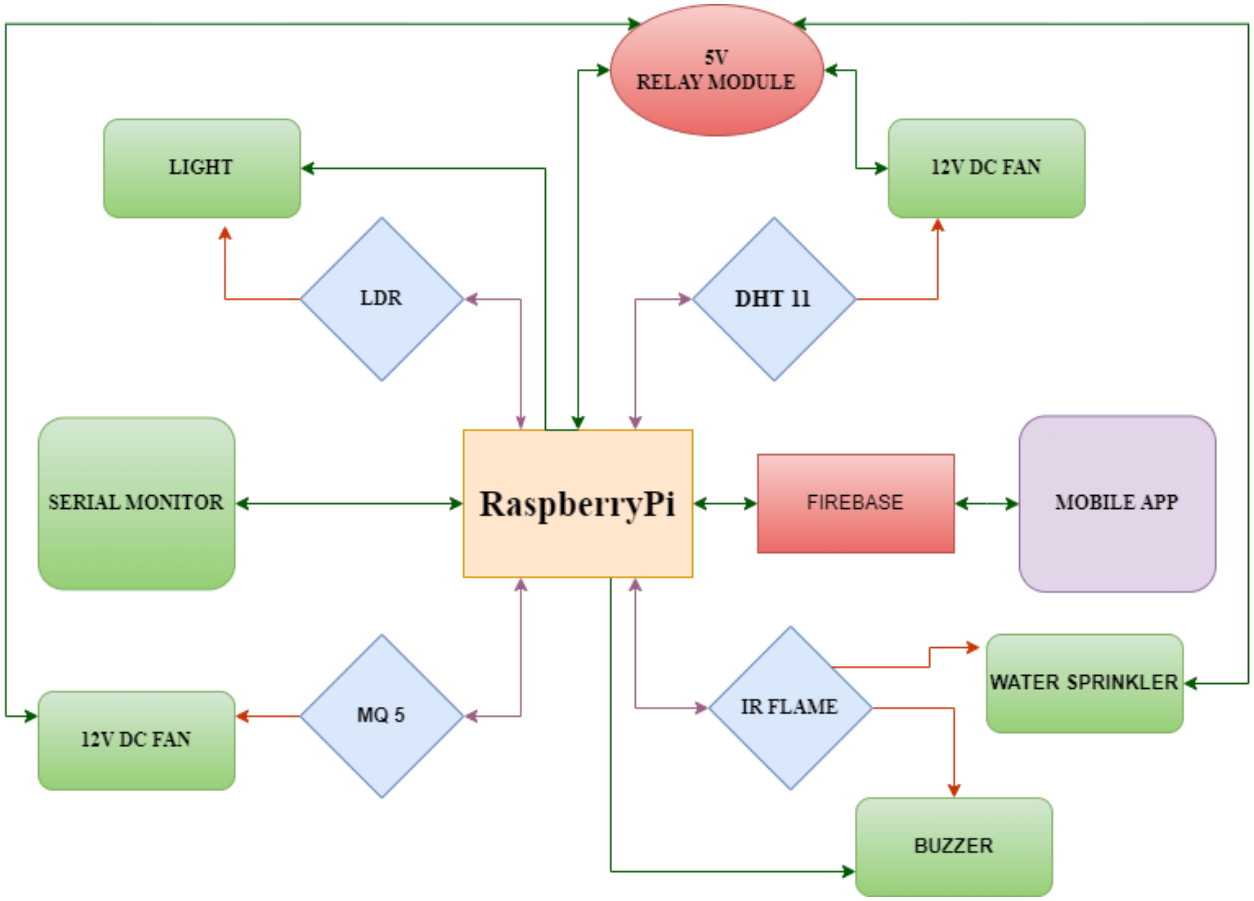
BLOCK DIAGRAM



BRIEF DESCRIPTION OF THE PROJECT

The "IoT Based Automated Industry Protection System," a Raspberry Pi-based embedded system, stands as an innovative solution to elevate safety and operational efficiency within warehouses. This comprehensive system utilizes strategically positioned sensors across four quadrants, enabling real-time monitoring and automated responses to critical events.

Flame Detection System:

An Infrared (IR) sensor is employed for prompt flame detection.

In the face of a fire hazard, the IR sensor triggers alerts on a dedicated mobile application.

Simultaneously, a water sprinkler system activates to swiftly contain and prevent the escalation of the fire.

Temperature and Humidity Monitoring:

The DHT11 sensor continuously monitors temperature and humidity levels within the warehouse.

If readings surpass predefined thresholds, the system proactively maintains optimal conditions.

This includes the automatic activation of exhaust fans to regulate temperature and humidity.

Low Light Level Sensing:

An LDR (Light Dependent Resistor) sensor identifies low light levels in the warehouse.

In response, the system triggers an automatic illumination mechanism, improving visibility and overall safety.

Gas Leak Detection:

MQ-5 gas sensors are integrated into the system to detect potential gas leaks within the warehouse.

Upon sensing a gas leak, the system activates exhaust fans to disperse the gas safely.

Alerts and Data Storage:

Alerts generated by the system are seamlessly transmitted to a dedicated mobile application or website for swift response and mitigation.

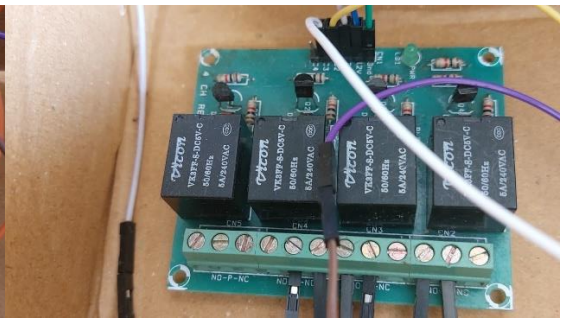
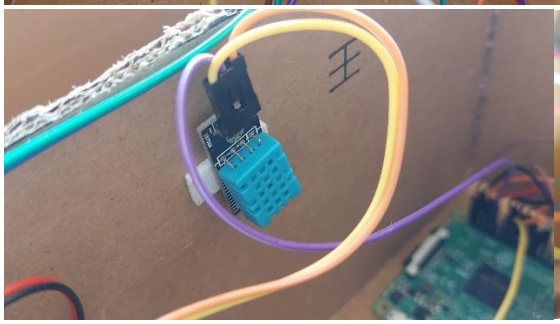
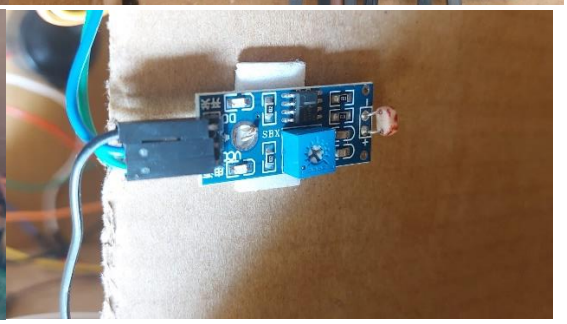
Data collected by the system is stored in Firebase, ensuring secure and accessible storage.

Users can conveniently monitor and analyze warehouse conditions through the dedicated mobile application.

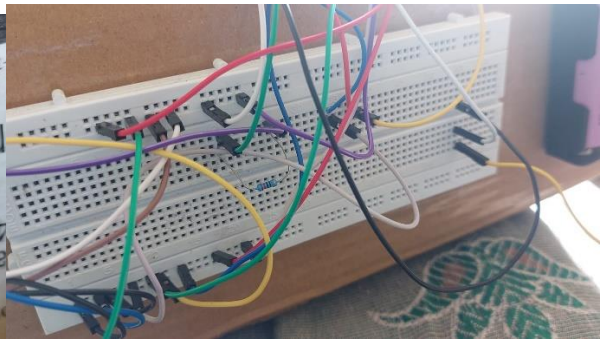
By incorporating multi-event alert capabilities and leveraging Firebase for data storage, the IoT-based system emerges as a versatile and comprehensive solution for warehouse safety. It effectively addresses a range of scenarios, including fire hazards, environmental conditions, low visibility, and other potential risks, demonstrating a commitment to advanced technology for enhanced industrial protection.

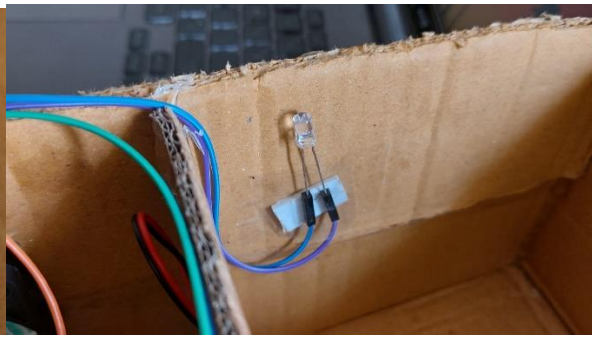
SCREENSHOTS OF HARDWARE MODULES

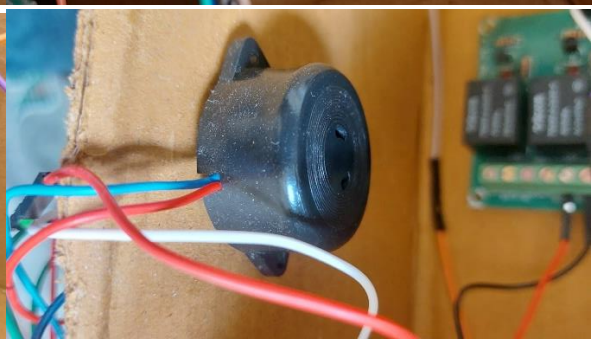
1. **RASPBERRY PI**
2. **IR FLAME SENSOR**
3. **LDR SENSOR**
4. **MQ-5 GAS SENSOR**
5. **DHT11 TEMPERATURE SENSOR**
6. **RELAY MODULE**
7. **LED LIGHT**
8. **BUZZER**
9. **12V DC FAN**
10. **BREAD BOARD**
11. **WATER SPRINKLER**


Flying-Fish

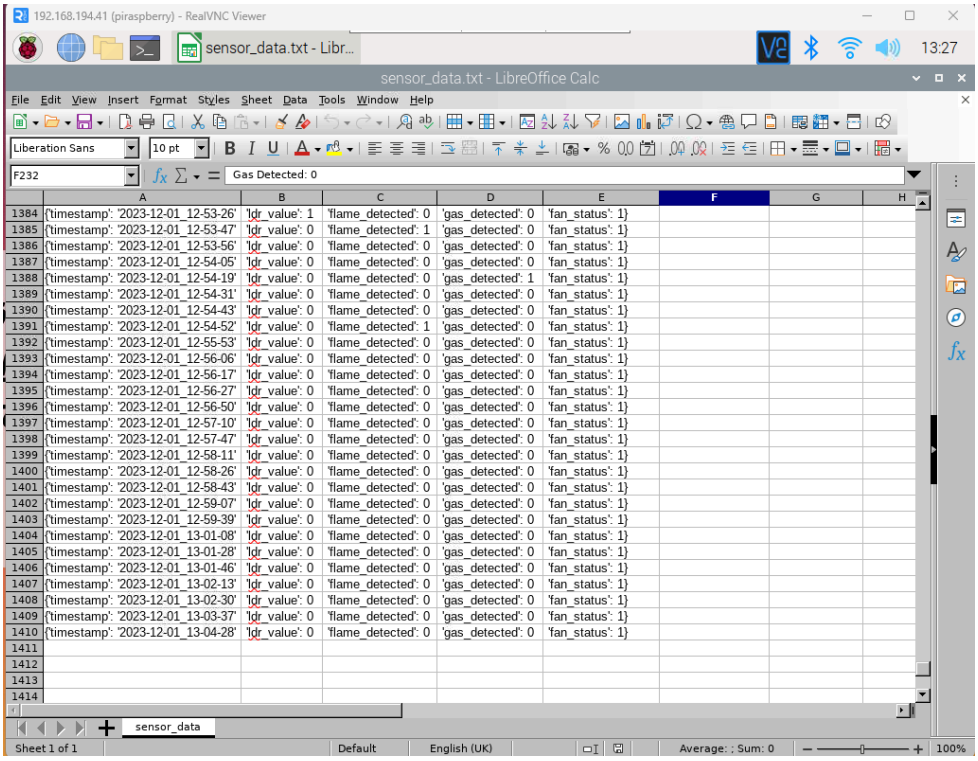




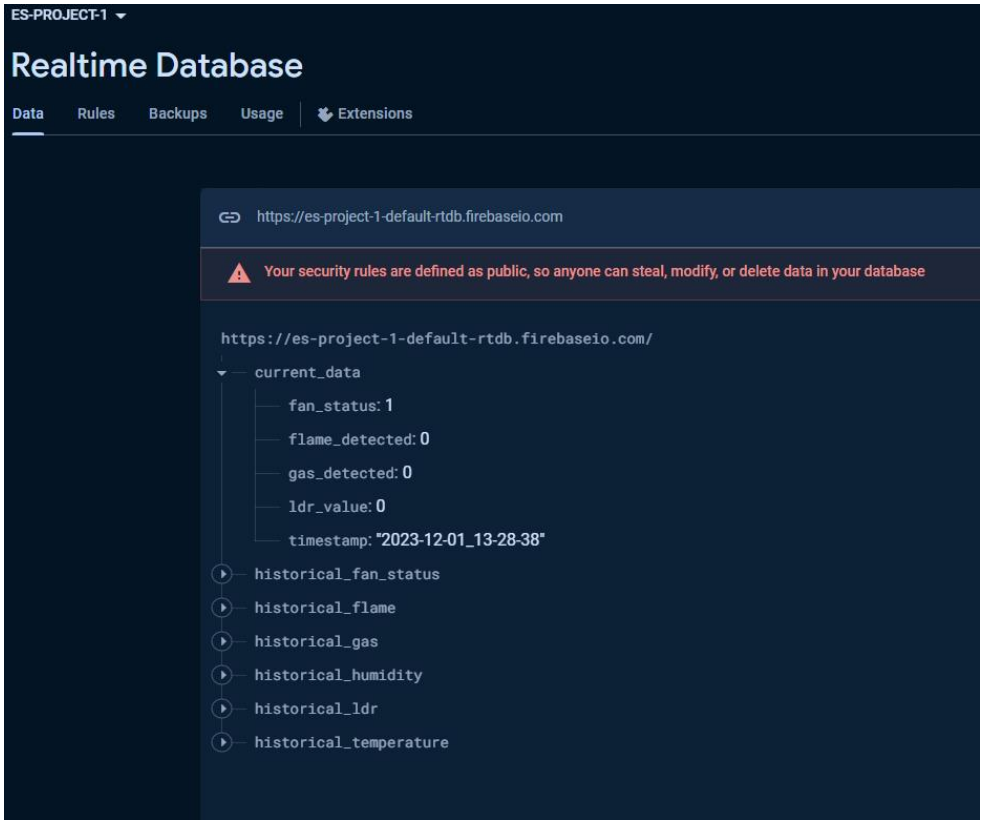


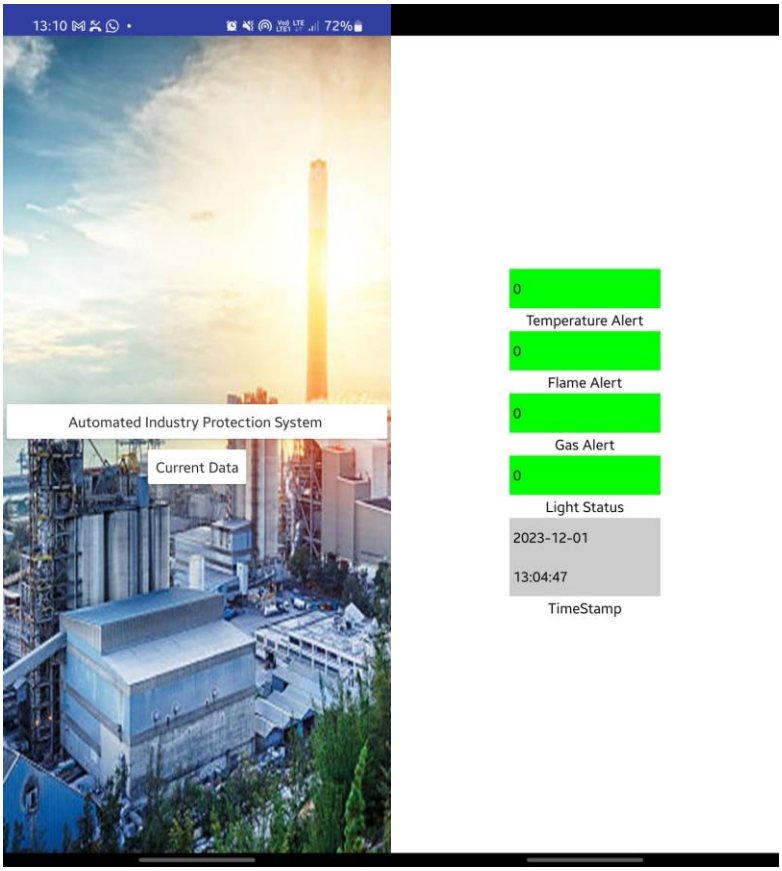
SCREENSHOTS OF SOFTWARE MODULES

1. **Real VNC**
2. **Excel Sheet To Store Data in RaspberryPi**
3. **Text Editor (Python, JS)**
4. **Fire Base to Store Data in Data Base**
5. **MIT App**

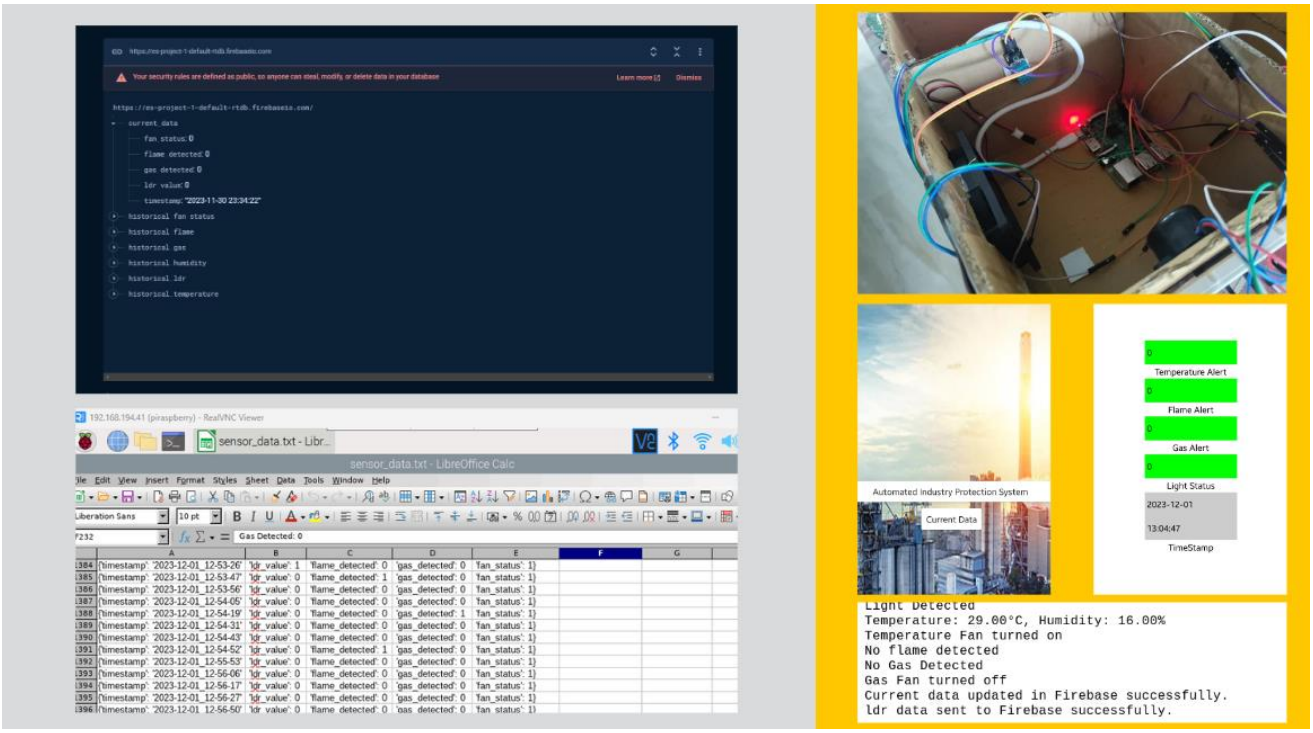



```
Light Detected
Temperature: 29.00°C, Humidity: 16.00%
Temperature Fan turned on
No flame detected
No Gas Detected
Gas Fan turned off
Current data updated in Firebase successfully.
ldr data sent to Firebase successfully.
```


ES-PROJECT-1
Realtime Database
Data
Rules
Backups
Usage
Extensions
https://es-project-1-default-rtdb.firebaseio.com
Your security rules are defined as public, so anyone can steal, modify, or delete data in your database
https://es-project-1-default-rtdb.firebaseio.com/
current_data
fan_status: 1
flame_detected: 0
gas_detected: 0
ldr_value: 0
timestamp: "2023-12-01_13-28-38"
historical_fan_status
historical_flame
historical_gas
historical_humidity
historical_ldr
historical_temperature


13:10
72%
Automated Industry Protection System
Current Data
0
Temperature Alert
0
Flame Alert
0
Gas Alert
0
Light Status
2023-12-01
13:04:47
TimeStamp

SCREENSHOTS OF THE OUTPUTS AND OBSERVATIONS



Observations:

Enhanced Safety:

Real-time hazard detection and automated responses significantly improved warehouse safety.

Operational Efficiency:

Monitoring and regulating environmental conditions contributed to optimized operational efficiency.

Versatility:

Multi-event alert capabilities showcased the system's adaptability to diverse risks and scenarios.

Data-Driven Insights:

Storing data in Firebase provided valuable insights for informed decision-making.

User-Friendly Interface:

The dedicated mobile app offered a user-friendly interface for remote system monitoring and control.

CHALLENGES AND CONCLUSIONS

Challenges:

Integration of Multiple Sensors:

Coordinating the seamless integration of various sensors, each serving a unique purpose (flame detection, temperature monitoring, low light sensing, gas leak detection), posed a challenge. Ensuring these sensors worked harmoniously to provide accurate and real-time data was a critical aspect of the project.

Real-time Responsiveness:

Achieving real-time responsiveness for critical events, such as flame detection, required minimizing latency in data processing and transmission. Balancing the need for quick responses with the limitations of hardware capabilities demanded meticulous optimization.

Environmental Calibration:

Calibrating sensors to accurately respond to the warehouse environment was a challenge. Factors like varying temperatures, humidity levels, and lighting conditions needed careful consideration to maintain the system's accuracy across different scenarios.

Conclusion:

In summary, the "IoT Based Automated Industry Protection System" employs Raspberry Pi technology and a network of sensors to enhance warehouse safety. With features like flame detection, temperature control, low light sensing, and gas leak detection, the system provides real-time monitoring and automated responses to critical events. This comprehensive approach ensures not only the safety of the warehouse environment but also contributes to operational efficiency, making it a forward-thinking solution for modern industrial settings.

Thank You