

Project Design Phase-I

Solution Architecture

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|---------------|---|
| Date | |
| Team ID | Team-592631 |
| Project Name | Detect smoke with the help of IOT data and trigger a fire alarm |
| Maximum Marks | 4 Marks |

Solution Architecture:

Traditional smoke detectors are basic devices designed to alert individuals about the presence of smoke, which may indicate a fire.

While these detectors are effective at providing a basic level of fire detection, they do have limitations. One significant drawback is the potential for false alarms, especially in the case of cooking-related smoke or steam.

This problem can be solved by using Machine Learning algorithms to train a model on smoke data and trigger the alarm accordingly.

IoT Sensors:

Choose IoT sensors equipped with smoke detection capabilities and opt for sensors that support real-time data transmission.

Data Processing:

Validate incoming data for completeness, correctness, and anomalies and then transform raw sensor data into a standardized format.

Machine Learning Model - Random Forest:

- Use a machine learning library such as scikit-learn to implement the Random Forest classification model.
- Select relevant features like sensor readings, location, time stamps, etc.
- Split data into training and testing sets for model evaluation.
- Set a probability threshold for smoke detection, if the probability exceeds the threshold, trigger the alarm system.

User Interface:

Develop a web-based interface to provide visualizations of sensor data trends, model predictions, and alarm trigger alerts.

Model Deployment:

Deploy the model using APIs like flask and fast

Alarm System Integration:

Connect the solution to a fire alarm system using appropriate protocols (e.g., MQTT for IoT).

Implement a reliable communication mechanism to ensure alarm triggers are received promptly.

Reference:

<https://www.azosensors.com/article.aspx?ArticleID=2753>

<https://blog.constellation.com/2018/09/19/best-smart-smoke-detectors/>