
FOREST FIRE
DETECTION

Team Members

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IoT-
Selecting appropriate Sensors. Connection with NodeMCU/ESP32-
Hardware
Coding and Implementaion

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Machine Learning-
Generation of dataset.
Exploring and implementing prediction algorithms
Coding and Implementation

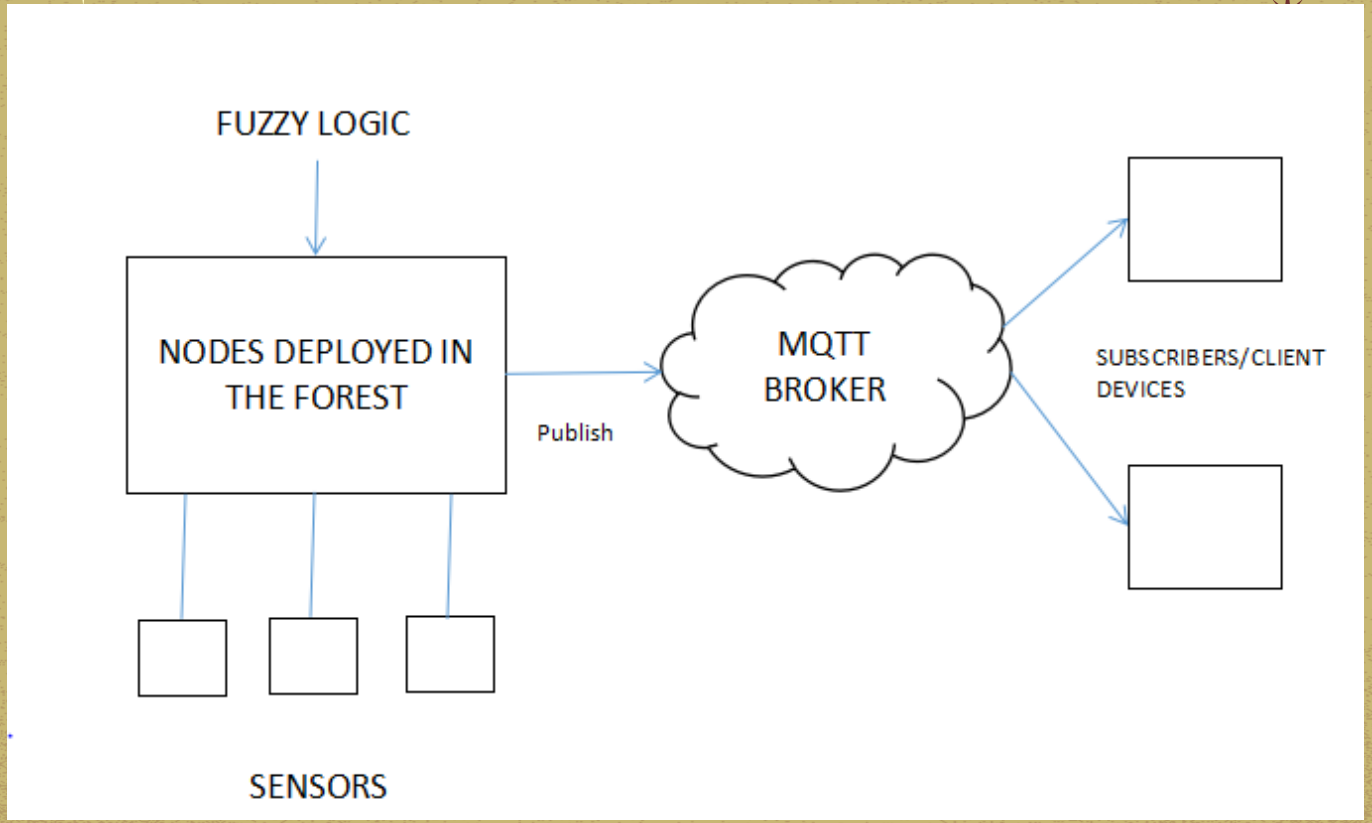
Abstract

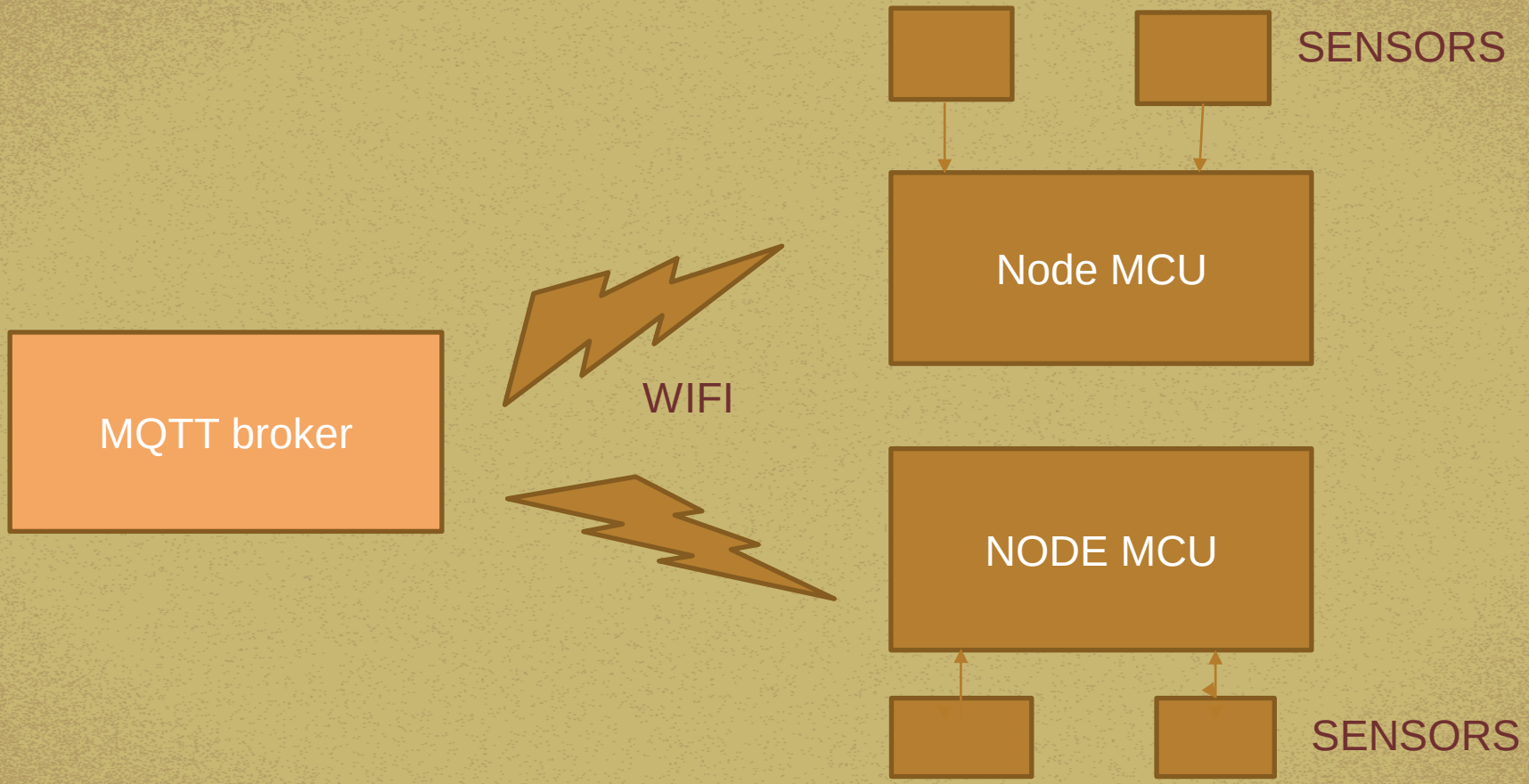
Forest is considered as one of the most important and indispensable resource. However, forest fire, affected by some human uncontrolled behavior in social activities and abnormal natural factors, occurs occasionally. This project's motive is to predict the occurrence of forest fire by continuous monitoring of factors that are responsible for forest fire like temperature, smoke and flame in forests. We use latest technologies like IoT for collecting data frequently through the sensors. All these nodes containing sensors are deployed at various locations of the forest publish the data to an MQTT broker. Further the nodes can be classified as no forest fire, mild, moderate and severe based on the threshold values and fuzzy logic is applied on this data to predict the chance of occurrence of forest fire and is expressed in percentage. The client devices subscribe to MQTT broker and obtain the sensor data and result of prediction. This will help the authorities to take necessary measures to prevent it and to avoid the loss of human life.

Problem Statement

Forest fire is also called as wild fire or wildland fire is an uncontrolled fire occurring in forest areas. A Large destructive fire that spread over a forest or area of woodland which leads to damage in Wildlife, humans, property and Environment. It is essential to distinguish these sorts of flames as ahead of schedule as conceivable in order to keep the harm away from the biological framework. To combat forest fires effectively their early detection and continuous tracking is vital. This project presents one of the methods for early wild fire identification using the datasets available and the current data to predict and prevent its spread. Objective is to classify the occurrence of forest fire based on the intensity and use fuzzy logic to express the chance of occurrence of forest fire in percentage.

Architecture Diagram




SENSORS
Node MCU
WIFI
MQTT broker
NODE MCU
SENSORS

Modules

1. **IoT-** Get data from all the sensors and send it for evaluation
2. **Machine Learning-** Check whether the input data gives us the proper probability of a Forest Fire beforehand
3. **API-** HiveMQTT or ThingSpeak

Implementation

1. Getting the code ready for the required input data and processing
2. Connecting the sensors and reading data
3. Prediction of occurrence of forest fire using fuzzy logic
4. Publishing data to MQTT broker
5. Displaying the output

References

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2. Anupam Mittal, Geetika Sharma, Ruchi Aggarwal, “Forest Fire DetectionThrough Various Machine Learning Techniques using Mobile Agent inWSN”International Research Journal of Engineering and Technology(IRJET)Volume: 03, Issue: 06, June-2016
3. Dutta M., Bhowmik S., Giri C. (2014) Fuzzy Logic Based Implementation for Forest Fire Detection Using Wireless Sensor Network. In:Kumar Kundu M., Mohapatra D., Konar A., Chakraborty A. (eds) AdvancedComputing, Networking and Informatics- Volume 1. Smart Innovation, Systems and Technologies, vol 27. Springer, Cham

Thank you!