Implementing Automatic Resource Fault Prediction and Detection System

A Project Report

Submitted by

LATHIKA S **412621106023**

GOPIKA J **412621106015**

MADHUMITHA R **412621106025**

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ANNA UNIVERSITY: CHENNAI 600 025

BONAFIDE CERTIFICATE

Certified that this project report "**Implementing Automatic Resource Fault Prediction and Detection System"** is the bonafide work of **"LATHIKA. S (412621106023)** who carried out the project work under my supervision.

SIGNATURE	**SIGNATURE**
DR.ABDUR RAHMAN	**DR.HARIKRISHNAN**
HEAD OF THE DEPARTMENT	**SUPERVISOR**
Department of ECE,	Department of ECE,
Sri Venkateswaraa College of	Sri Venkateswaraa College of
Technology, Vadakal,	Technology, Vadakal,
Sriperumbudur.	Sriperumbudur.

This project work was submitted for viva voce held on _____at Sri Venkateswaraa College of Technology.

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INTERNAL EXAMINER **EXTERNAL EXAMINER**

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ABSTRACT

This project focuses on building a smart fault detection and alert system using IoT technology. In today's world, it's important to identify issues like light failure, water leakage or overflow, and fire or smoke hazards at an early stage to prevent damage and ensure safety. Our system is designed to automatically detect such faults and instantly alert the user through a mobile application.

We used an **ESP8266-NodeMCU** board as the brain of the system, connected to various sensors like **LDR** (for light detection), **DHT11** (for temperature and humidity), **MQ2** (for smoke), **flame sensor**, and a **water level sensor**. These sensors constantly monitor the environment, and if any abnormal condition is detected, the system immediately triggers a **buzzer** and sends a real-time notification to the user via the **Blynk app**.

To make the system more informative, we also simulated voltage and current fluctuations during fault conditions. The water level detection is linked with a **relay module**, which automatically controls the flow of water in case of overflow.

The main goal of this project is to reduce manual monitoring, improve safety, and allow users to stay informed through mobile alerts. This system can be easily expanded or customized to suit different environments like homes, offices, or industries.

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LIST OF ABBREVATIONS

Abbreviation	Full Form
IOT	Internet of Things
LDR	Light Dependent Resistor
DHT11	Digital Humidity and Temperature sensor
MQ2	Smoke and Gas Sensor
ESP8266	Wi-Fi Microcontroller
LED	Light Emitting Diode
VCC	Voltage Common Collector (Power Supply Pin)
Blynk	Cloud-based IoT Application Platform
MCU	Microcontroller Unit
API	Application Programming Interface
°C	Degree Celsius
V	Voltage
A	Ampere (Current)
Wi-Fi	Wireless Fidelity
ADC	Analog to Digital Converter
GPIO	General Purpose Input Output

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