REAL TIME MONITORING SYSTEM

Assit. Prof. Pratiksha Panchbhai, Prof. M.S. Isasare

Department Of Electrical Engineering

Harshit Pillai[1], Nikhil Bhoyar[2], Tanay Gaykwad[3], Adwait Yelekar[4], Omakar Rakewar[5]

Department Of Electrical Engineering

JD College Of Engineering & Management,Nagpur

Abstract

 Online monitoring is a good way to evaluate the facts. Online monitoring based on IoT is useful for remote data access. The Internet of Things is a network of physical devices equipped with electronics, software, and sensors that collect and share data. The Internet of Things can easily transmit and access machines in remote locations to continuously monitor machine behavior in real time. The use of this method in the design of electrical devices makes it easier to analyze the difference. The performance of electronic equipment can be monitored instantly to ensure efficient operation. IoT is used to instantly observe the difference. It helps in measuring and gauging many parameters of an electrical device such as power, voltage, current, temperature, power and frequency. This article examines the feasibility of online monitoring for electronic devices based on the Internet of Things.

Keywords – Online Monitoring, IoT, Machine, Performance, etc

INTRODUCTION

Preface Electrical monitoring systems are essential to insure optimal performance, trustability, and life of electric motors. These systems continuously assess the condition of the device using a variety of parameters, including current, voltage, moisture, temperature, and optocouplers. By covering voltage and current, the system detects diversions from normal operating conditions that may indicate electrical problems or inefficiencies. Meanwhile, covering temperature and moisture detectors helps help overheating and moisture that can lead to device damage or failure. Optocouplers are semiconductor bias that can transmit electrical signals between two separate circuits. Using these criteria together can ameliorate prophetic conservation, reduce time-out, and ameliorate the overall effectiveness of the device operation system. It also calculates the consumption of individual bias and manages remote switching. In this paper, we present a prototype of a detector- grounded wireless real- time monitoring system for machine condition discovery. It's used to descry functional abnormalities in electric motors and perform prophetic conservation.

LITERATURE REVIEW

R Harsha Vardhan, R Ramanjan Prasad, Dr.B.Pakkiraiah, M. Rajitha (2024) IoT based electronic device imonitoring and control IoT based electronic device monitoring and control. In today's technologically advanced society, analog electronics have been replaced by digital electronics. Another aspect of our increasingly digital society is home management tools. Many people talk about this through mobile phones and the internet. These phones mainly rely on WIFI modules. The definition of "Global Communication System" is WIFI. It is widely used in industry and also used in many electrical projects carried out by engineering students. The device can be operated remotely using WIFI as a function.

Kulkarni Sheetal Vijay, Saahieel Sasane, Mrunali Bajare, Rahul Deshmukh. (May2024)This project demonstrates a real-time temperature and humidity sensor developed by LabVIEW with ML prediction capabilities. It facilitates data collection from various sensors to ensure accuracy of environmental monitoring. The machine learning algorithm in the system can predict future temperature and humidity to help you make the right decision. Users can use the intuitive graphical interface to view data, analyze past events, and receive change notifications. Additionally, the system increases its usability and ease of use by offering remote monitoring, recording and reporting capabilities..

Dr. Shailesh Madhavrao Deshmukh, Ravi Prakash Mahobia (2024) Current mode based voltage regulation model to improve stable power supply. Many methods are available in literature to achieve good power management and stable power. The process takes into account the residual voltages in many networks to maximize power stability. However, these systems struggle to achieve better performance in terms of energy stability and power management. To solve this problem, this paper introduces an energy efficiency based management model (EPVRM).Syeda Faiza Nasim1 , Sidra Aziz2 , Asma Qaiser3 , Umm-e-

Kulsoom4 , and Saad Ahmed5 (2024) Fault Detection and Fault Diagnosis in Power System Using AI. Electricity, which is essential to modern society, necessitates a consistent and uninterrupted supply. Faults in power systems pose difficulties, highlighting the vital importance of fault identification and diagnosis. This review paper provides a concise overview of artificial intelligence-based fault detection and diagnosis in power systems.

Ayush Gautam, Arnav, Gaurav Kumar Mishra, Saksha m Gangotri. This research paper presents the design an d implementation of an Arduino based undervoltage an d overvoltage protection system. Voltage fluctuations c an pose serious risks to electrical, electronic and electr onic equipment as a whole. This system uses an Ardui no microcontroller, voltage regulator, bridge rectifier ci rcuit, stepdown transformer, relay module and LCD dis play to monitor and prevent overvoltage and undervolt age conditions. The system continuously evaluates the power input level, compares it with the previous level and takes necessary steps to ensure the safety and relia bility of power systems.

Nur Aira Abd Rahman, Noor Hisyam Ibrahim, Lojius Lombigit, Azraf Azman, Zainudin Jaafar, Nor Arymas wati Abdullah and Glam Hadzir Patai Mohamad(2017) . Specialized Global System for Mobile Communicatio ns (GSM) modules designed for wireless electronic mo nitoring of Short Message Service (SMS). This model has the ability to receive serial data from electronic mo nitoring devices such as meters or monitoring zones an d send data to the server as SMS. It provides twoway c ommunication for information exchange, status query and configuration. The hardware module consists of G SM module, phase converter, SIM circuit and Atmega3 28P microcontroller. The microcontroller provides con trol of the GSM module's sending, receiving and AT co mmands.

Manisha P Jadhav, Ajij D Sayyad, (2024) Home autom ation based on IoT, the rapid development of the autom ation sector and wireless connectivity allows all home appliances to be connected to each other. Today, the w orld is moving towards digitalization and everything h as become easy and comfortable for everyone, young a nd old. Smart home application using IOT (Internet of Things) is a system that can control home settings such as turning on and off lights, fans, televisions, washing machines, etc

Modelling and Analysis

This article focuses on solving the problems related to motion control, automation and billing through the development of the GSM Automatic Electricity Meter Reading (GAPMR) system. The main goal is to simplify

the electricity bill payment process of residential and commercial customers and prevent errors. Wireless transmission of readings to the power of sending SMS eliminates manual processing and reduces errors. A low-cost, energy-efficient microcontroller with Wi-Fi and Bluetooth capabilities. and manufactured by TSMC. For more severe conditions (up to 120°C and 90% humidity), special tools are required. It manages electronic equipment ideal for automotive machinery.

A cost-effective, pipelined RISC - Harvard architecture based device with basic concepts such as W registers and reset vectors. The current climate is contagious. Many components are integrated - GSM-based power meter, ESP32 microcontroller, sensors and relays, automates energy monitoring and billing. The system increases efficiency, accuracy and flexibility by enabling instant reading and reporting, minimizing human error and providing seamless connections to infrastructure and utilities.

Block Diagram
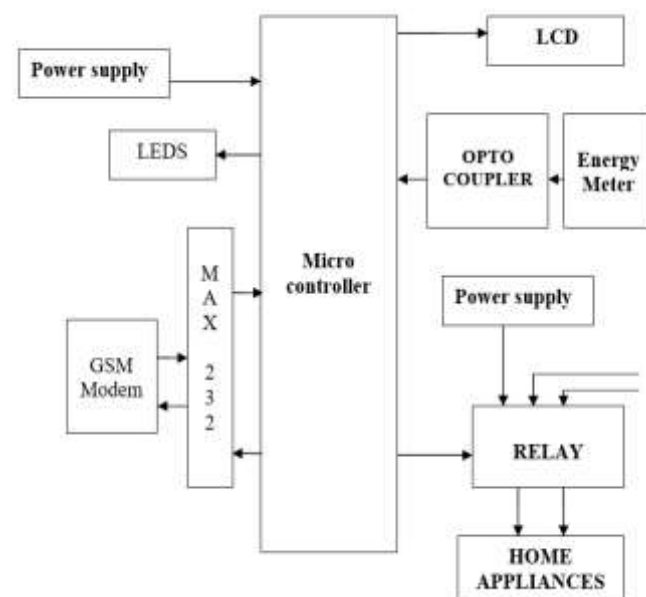
Circuit Diagram
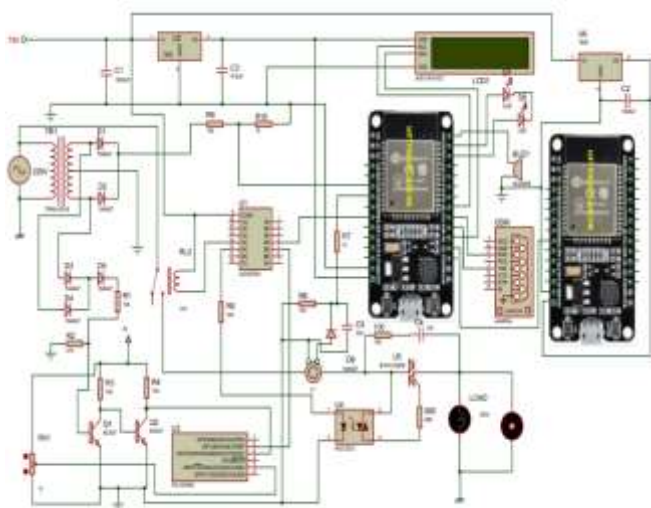
Hardware Components	Software Tools
Microcontroller	Arduino (for Esp32 Coding)
Power Supply	MPLAB (for PIC coding)
GSM	Embedded C (language of coding)
Relay	
Energy Meter	
LCD	
Buzzer	

Future scope

The future scope of this system is vast and promising, with potential integrations with Industry 4.0 technologies, advanced analytics, and edge computing capabilities. Expansion to other industrial assets, cloud-based services, and AI-powered automation are also on the horizon. Additionally, enhancements to user experience, security, and compliance with emerging standards and regulations will be crucial. As the system continues to evolve, its scalability and flexibility will be essential to accommodate diverse industrial applications and meet the growing needs of users. By exploring these opportunities, the real-time electric motor monitoring system can unlock new levels of efficiency, productivity, and innovation in various industries

Conclusion

The real-time electrical devices monitoring system demonstrates a robust and effective solution for optimizing any device performance ex.motor, predicting maintenance needs, and reducing downtime. By leveraging advanced sensors, machine learning algorithms, and cloud-based data analytics, this system provides actionable insights into motor health, enabling proactive decision-making and minimizing operational costs. With its scalable and flexible architecture, this system can be widely adopted across various industries, contributing to increased efficiency, reliability, and sustainability in electric motor-driven applications

Results

Case 1:-When the condition of **over current** occurs the system, trips and send the a following message to the user and display on LCD of model.

Timer-OFF. Humidity =76 %, Volt:235v, Current:1.35A, Temperature:31, POWER:96.78Whr , BILL:290.34/-

Over Current =2.05A, Volt:235v, Humi:75%, Temp:31, POWER:97.09Whr , BILL:291.26/-

Case2:-When the condition of **High Humidity** occurs the system, trips and send the a following message to the user and display on LCD of model.

Timer-OFF. Humidity =75 %, Volt:235v, Current:1.33A, Temperature:31, POWER:94.54Whr , BILL:283.63/-

High Humidity =82 %, Volt:236v, Current:1.34A, Temperature:31, POWER:95.39Whr , BILL:286.18/-

Case3:-When the condition of **High voltage** occurs the system, trips and send the a following message to the user and display on LCD of model.

Timer-OFF. Humidity =76 %, Volt:236v, Current:1.34A, Temperature:31, POWER:91.67Whr , BILL:275.01/-

Abnormal Voltage =468v, Current:3.30A, Humi:76%, Temp:31, POWER:93.29Whr , BILL:279.86/-
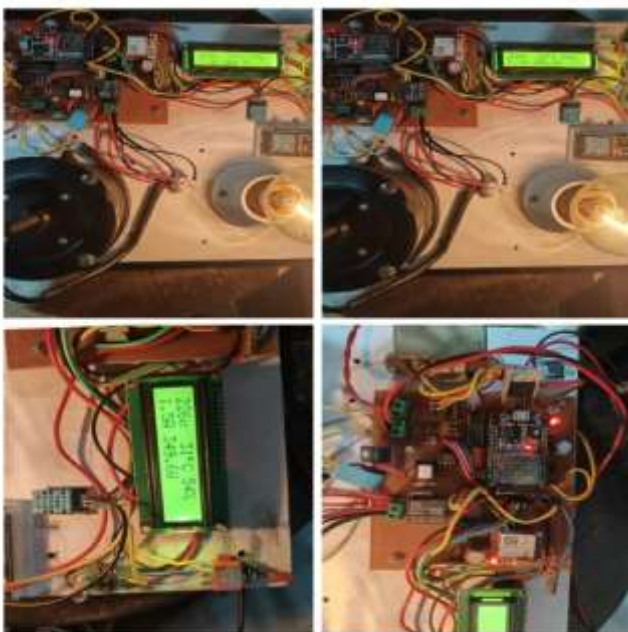
Case 4:-This System credits or Calculate the **electricity bill** of individual device for a particular given of time. Also monitor the real time **voltage regulation** and **current regulation.**

> Timer-OFF. Humidity =64 %, Volt:241v, Current:1.35A, Temperature:33, POWER:98.54Whr , BILL:295.62/-

Case 5:- Online Switching [ON-OFF] and time settling

Hardware Model :-

Reference

[1] R Harsha Vardhan, R Ramanjan Prasad, Dr.B Pakkiraiah,M. Rajitha, "IOT based Electrical Devices Surveillance Control", EDP Science,E3S Web Of Conferences 472,01013,2024.

[2] Najmus Saqib malik, Friedrich kupzog, Michael Sonntag, "An approach to secure mobile agents in automatic meter reading", IEEE ,International Conference on Cyber worlds,2010.

[3] Kulkarn Sheetal Vijay, Saahieel Sasane, Mrunali Bajare, Rahul Deshmukh, "Real Time Monitoring Of Temperature And Humidity Using LabVIEW and ML" IJRASET.2024.

[4] Dr.Shailesh Madhavrao Deshmukh, Ravi Prakash Mohobia, "Real Time Electric Pattern Based Volatge Regulation Model For Improved Power Stability" ,EDP Science, E3S Of Conference 540,10027,2024.

[5] Syeda Faiza Nasim, Sidra Aziz, Asma Qaiser, Umm-e-kulsoon, Saad Ahmed, "Fault Detection and Fault Diagnosis in Power System Using AI" SSURJET,VOL.14,No.1,2024

[6] Bharat Sigh, Sandeep Sharma, Ayush Gautam, Arnav, Gaurav Kumar Mishra, Saksham Gangotri, "Over voltage and Undervoltage Intelligent Protection" System,Mukta Shabd Journal, VolumeXIII, JAN-2024.

[7] Varun Shukla,Ankit Khushwaha,Shivam Singh Parihar,Shubham Srivastava, Varun Pratap Singh, "Authenticated Wireless Information Display System Using GSM Module,CAE, ISSN:239-4714Volume - 5NO.3,JUN-2016.

[8] [Pranavp.Kulkarni & Mohit Patil 'ONLINE MONITORING Of Electrical Machine Using IOT IEEE' DOI:1109/ICNTE44896.2019][1]

[9] [Magadan, F.J.Suarez Real Time Monitoring Of Electrical Motors For The Industry 4.0' International Conference Of Industry & Smart Monitoring (ISM 2019)][3]