DESIGN AND IMPLEMENTATION OF ELECTRICAL MACHINE: MONITORING AND CONTROLLING USING IOT

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ABSTRACT

The rapid growth of industry and advancement of technology has resulted in reduction of human effect, the main reason for which being machines. Machines are playing an important role in your life. In this project they use internet to establish communication between the users and monitoring unit. In this proposed system, they are monitoring and controlling the speed of electrical machines as well as direction of the motor this system consist of microcontroller, temperature sensor, induction motor and WI-FI module with think speak software. Here they are controlling the speed of the motor using opto coupler to sensing the speed through think software. They can measure the temperature and electrical machine using temperature sensor. This project presents the calculation and display of live temperature and speed of the motor through think speak software using IOT. Think speak software simultaneously store the electrical machine operating conditions through Arduino Uno, wi-fi module (ESP8266). At the same time they can control the electrical apparatus (or) electrical machines running status from the remote area using IOT.

Keywords: monitoring, module, arduino uno, opto coupler, IOT

1.INTRODUCTION

Electrical machine plays an important role in that world because of electrical machine has reduced human efforts and main useful in agricultural purpose, industries factories and cities. This project has improved our knowledge with easy operate electrical appliances. The rapid growth of industries, factories and also agricultural purpose technology has resulted in reduction of human efforts. This project, use Internet to establish communication between the user and monitoring unit.

Electrical machine has various problems occurred in electrical operation Because of it can damage mainly in electrical rotation with temperature, so this problems are reduced by using our project for electrical machine monitoring and controlling using IOT though think speak software with Arduino Uno wia, Project consists of microcontroller, temperature sensor, electrical machine, Wi-Fi modulo, opto coupler with think speak software through Arduino microcontroller software.

Here they are controlling the speed of electrical machine using think speak software IOT based through Arduino Uno microcontroller. At the same time they are measuring though temperature though think speak software using IOT.For example the electrical machine has rotating at high speed it can damage or firing on electrical machine coil .This kinds of problems

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are reduced by using relay to of the electrical machine through IOT using think speak software .Simultaneously it can store the running states on electrical machine operation.

Now day's the electrical machine has an essential for all operation at the same time power will also important in the world because of the electrical machine has operated at high speed it can produced loses with can need high power factor on electrical transformer. Then immediately fire on the fuse, so these losses are reduced and maintaining is an essential in the world.

2. METHODOLOGY

Electrical machine monitoring and controlling using IOT through Arduino microcontroller in think speak software. Electrical machine states can have monitoring by think speak software through Arduino Uno in IOT (Cloud space).The operating electrical machine speed and temperature to measure by two sensors are speed measure sensor (opto coupler) and LM35 sensor which can lively to monitoring on think speak software using Arduino Uno (IOT) at cloud region.

Internet of thinks has used to easy way of automatically to ON and OFF of electrical machine appliances at various places .For example if you are stay in another place or nation then it have easily monitoring on electrical appliances using think speak software through IOT in Arduino Uno microconroller. Electrical machine has monitored after it does not properly running condition then automatically OFF the electrical appliances using relay through think speak software in microcontroller (Arduino Uno).

In this condition can maintaining properly on electrical machine with safely operating on electrical machine states. For example, if you are stay in another place you electrical machine has highly rotating at 1600RPM then it produced at high temperature then it can monitoring at think speak software through IOT (Internet of Thinks) using Arduino Uno micro controller.

Then they can immediately to OFF electrical appliances through relay to stop the electrical appliances. It has newly updated version or newly improved technology in electrical machine states. Then they can start the motor and maintaining or monitoring on electrical machine operation. This project has to useful in industries, factories agricultural and also home electrical machine appliances has safely with easily operating electrical appliances.

The operating principle of electrical machine has easily operating with monitoring through Arduino using think speak software process. It have two

systems are proposed and existing system it has how to safely operated on electrical machine operating states in think speak software in inter net thinks wia, in electrical machine appliances

2.1 SOLAR POWER MONITORING SYSTEM USING IOT

Using the Internet of Things Technology for supervising solar power generation can greatly enhance the performance, monitoring and maintenance of the plant. With advancement of technologies the cost of renewable energy equipment is going down globally encouraging large scale solar plant installations. This massive scale of solar system deployment requires sophisticated systems for automation of the plant monitoring remotely using web-based interfaces as majority of them are installed in inaccessible locations and thus unable to be monitored from a dedicated location. The Project is based on implementation of new cost-effective methodology based on IoT to remotely monitoring a solar plant for performance evaluation. This will facilitate preventive maintenance, fault detection of the plant in addition to real time monitoring. As this system keeps continues track of solar power plant, the daily weekly and monthly analysis becomes easy and efficient also with the help of this analysis it is possible to detect any fault occurred within power plant as the generated power may show some inconsistency in data of Solar power plant.

2.2 ON-LINE MONITORING OF POWER PLANTS

In recent years significant changes in the business relationships between customers and original equipment manufacturers (OEMs) could be observed in the power industry, which led to new forms of cooperation between those partners. Remote online monitoring is one important outcome of this development. An analysis gives various reasons for these changes. Since the early nineties a strong trend towards gas turbine application for power generation could be noticed. Decreasing gas prices in connection with high efficiency in combined cycle mode and small staff required made this technology attractive compared to the traditional coal-based power generation. In the late nineties advanced gas turbines became available with more than 250 MW electrical output and 38 % simple cycle / 58 % combined cycle efficiency. This impressive development could only be realized by applying the most advanced technologies and materials available. As always, you do not get things for free. The more complex the machines got, the higher the turbine inlet temperature was pushed, the more exotic cooling techniques and materials had to be applied, resulting in an increased risk for abnormal behaviour with the threat of non-availability on the horizon. In traditional business relationships, OEMs sold gas turbines to utilities, and –after a fixed

guarantee period– the customer had to carry all the risk and to cover the repair costs for his machine to the full extend. With the new high-performance engines being introduced in the market, customers, in particular independent power producers (IPPs), OEMs and insurance companies were looking for new structures in their relationship. As a consequence, O&M Contracts and Long-Term Service Agreements were established that are designed to cover the greater part of the lifetime of the engine or even the entire combined cycle plant, which under certain contractual conditions include an OEM contribution on repair costs. This made the situation more calculable for the customer, but resulted in additional risk for the OEM, as he eventually had to pay for repairs without knowing how the engine was actually operated. At the same time as these changes were occurring in power generation, a real boost in information technology took place, allowing the transfer of large masses of data over long distances. As a result, the idea of using remote monitoring to mitigate risk for long term service contracts was born. Remote monitoring is rapidly growing in the power generation industry, and Power Diagnostics Services is doing its part to take care of its customers. PDS provides data acquisition, analysis, storage, and versatile reporting capabilities that are used to help in the early detection of abnormal operating conditions of gas turbines and other power plant equipment. This information, along with associated recommendations, makes it possible to make more informed business decisions about the course of action regarding diagnostics issues. Fact-based decisions can have substantial financial benefits for both the customer and the OEM. Maintaining good instrumentation health, starting reliability and optimum control settings by continuous monitoring are additional objectives that can help the operators keep plant availability high. Customers can help achieve these objectives through disciplined review, reporting, and follow-up, and addressing small issues before they combine into bigger problems. Only working hand in hand in an atmosphere of mutual trust can lead to optimum plant conditions and operation.

2.3 A HYBRID MODEL OF SOLAR-WIND POWER GENERATION SYSTEM

The world in which we live have developed a large appetite for electrical energy. This appetite has been stimulated by the relative ease with which electricity can be generated, distributed, and utilized, and by the great variety of its applications. It is arguable whether the consumption of electricity should be allowed to grow unchecked, but the fact is that there is an ever-increasing demand for this energy form. Clearly, if this demand is to be met, then the world's electricity generating capacity will have to continue to grow. Presently almost all the electricity generation takes place at central power station which utilizes coal, oil, gas, water or fissile nuclear material as the primary fuel source. There are problem facing the further development of generating

methods based on any of these conventional fuels‖. Hydro-power generation is restricted to geographically suitable areas, and reserves of coal, although presently plentiful, are not renewable. The possible hazards of nuclear power have been much publicized, particularly those concerning the storage and military use of nuclear waste material. Nevertheless, to assist in maintaining electrical supply in many of our societies its seems likely that an increasing nuclear power presence, involving breeder and possibly fusion reactors, will be tolerated. To achieve this and also to aid in management of the existing fossil-fuel resources, it is essential that some part and an increasing part, of future electrical energy research and development be concerned with so called nonconventional methods of generation Wind- solar power generations are visible options for future power generation. Besides being free, they are free of recurring costs. They also offer power supply solutions for remote areas, not accessible by grid power supply today around 30,000 wind turbines and more than 1,00,000 off-grid solar PV systems are installed all over the world

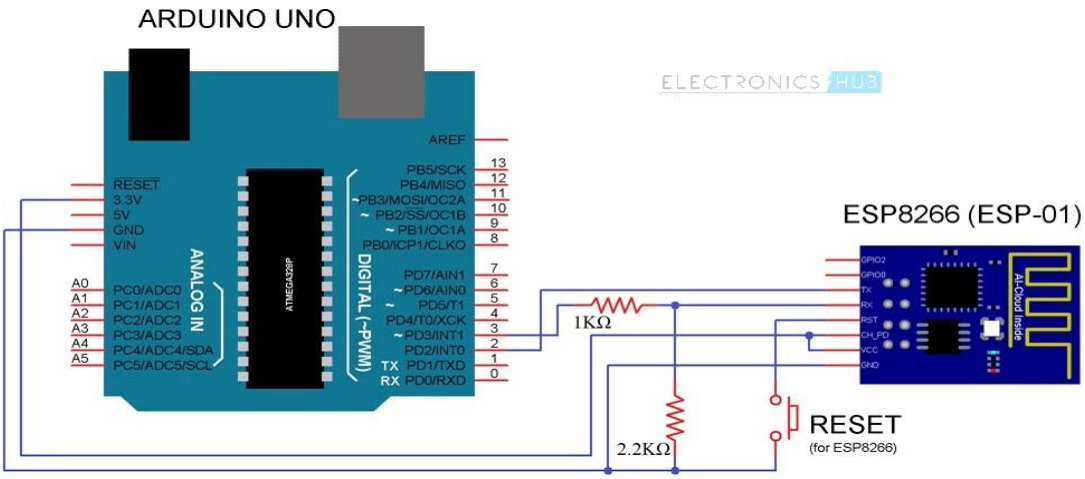
3. SOFTWARE DISCRIBTION

3.1 ARDUINO SOFTWARE

Arduino interface boards provide the engineers, artists, designers, hobbyists and anyone who tinker with technology with a low-cost, easy-to-use technology to create their creative, interactive objects, useful projects etc. A whole new breed of projects can now be built that can be controlled from a computer

Arduino is an open source electronics prototyping platform based on flexible, easy-to-use hardware and software. It's intended for artists, designers, hobbyists, and anyone interested in creating interactive objects or environments. It's an open-source physical computing platform based on a microcontroller board, and a development environment for writing software for the board.

In simple words, Arduino is a small microcontroller board with a USB plug to connect to your computer and a number of connection sockets that can be wired up to external electronics, such as motors,relays,light sensors, laser diodes,loudspeakers,microphones,etc.,They can either be powered through the USB connection from the computer or from a 9V battery. They can be controlled from the computer or programmed by the computer and then disconnected and allowed to work independently. Anyone can buy this device through online auction site or search engine. Since the Arduino is an open-source hardware designs and creates their own clones of the Arduino and sell then, so the market for the boards is competitive. An official Arduino costs about $30 and a clone often less than $20.



3.1.1 CIRCUIT DIAGRAM ARDUINO UNO FOR ESP8266

The name “Arduino” is reserved by the original makers. However, clone Arduino designs often have the letters “dui no” on the end of their name, for example, Fredonia or DFR Arduino. The software for programming your Arduino is easy to use and also freely available for Windows, Mac, and LINUX computers at no cost. Microcontroller can be described as a computer embedded on a rather small circuit board. To describe the function of a microcontroller more precisely, it is a single chip that can perform various calculations and tasks, and send/receive signals from other devices via the available pins. Precisely what tasks and Communication with the world it does, is what is governed by what instructions they give to the Microcontroller. It is this job of telling the chip what to do, is what they refer to as programming on it. However, the uC by itself, cannot accomplish much; it needs several external inputs: power, for one; a steady clock signal, for another. So typically, a uC is used along with a circuit which provides these things to it; this combination is called a microcontroller board. The Arduino Uno that you have received, is one such microcontroller board. The actual microcontroller at its heart is the chip called Atmega328. The advantages that Arduino offers over other microcontroller boards are largely in terms of reliability of the circuit hardware as well as the ease of programming and using it.

3.2 THINK SPEAK SOFTWARE

They have already seen one such IoT implementation using ESP8266 and a REST Platform. What makes Thing Speak different and special is that is uses simple HTTP Protocol to transfer, store and retrieve information from different sensors. Also, the Thing Speak Application allows us to log the sensor

data, track locations and even social networking of things. Another important thing (or rather a unique feature) about Thing Speak is its support from MATLAB. The close relationship between Thing Speak and MATLAB has lead to integrate several key features of MATLAB into the Thing Speak Application. One such feature is to analyse and visualize the user data i.e. the sensor data in a graphical way without the MATLAB License. Keeping the corporate stuff aside, the Thing Speak Application is a great tool for our IoT related projects and hence this project focuses on the basics i.e. how to connect ESP8266 to Thing Speak Application and also how the ESP8266 Thing Speak Interface can be used in our future projects.

5. RESULT AND CONCLUSION

5.1 RESULT

5.1.1 HARDWARE IMPLEMENTATION

5.1.2 TEMPRATURE SENSOR FLOW CHART

5.2 CONCLUSION

This project has proposed an IOT based Electrical machine monitoring and controlling using think speak software concept, as an advancement of safely operated electrical machine. Inter net of thinks as connected to think speak software which has automatically to controlled in electrical machine whatever places to monitoring in electrical appliances has easily to gather to information in running states in electrical machine appliances the it has automatically to store electrical machine states in think speak software. It has more useful in the industries and factories and laboratories as well as in agricultural purpose. This project has full and full in IOT based operated in think speak software. It has easily and safely operated in electrical machine. IOT has easily to communicate their electrical machine system through think speak software which has more use full to operate in think speak software project and it has operation in electrical machine operation system

6. Applications

• In this project, I have shown you how to connect ESP8266 to Thing Speak API using both the direct AT Commands as well as through Arduino.

• Using the Thing Speak API, you can monitor sensor data from anywhere in the World.

• Most frequently used sensors are DHT11 Humidity and Temperature Sensor, DS18B20 Temperature Sensor and LM35

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