DESIGN AND IMPLEMENTATION OF MOBILE BASED CONTROLLER FOR THREE PHASE MOTOR

Sharan.N[1], Shilpa.V[1], Yoshitha.K.S[1], Mr.Madhukar M[2]

Dept. of Electronics & Communication Engineering,
Jyothy Institute of Technology, Visvesvaraya Technological University Thataguni Post,
Bengaluru-560082, Karnataka,India.

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Abstract - *This project is designed to operate a three-phase motor using a mobile application. Three-phase motor is widely used in agriculture. In India, agricultural field play an important role in economic development. When the farm is a way from the farmer's house, typically a few kilometers away, the farmer must go on foot to turn on or turn off the motor. If the motor isn't operated properly it will lead to the motor being damaged. Or sometimes the motor might even get destroyed. Thereby it would be more liable to control the motor from anywhere convenient to the farmer. Our target is to control the motor from distant place by our mobile application. Using the mobile application, we control the motor from any place for benefit to farmers.*

Farmers are unable to check if three phase current is available via their phones. They follow the traditional manual method, which is both energy and time consuming. Thereby checking for three-phase current through their mobile phones is a faster and convenient approach.

Switching on the motor during rain is a waste of current. Thunder storm can destroy a motor within no time. Hence, protection is required for the motor. Rain detector is present to indicate rain and lightning to protect the motor.

Key Words**: **Three phase motor, Controlling, detects rain, Mobile application.

1. INTRODUCTION

In this project, we are going to Design and Implement Remote Control System to turn on and off a three phase motor. Farmers cannot depend only on the climate and rainfall alone for irrigation. This is why the farmers use motors for irrigation purpose. Three-phase motor is widely used in agriculture. Traditionally they are controlled by user manually where protection are mostly not taken care or must be done using isolated unit. To be able to start from the cell phone, we use the Arduino and a relay module that will be the bridge between the power part (electrical part) and the control part (electronic part).

A farmer depending solely on rainfall for the purpose of irrigation is long gone. Farmers in these days opt for three-phase motor for irrigation. However, the operation of the motor is done manually. In a situation where there is heavy rainfall and the motor is functioning, it does not only lead to wastage of water but also if there is lightning, there is a chance of motor destroyed. This is a huge loss to the

farmer. A lot of people who live in the cities and are passionate about farming cannot afford to go back and fort from the city to their villages only for irrigation. For such people it would be more convenient to operate the motor from a distance place, conveniently from their mobile.

This is from where our project is implemented. The rain sensors on the motor detect the presence of rainfall and this can be seen on the app. The motor can be turned on and turned off from the app from any area.

1.1 OBJECTIVE

The following are the objectives of our projects:

- To Design and Implement Remote Control System to turn On and Off a three phase Motor
- To check three phase current through mobile application.
- To check the presence of rain in the android app.
- To monitor Rain and Thunder using sensor and fetch data through GSM / AWS / Cloud.
- To demonstrate the correct motor operation in a practical way.

1.2 PROBLEM FORMULATION

1.2.1 Problem statement

A farmer depending solely on rainfall for the purpose of irrigation is long gone. Farmers in these days opt for three phase motor for irrigation. But the operation of the motor is done manually. In a situation where there is heavy rainfall and the motor is functioning, it does not only lead to wastage of water but also if there is lightning, there is a chance that the motor will get destroyed. This is a huge loss to the farmer. A lot of people who live in the cities and are passionate about farming cannot afford to go back and fort from the city to their villages only for irrigation. For such people it would be more convenient to operate the motor from a distance place, conveniently from their mobile.

Few breeds of plants like orchids grow only in a particular flora. That is they grow only in a specific temperature and moisture. If this is not maintained, then the crop will get destroyed.

1.2.2 Problem solution

The proposed is that the farmer/user will be operating the three phase motor through an app. In the app the rain

sensors resent in the motor display the presence or absence of rainfall in the area where the motor is located. If there is rainfall, there is an option to turn off the motor so that water is saved and to ensure that the motor is safe.

A person living far away from his field can easily operate the motor without travelling all the way to the farm. This not only ensures the motor from disfunctioning but also enables people living in cities to regularly irrigate the farm without burning a whole in their pocket. The presence of temperature sensors and moisture sensors enable passionate farmer to grow environment specific crops by carefully monitoring the temperature and moisture through the app. This is a very cost efficient way for irrigating the farms.

2. METHODOLOGY

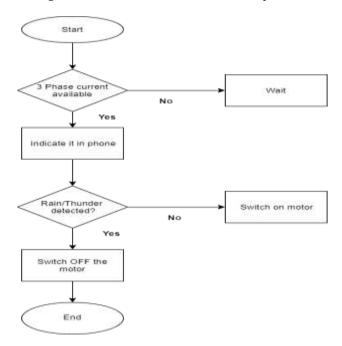Working of mobile based controller for three phase motor

Fig-1.flow chart of mobile based controller for three phase motor

Here is the proposed system,

- First we check if three Phase current is available through Mobile application. The CT Sensor detects the presence of three phase current.
- The presence of three phase current will be displayed on the app.
- If there is no three phase current, we wait for the current to come.
- If there is three phase current then by the help of the android app the motor is turned on.
- Rain monitoring sensor is present to check the rain. If the rain is coming the motor will not be started.
- The temperature and moisture sensor's respective outputs will be displayed in the app. If there are any

adjustments required in these, it can be easily monitored from the phone.

Farmers are increasingly using motors for irrigation, but they are unable to check if three phase current is available or not in the field. In some times it is difficult for the farmer to go field and switch ON/OFF the motor. The proposed project is aimed at creating a motor device that would operate a motor using a mobile application.
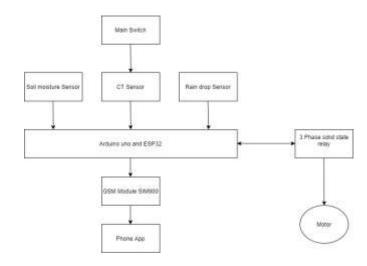
3. BLOCK DIAGRAM

Fig-2.Working of mobile based Three phase motor

1. The main switch is connected to the motor
2. The motor, rain sensor and other sensors including soil moisture sensor are connected to the ESP32 microcontroller.
3. When the user opens the app, in the home screen he will be given an option to check the availability of three phase current.
4. The CT sensor checks the availability of the current and through the microcontroller it sends a message to the app with the help of GSM module.
5. If there is no three phase current then the user must wait for the current.
6. If the three phase current is available, its presence is indicated on the app.
7. The user can click on turn on motor option to turn in the motor.
8. This sends a message to the GSM module to turn on the motor.
9. The three phase relay turns on the motor.
10. The output of the three sensors can be read on the app.
11. If the user wants the motor to be turned off, he can select turn off option in the app.
12. This sends a message to the to the GSM module to turn off the motor.
13. The motor is turn off using the three phase relay.

4. SOFTWARE DESIGN AND RESULTS

The main software used in the implementation of this project is Embedded C (Arduino) and the software tool used is Android studio. The programming language used to write a code for Arduino is embedded C. Android studio is the tool used to develop the android application.

5. PROCESS STAGES

- The circuit was rigged up first using CT sensor, microcontroller and the GSP module.
- The embedded C code was written.
- The circuit was tested. Android studio was downloaded.
- The code to write design the app was developed.
- The system was run to test the presence of three phase current

6. LITERATURE SURVEY

Authors	Papers	Methodology	Advantages	Disadvantages
1.Robert Wall	YHDC SCT006 Current Transformer	All tests were carried out At 50 Hz. For the tests,the CT primary consisted of 1or 5 passes of insulated 16/0.2mm wire	Suitable in limited Circumstances. It can offer an improvement over the SCT- 013 000 on individual low current circuits	Not recommended for use with the high sensitivity input of the emonTx.
2.Rohit Gupta	A Study of AC/DC Converter with Improved power factor	The diode bridge rectifier Is Constructed. All Methods are compared in terms of THD (Total harmonic distortion)	PF can be achieved by Active method of Power factor correction. Can be used with three phase circuit for higher power output.	Best result is seen only in the last topology(Single phase diode rectifier circuit with improved parallel input resonant filter)
3.P.Abhilash Reddy,G. Prudhvi,Dr.S .SSubhashka P.J Surya Shankar Reddy,	Automatic rain Sensing car wiper	Servomotor, rain sensor Arduino, LCD module for control in the wiper system. Whenever the rain falls, the rain sensor detects the Intensity of the rainfall and sends the information to Arduino which is sent to servomotor to take action.	Driver's response to control the Wiper is Automated. It's response to the rain for moving the windshield wipers is less than400 milliseconds	Cannot accurately determine and detect rainfall
4.Neha Malik,Yogita Bodwade	Literature Review on Home Automation System	Wi-Fi based using Arduino microcontroller through IOT	Low cost, Secure, Remotely controlled	Slow, might have loose connection
5.Anbuganam N	Control of Three Phase Induction Motor by Ardiuno with IoT	Speed and direction of Motor is controlled by Wi-Fi. By PWM method Output voltage can be adjusted.	High speed, easy control of motor	Internet connection is needed all the time.

6.1 ADVANTAGES AND LIMITATIONS

6.1.1 Advantages

- The safety of the motor is ensured by properly usage of the motor.
- Farmers even without a smart phone can use this motor as they can receive messages through GSM as GSM is 2G.
- People passionate about farming can continue their passion even by living in the cities by using the motor from any area.
- As irrigation is automated, this is very cost effective.

6.1.2 Limitations

- Since ESP32 is a Wi-Fi based microcontroller, it works only in the presence of internet.
- This problem is resolved by implementing GSM module. Since GSM works on 2G it sends messages to any simple mobile through which the motor is operated.

7. CONCLUSION AND FUTURE SCOPE

A) *Conclusion:*

Agriculture:
- This project can be widely used in agriculture.
- Checking the presence of three phase current in the phone is a very time saving approach
- This project can also be used to irrigate small and large farms.
- The irrigation system of the farm can be controlled from the farmer's figure tips from anywhere.
- This project helps farmers to not only protect the motor but also saves power by turning it off anytime.
- Rain sensor detects the rain and accordingly the motor can be turned on or turned off from any convenient place in no time.

Green House / Nursery:
- Many companies are doing Green House Projects and they can check the
- Water management through our Mobile application.
- Since this project is cost efficient it can be implemented in small scale and individual green house projects is benefitted.
- By the help of this project the irrigation system can be taken care of even from the person's office.
- Nursery water management can be implemented through our Mobile based water management system

Water supply system:
- The motor is used to supply water to houses.
- This is also used to supply drinking water to houses in the rural areas.

Industry: *Industrial motors:*
- Our Mobile Motor Controller is used to detect the phase sequence.
- It is widely used in industries to check the phase sequence, so that the correct phase sequence supply is given to machine and the chance of damage of machine gets reduced.
- It is used for tracking the electrical connection during both, the installation and the electrical connection.
- It is also used for wiring switchboards when three phase supply is matter of concern.

Chemical Industries:
- The industries which use chemical can benefit from this
- Chemical liquids can be monitored from the office without entering into harsh environment of the chemicals.

B) Future scope
- India is heading towards digital India, modernization in agriculture is important.
- Farmer required to utilize every drop of water
- Our project is suitable for any size of farm fields or any type of crop.
- This project automates the irrigation system like normal farm, green house, nursery etc.,
- Making use of this Mobile Application farmer can protect his motor and thereby avoiding future damages and losses.
- This is a very cost effective project which is easily affordable by the Farmers, Engineering Industries, Water Departments and Hazardous Industries.

ACKNOWLEDGMENT

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BIOGRAPHIES

Sharan.N currently pursuing his B.E in Electronics and communication engineering at Jyothy Institute of Technology, Bangalore.

Shilpa.V currently pursuing her B.E in Electronics and communication engineering at Jyothy Institute of Technology, Bangalore.

Yoshita.K.S *currently* pursuing her B.E in Electronics and communication engineering at Jyothy Institute of Technology, Bangalore.

Madhukar.M is an Assistant Professor of Electronics and Communication Engineering at Jyothy Institute of Technology, Bangalore. His research interests include cryptography, image processing and FPGA...