

Intelligent Motor Protection and Control using Android Application

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Abstract— IVRS based motor protection and control unit is user friendly system. This paper is focused on interactive voice response system for three phase induction motor control as well as android application for advanced application. The main aim of this project is to control motor from remote places using IVRS or Android application. As its operations is control by intelligent software inside the renesas MCU. To implement this, we are use GSM modem at motor end to programmed microcontroller which would receive message from authorized mobile number. We can achieve motor control by using SMS or DTMF tone also.

Key words: IVRS-Interactive voice response system, SMS-Short Service Message, GSM- Global system for Mobile communication, DTMF-Dual tone multiple Frequency, MCU-Microcontroller Unit

I. INTRODUCTION

India is basically an agricultural country, and all its resources depend on the agriculture output. So in India various automation technologies used for agriculture application. Interactive Voice response System is a technology that allows a computer to interact with humans through the use of voice and DTMF tones input via Keypad. IVR system can respond with prerecorded or dynamically generated audio to further direct users on how to proceed. This project is totally based on embedded system as all applications are controlled by intelligent software inbuilt in renesas controller. The microstart GSM controlled, start/stop and remote monitoring. The unit is installed where controlling is needed for three phase motor. User can control the motor by voice call and SMS only by entering password, so it provides security to the user. This unit will monitor all three phase voltages. The controller displays the fault occurred in the system through LED's and accordingly send the SMS to the registered numbers, so that the user will be aware of current status of the motor. Also the system will be providing the information in the regional language so that any ordinary person can handle that system. The aim of this paper is developed a cost effective solution that will provide remote control of induction motors through mobile phones using missed calls, SMS and through android application.

II. LITERATURE SURVEY

Enck, W., Ongtang, M., McDaniel,P.[1], "A study of Android application security" Android is an OS designed for Smartphone's. Android provides a sandboxed application execution. The research work carried out by using researcher in the field of modeling, control and implementation of control induction motor using various control strategies is presented in this paper. Various researchers have worked on the induction motor ON/OFF control from remote places. Some of the techniques of controlling motor from remote places are as by using GSM modem, Zigbee protocol, IVRS, Android application. The

internet based monitoring is one of the common approaches. This approach requires PCs along with additional devices like Modem, buffer, etc.

III. PROBLEM DESCRIPTION

In India there are most of load shedding problems in villages or rural areas. In rural areas 12 to 13 Hr load shedding happened and most of the farmers use induction motor pumps to irrigate their farms from wells, rivers and nearby streams. Moreover single phase electricity is provided for rural areas. Former have to manage this at night hrs which is too irritating so to overcome this problem unit is installed at motor which is automatically controlled the motor and gives response in SMS form. If any fault occurs then it will stop motor and gives indication to user what kind of fault occurs.

IV. PROPOSED SYSTEM

To overcome the drawbacks the system is approaches which consist of remotely control of motor using missed call, SMS, Android application. This remote control method is existed to reduce the farmer problems. Wireless three phase induction motor device can start the motor from long distance without using wire. In this system three phase supply is applied to the motor through contactors CT is used to measuring the current value and PT is used to measure the voltage value. There are five power supply are used for this model. 5V supply is renesas MCU IC, Ap89170 IC, Quectel M95 Modem and two relay driver operation. This starter works with mobile device. The call is automatically received by receiving mobile or unit and motor is started and this information is applied to register mobile number and to stop the motor other command is given to the motor through pressing button on android application or through pressing button on cellular phone or through SMS. GSM system is used to ON/OFF motor as well as to indicate faults from remote place. And In advanced unit android application is used. In our unit all type of user can operate the system because unit operates on Cellular phone and smart phone. For cellular phone DTMF system is used for operation. After installing this unit you can perform operation like motor ON/OFF, voltage HIGH/LOW, to set motor current, to change motor password, to get motor status on site, to load factory setting.

V. BLOCK DIAGRAM

A. Renesas MCU:

Renesas is world number one microcontroller supplier and manufacturer. Here we are used renesas microcontroller for monitoring the different parameters and making decisions. Renesas operates on ultra-low power applications.

B. Aplus AP89170:

This IC is used for sound recording and it is OTP IC i.e. One Time Programmable. By using GOLDWAVE software recording is done.

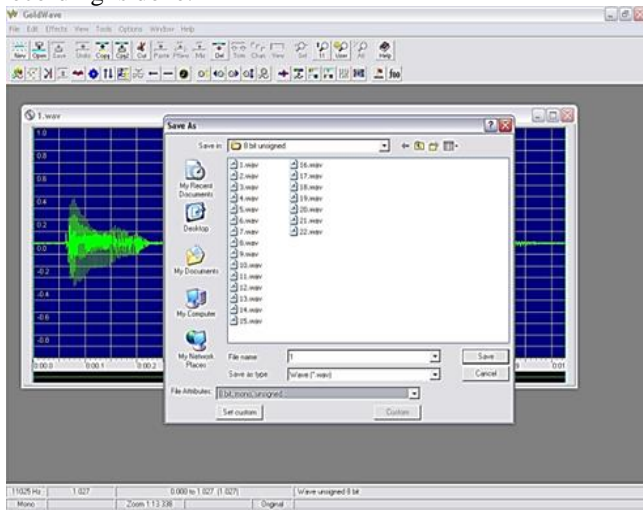


Fig. 2: Gold wave software for sound recording

C. Quectel M95:

Here we are using Quectel M95GSM modem since it has good range in accuracy. As compare with sim 300 and sim 900. We have used extended antenna which will help to get the range rural areas.

VI. WORKING

The SPDT relay is used as a switch, to ON/OFF the motor. The microcontroller is continuously monitor the RYB phase and if voltage is under, over voltage or not within the range then it will OFF the motor and send the corresponding message to the user through GSM modem. LED's are used for corresponding indication like dry run, SPP, power on etc. AP89170 IC is used for sound recording.

VII. RESULT

Motor control via Call: The GSM controller has inbuilt Interactive voice response system controlled start and stop the motor by voice call to controller only by entering the password. While the call is on the motor starts if user presses one on his mobile and to stop the motor 3 is pressed. Also user can change the password by pressing 7 and entering the new password when asked from the unit.



Fig. 3: Result of motor control via SMS

Motor controlled via SMS: To start and stop the motor controller will send SMS to the register numbers in the unit. If any fault occurs the controller will send an SMS which contains current fault.

A. Motor Controlled via Android Application:

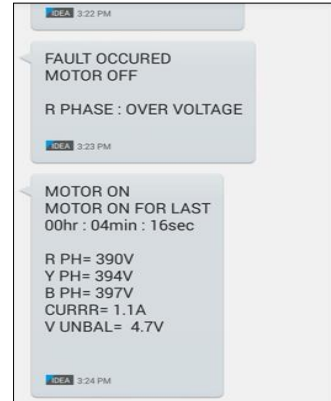


Fig. 4: Result of motor control via Android application
The result of this project is suitable for three phase pumps. upto 25HP. Marathi/Hindi/English in this three languages this is available. It can be operated in 3 modes such as GSM/AUTO/MANUAL as well as can get live motor operation status available via SMS as motor ON/OFF status, live fault, phase voltages and current drawn per phase.

VIII. CONCLUSION

In dynamic world motors is the most convenient and useful tool in industry. Large rated motors required flexible control and protection. We hope our project can bring dynamic change in our industrial level and former method of motor control from remote places. There are many alternatives for controlling devices individually but the proposed system is a multiple task control which will really saves the time, energy and cost of the faner being reliable and effective.

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