"MOTOR PROTECTION AND WATER LEVEL MEASUREMENT USING RASPBERRY-PI"

Darade Sagar Sudarshan[1], Ghogare Priyanka Bhauso[2], Gore Balaji Dnyanadeo [3] V.U.Bansude [4]

Darade Sagar Sudarshan [1] E&TC & A/P:AKOLE, DIST:PUNE 413130
Ghogare Priyanka Bhauso [2] E&TC & A/P:BAWADA, DIST:PUNE 413105
Gore Balaji Dnyanadeo[3] E&TC & A/P:TEMBURNI, DIST:SOLAPUR 413208
Professor V.U.Bansude [4], Dept. Electronics & Telecommunication of Engineering,
S. B. Patil College of Engineering, Indapur,Maharashtra,india

---***---

Abstract - *By using traditional individual cellular mobile telephony we now a day's get a lot of facilities. The facilities are increasing day by day by new invention and utilization of those inventions by scientists and engineers world-wide. In this project discussion of a Mobile Phone Controlling Water Pump Machine is secured. It also attempts to discuss about how various mobile phone users can easily control a particular water pump machine as per their needs from any kinds of distance . If thief removes system from installed location then all users will be alerted via call and SMS and then system will be locked. If user is near starter panel box then no need to use mobile for turning on motor. Motor can be turned on by using push button so user will not be charged for starting motor pump. Proper timing of irrigation water application is a crucial decision for a farmer. Water level measurement data is important in some water related field. An automatic water level system is needed to prvent the difficulties occurs in farming. We uses ultrasonic sensor to measure water level, and GSM modem to send and receive sms. This system placed in many places.*

Keywords:- Raspberry- Pi, GSM , Relay , Starter ,Motor.

1.INTRODUCTION

Now a days in our life, everyone gives importance to time. Time does not wait for anybody. Everything should be performed in time with accuracy.Mobile Starter is a GSM based remote control system which has been specially designed to address the practical problems of agriculture. With this the farmer can operate his motor pump anytime and from anywhere. He can know the status of the pump and can get the information of the pump site on his phone. The farmer takes the full control in his hands. A GSM modem is used in our project which connects Raspberry-Pi model with the mobile phone of the user. GSM is an open, digital cellular technology used for transmitting mobile voice and data services. A GSM modem is a wireless modem that works with a GSM wireless network. A wireless modem We haves like a dialup modem. We are going to give the total security to this mobile starter. With around 70% of world fresh water is being used for irrigation.

We should look forward for the ways to reduce water lost and time required for measuring water level. Some automatic water level measurement systems have been made using mechanical sensors such as resistive, capacitive, or magnetic sensor, but these sensors have to do direct contact with water that makes their life span shorter because of corrosion. On the other hand, this system uses ultrasonic sensor that can measure the water level without direct contact with water, which makes its life span longer. The Raspberry-Pi is used in this system as a data processor and controller to other electronic components. This system will report the measurement result using long-distance communication in a form of SMS, which means that there is no need to come directly to the measurement site. The main purpose of this is to design and construct a system that can measure the water level automatically based on Raspberry-Pi and also can send the measurement result as a SMS to the user's cell phone.

1.1 OBJECTIVES

The main goal of this project is to allow us implementation and design system for Motor protection and water level measurement using Rpi in the software and hardware. Besides that there are many other objectives to achieve in this project which are:

User can give commands to system by writing command to message body and sending SMS/Message to system's SIM card

1. If thief removes system from installed location then all users will be alerted via call and SMS and then system will be locked.

2. If anyone wants to remove SIM card of system to disable security of system then firstly before removing SIM card all users will be alerted through doing call and sending SMS's to all user's and SMS and system will be locked.

3. In case if none of the user from 10 users reaches to the system's installation location then, system

is already locked so it will not work for any motor related function, but after changing SIM card, System will call to administrator and will also send SMS from that new SIM card. After this user can catch thief from SIM card number.

4. User can give commands to system by writing command to message body and sending SMS/Message to system's SIM card.

5. System Lock Feature:

    If system detects that system is removed from installed location then after alerting all users system will be locked.
    In locked condition system will not respond to any command related to motor function.
    System can be activated only by doing NTV (No Thief Verification).

6. Basic Functions:

    Single phase prevention
    Imbalance voltage condition start prevention
    Low voltage condition start prevention
    Wrong sequence prevention
    Auto/Manual facility

1.2 FUTURE SCOPE OF PROJECT

We develop many application in this project , nevertheless, further improvements should be made to the motor starter using mobile telephone and give security to the motor using raspberry-pi and GSM.

In the future we can use application such as Balance check Accessibility

    Balance of SIM card which is inserted in system can be checked by just giving USSD code via mobile handset, there is no need to remove SIM card and insert in other phone for checking balance on that card. After sending command system will reply SMS with available account balance.

In the future we can use application such as digital signal processing, in our project.

2. LITERATURE SURVEY

GSM Based Automatic Motor Control and Protection System
(Kamrul Hassan,Raziul Islam Siddiqui, Md. Takdirul Islam):-

As the name suggested the automatic control is for controlling the motor from remote place, look over it's operating conditions, get feedback from the motor itself. Our target is to control the motor from distant place by mobile DTMF tone and also get feedback by SMS while it is in ON or OFF condition. We also ensure the safe operation of the motor by detecting the voltage of the source and ensure feedback from system while it is over or under voltage. Again we also get these feedbacks by SMS as well. GSM network is everywhere in our country that's why we choose GSM network to operate our motor also transfer feedback information through it. We also use GSM network because if we use it then we don't need to establish extra equipment for networking.

Speed Control of an Induction Motor using Raspberry-Pi
(P. M. Palpankar ,Shraddha Waghmare, B. Shikkewal.):-

The induction motor speed variation can be easily achieved for a short range by stator voltage control. The terminal voltage across the stator winding of the motor can be varied for obtaining the desired speed control by controlling the firing angle of the semiconductor power devices. RASPBERRY PI 2 (model B) plays an important in our project. Raspberry Pi has very small size and it is a low cost device. Raspberry Pi has a Quadcore broadcom BCM2836 900 MHz processor and 1GB RAM. It can perform the work like that of computer thus it can be referred as minicomputer. Python language must be used for this. And it uses Raspbian operating system based on Debian distribution of LINUX.

Mobile Starter Controller
(Grace John M1, Aneena Joseph2, Haritha Mohan):-

Mobile Starter Controller, which aims to keep the irrigation of landscape automatic. The automated operation of the system eliminates the need of human work. This is basically a system with reduced complexity. A GSM modem is used in our project which connects microcontroller with the mobile phone of the user.

Android Management Tool, That Controls Electronic Devices Through A Raspberry Pi Under The Iot Model
(Edgar Alberto Díaz Ballesteros, Yovanny Castro Calderon, Carlos Eduardo):-

The mobile application arises from the need to design solutions that solve multiple problems of control and management in the context of the Internet of Things. The prototype was made using hardware technologies and open source software, where several areas of computer applied, as: the development of mobile applications, databases, electronic design and computer networks. The main function of the application is to allow control and monitoring of electronic object from the internet, a computer through reduced plate (Raspberry Pi).

Controlling Water Pump Machine Using Cellular Mobile Telephony

(Subrata karmoker, Kazi Shamsul Arefin and A. S. Zaforullah Momtaz):-

By using traditional individual cellular mobile telephony we now a day's get a lot of facilities. The facitihis are increasing day by day by new inventions and utilization of those inventions by scientists and engineers world-wide. In this paper a broad discussion of a Mobile Phone Controlling Water Pump Machine is discussed. It also attempts to discuss about how various mobile phone users can easily control a particular water pump machine as per their needs from any kinds of distance.

Design and Construction Of Water Level Measurement System Accessible Through SMS
(Made Saraswati, Endrowednes Kuantama, Pono Mardjoko):-

Water level measurement data is important in some water releted field. This system uses sensor to measure the water level. The system can measure the water level and give measurement report upon requested sms. This system can be placed in many place, because it only needs the initial setting via sms, based on installation condition at those places.
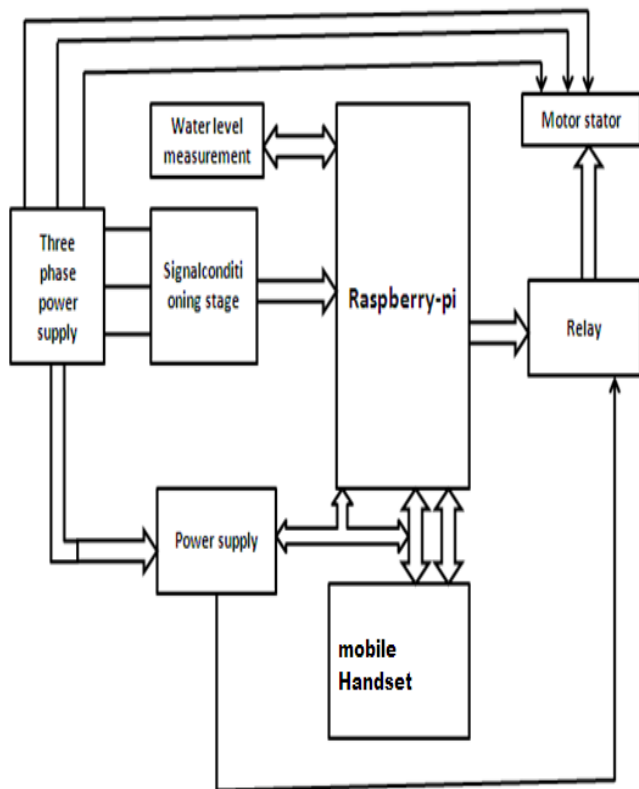
Chart -1: Flowchart
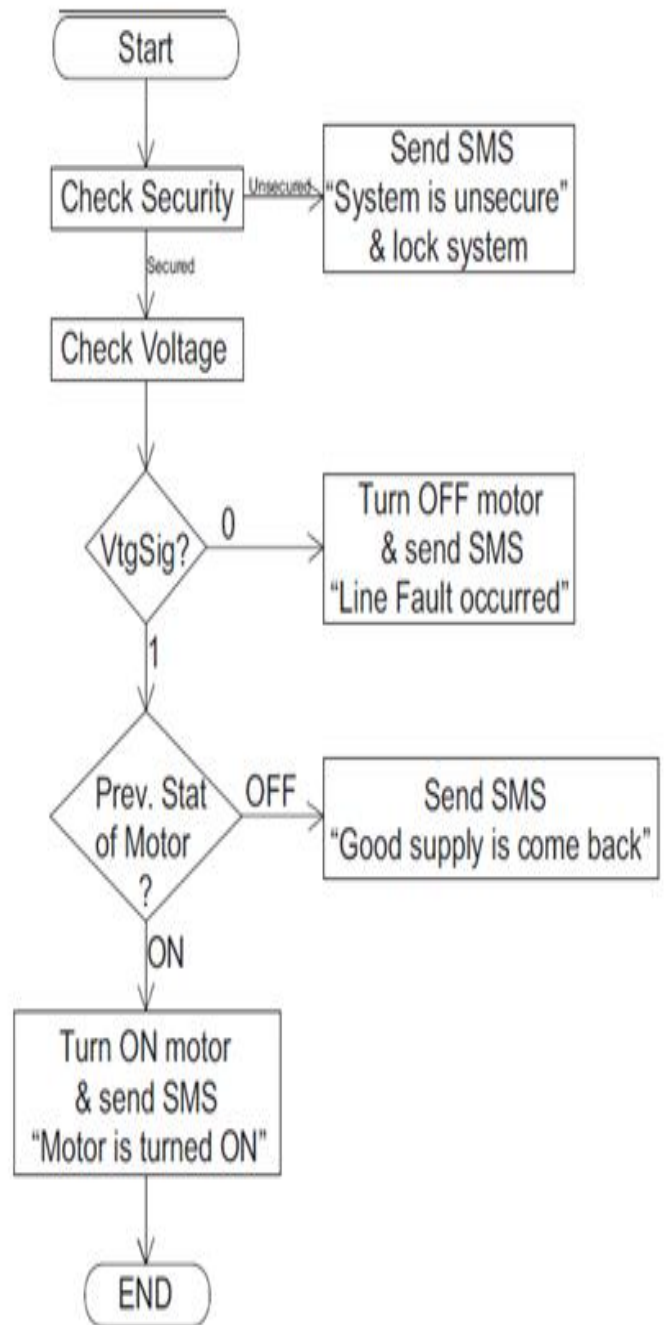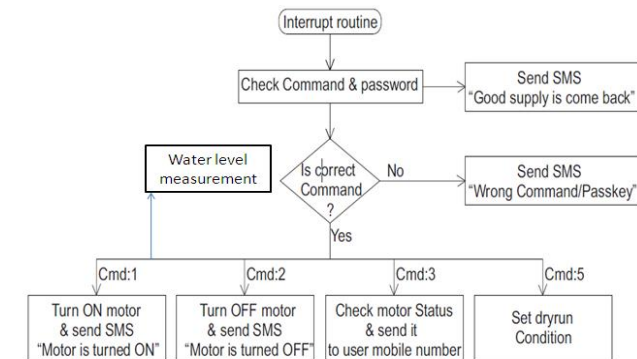
Fig -1: Block Diagram of the motor protection and waterlevel measurement using Raspberry-Pi
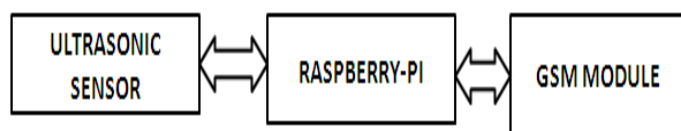

Fig. Water level measurement system's block diagram

Mobile starter is a GSM based remote control system which has been specially designed to address the practical problems of agriculture. With this the farmer can operate his motor pump anytime and from anywhere. He can know the status of the pump and can get the information of the pump site on his phone. With MPS, the farmer takes the full control in his hands.. A GSM modemis used in our project which connects Raspberry-Pi model with the mobile phone of the user. GSM is an open, digital cellular technology used for transmitting mobile voice and data services. Block diagram consist of Raspberry-pi, Power supply, GSM, Memory card module, water level measurement by using ultrasonic sensor and relay driver and relay are used to control the motor.GSM module is use to communication to user and control set-up.

The Raspberry-Pi is used in this system as a data processor and controller to other electronic components. This system will report the measurement result using long-distance communication in a form of SMS, which means that

there is no need to come directly to the measurement site. The main purpose of this is to design and construct a system that can measure the water level automatically based on Raspberry-Pi and also can send the measurement result as a SMS to the user's cell phone.

3. CONCLUSIONS

According to theoretical source we will be able to give protection to motor and water level measurement using Raspberry-Pi. This system provided security to all setup ,because of this system reduces time and manually work of the user. If user is near starter panel box then no need to use mobile for turning on motor. Motor can be turned on by using push button so user will not be charged for starting motor pump. The water level measurement system is proven to be capable to calculate water level and can work well to receive and send message to users. The initial setting data can be inputted into the system via SMS. Upon receiving the SMS to request water level data, the system will send the result of water level measurement data.

REFERENCES

[1] Kazi Shamsul Arefin *and A. S. Zaforullah Momtaz* Controlling Water Pump Machine Using Cellular Mobile Telephony.15 may 1995.

[2] .M.Syed Jarnil Asghar," Smooth Speed Control of Single-phase Induction Motors by Integral-Cycle Switching", IEEE Transactions on Energy   Conversion, Vol. 14, No. 4, December 1999.

[3] Grace John M1, Aneena Joseph2, Haritha Mohan V3." Mobile Starter Controller"   M.Syed   Jarnil Asghar,"

Smooth Speed Control of Single- phase Induction Motors by", IEEE Transactions on Energy Conversion, Vol. 14, No. 4, December 1999.

[4] Agencia de las, Android Management Tool, That Controls Electronic Devices Through Raspberry Pi Under The Iot Model. Tunis Tunisia on 17 , 2005

[5] U. Ema, C. A. Dwi. Design and construction of water level measurement. 2008, June.

[6] Rabisankar Roy, Susmita Das, Jayanta Kumar Ray, Shreyashi Barat, Biswarup Neogi," Automatic Speed Control of Single Phase Induction Motor with the Variation of Ambient Temperature", International Journal of Scientific and Research Publications, Volume 2, Issue 11, November 2012.

[7] Sarthak Jain, AnantVaibhav, Lovely Goyal, Raspberry Pi based Interactive Home Automation System through E-mail‖, 2014 International Conference on Reliability, Optimization and Information Technology. India, Feb 6-8 2014.

[8] N.Suresh, E.Balaji,K.JeffryAnto, J.Jenith, Raspberry Pi Based Liquid Flow Monitoring And Control‖,International Journal Dr.Roy Choudhary, Shail Djain "Linear Integrated Circuits" Volume 5, Issue 12, December 2015.

[9] of Research in Engineering and Technology,Volume:03 ,Issue:07,Jul- 2014.

[10] Md. Taslim Arefin, Mithun Banik, Imtiajur Rahim, Tawfiqul Islam,Tithi Biswas, "Automated Irrigation Control System: An Advanced Approach", IEEE/OSA/IAPR International Conference on Informatics,Electronics & Vision, 2012.