SMART MONITORING SYSTEM FOR WASHING MACHINE

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APPRECIATION

Thank God uttered to the Almighty, with the grace and permission of his scientific writing, I can set it up successfully. Thousands of thanks addressed to my lecturer Puan Siti Aminah Binti Mohd Radzi who has provided guidance, encouragement, donations mind, as well as constructive criticism, regardless of time and energy in a lot of things to help me prepare this scientific study. Our deepest gratitude and appreciation for the infinite is also for colleagues who are directly involved in gratitude for all the assistance either in terms of energy, ideas and knowledge provided. Thanks again to all parties involved either directly or indirectly in the success of this task. God willing, I will always remember and appreciate your help, hopefully all the services and kindness that was given reap the rewards from Allah S.W.T

Thank you.

ABSTRACT

Electricity is one of the important sources for every human being. In this modern age, people are more interested in products that are used automatically in their lives. Many users of washing machine in dorm often forget to make sure their cloth on washing machine taken. As a result of this problem, there is an idea to produce a product that isSmart Monitoring System for Washing Machine. Smart monitoring system for washing machine were building because the problem that student faces when wash the clothes at washing machine. The students at hostel have to wait another user of washing machine takes out their clothes after wash it. Then, the students do not have something that alerted them about the status of washing machine. Since the washing machine which is existing on the hostel cannot give something that easier them to get info about the use of washing machine, this project can make an alarm to alert the user to take their cloth after wash and another user can use it after seeing the bulb turned on and buzzer were ringing. Programming is used to set the time and relay as the switch is programmed arduino, this software is a method umtul write a program construction software system has to provide some programs for each component, but will need to download some libraries needed by each component has a library distinctive, After-phase combination of electronics and electrical circuit is completed, the construction program has been made, so that they become a complete program that involved components to function properly. , The results showed that four key characteristics of effective, easy-owned, user-friendly, simple and safe high scalability of this product to be applied.

ABSTRAK

Elektrik adalah salah satu sumber penting bagi setiap manusia. Dalam zaman moden ini, orang lebih berminat dengan produk yang digunakan secara automatik di dalam kehidupan mereka. Ramai pengguna mesin basuh di asrama sering lupa untuk memastikan kain mereka pada mesin basuh diambil. Akibat daripada masalah ini, terdapat satu idea untuk menghasilkan produk yang Sistem Pemantauan Smart untuk Mesin basuh. sistem pemantauan Smart untuk mesin basuh sedang membina kerana masalah ini bahawa pelajar menghadapi apabila mencuci pakaian di mesin basuh. Pelajar-pelajar di asrama perlu menunggu satu lagi pengguna mesin basuh membawa keluar pakaian mereka selepas mencuci. Kemudian, pelajar tidak mempunyai sesuatu yang memberitahu mereka mengenai status mesin basuh. Sejak mesin basuh yang sedia ada di asrama tidak boleh memberikan sesuatu yang lebih mudah mereka untuk mendapatkan maklumat mengenai pengguna mesin basuh, projek ini boleh membuat penggera untuk memberi amaran kepada pengguna untuk mengambil kain mereka selepas mencuci dan pengguna lain boleh menggunakannya selepas melihat mentol dihidupkan dan buzzer telah berdering. Programming digunakan untuk menetapkan masa dan menyampaikan arduino sebagai suis diprogramkan, perisian ini merupakan satu kaedah umtul naik sistem perisian pembinaan program telah menyediakan beberapa program bagi setiap komponen, tetapi perlu memuat turun beberapa perpustakaan yang diperlukan oleh setiap komponen mempunyai perpustakaan yang tersendiri, Selepas fasa gabungan elektronik dan litar elektrik selesai, program pembinaan telah dibuat, supaya mereka menjadi satu program yang lengkap yang terlibat komponen berfungsi dengan baik. , Hasil kajian menunjukkan bahawa empat ciri utama yang berkesan, milik mudah, mesra pengguna, mudah dan selamat berskala tinggi bagi produk ini untuk digunakan.

CHAPTER 1: INTRODUCTION

1.1 INTRODUCTION

For this year's theme would be 'Programming Based Applications' which means we have to included programming to our project to complete it successfully. For this application, the main component is microcontroller and it is used widely. Microcontroller is one of the fast selling single integrated circuit (IC) containing a processing core, memory and programmable input/output peripherals. Microcontroller has a lot of types such as Arduino, Respberry, ARM, PIC Atmel, freescale and many more. The advantages of microcontroller are that it could combine hardware and software to become one application which will turn out smarter or can be called as Artificial Intelligence (AI).

The main components that we are using for this project is. **ARDUINO UNO, ARDUINO SOFTWARE (IDE), Relay, Piezo Buzzer,LCD display,** and **Bulb.** Using Arduino which is an open-source electronics platform based on easy-to-use hardware and software, are able to read inputs from our circuit which is Arduino and turn it into many output which is turning on the buzzer and showing the status of washing machine which is stop on LCD display. Other than that, as mentioned above, the bulb is using to

give an alarm by turned on when washing machine has been stopped. These are the main components and features that are available in our Smart Monitoring System project which implement low cost, reliable and more environmental for our hostel.

1.2 PROBLEM STATEMENT

Smart monitoring system for washing machine were building because the problem that student faces when wash the clothes at washing machine. The students at hostel have to wait another user of washing machine takes out their clothes after wash it. Then, the students do not have something that alerted them about the status of washing machine. Since the washing machine which is existing on the hostel cannot give something that easier them to get info about the user of washing machine, this project can make an alarm to alert the user to take their cloth after wash and another user can use it after seeing the bulb turned on and buzzer were ringing.

1.3 OBJECTIVES

- Designing the monitoring system using microcontroller Arduino Uno.
- Building Smart Monitoring System for hostel student to watching and give an alert the status of washing machine.

1.4 SCOPE AND LIMITATION PROJECT

- Aim to facilitate students in hostel area to save their time by alert the user to get their cloth and another user can used it.
- The system only can use on hostel area only.
- Smart Monitoring System only can monitor for one washing machine in a time.

1.5 THE IMPORTANCE OF SMART MONITORING SYSTEM

Smart Monitoring System is one important feature of modern hostel. The system feature become draws much attention in the future. People getting more alert about the status of their clothes when wash it on washing machine. In this project, we designed a simple but very efficient system which this system can monitor a washing machine by connected that integrated with a microcontroller and a LCD display. LCD display use to alert when washing machine stops. It will shows 'STOP' when washing machine stop and a buzzer will ringing. The bulb also turned on to alert the user to get their cloth from afar. The buzzer that use in this project to alert the user by ringing after the washing machine stops.

CHAPTER 2: LITERATURE REVIEW

2.1 RESEARCH OF PROJECT

Before starting this project, students were doing some research on the topic of this project, the smart monitoring system. This study is based on projects that have been carried out because of the problem that student faces. The projects carried out in connection with programming based application.

Based on the projects in market which is has a same concept, the students have their own ideas and creativity to change the circuit creation to a higher and more sophisticated. In addition students will also modify the circuit diagram with additional door for the purpose of completing the circuit. Before a project is getting started, particular studies on the ways or methods to achieve the aims are required. To specify and solve a particular question encountered during the design period, the strengths and weaknesses of the particular method have to be carried out to justify what terms are actually needed in the project, and decide the methods that will be adopted.

2.2 PREVIOUS RESEARCH

We were found that our system has same objectives and the ways of use with the GSM based Home Security System. This system used GSM modules to send the SMS whenever it detects if any person is entering inside the house. This feature is helpful at night time or whenever we are out of our home. It is same with our system which is give an alert via bulb and buzzer to the user when the washing machine stops. Meanwhile, our system more efficient by included Arduino Uno as microprocessor to control the system.

2.3 Application of Relay

A relay is an electrically operated switch. Current flowing through the coil of the relay creates a magnetic field which attracts a lever and changes the switch contacts. The coil current can be on or off so relays have two switch positions and they are double throw (changeover) switches. The using of this relay circuit on this project for give an alarm to user by turn on the bulb.

2.4 Working Principle

The relay's switch connections are usually labeled COM(POLE), NC and NO:

COM/POLE= Common, NC and NO always connect to this, it is the moving part of the switch.

NC = Normally Closed, COM/POLE is connected to this when the relay coil is not magnetized.

NO = Normally Open, COM/POLE is connected to this when the relay coil is MAGNETIZED and vice versa.

2.5 Characteristics of Relay

There are 5 Pins in a relay. Two pins A and B are two ends of a coil that are kept inside the relay. The coil is wound on a small rod that gets magnetized whenever current passes through it.

COM/POLE is always connected to NC(Normally connected) pin. As current is passed through the coil A, B, the pole gets connected to NO(Normally Open) pin of the relay.

2.6 Operation

If the coil current is suddenly interrupted, a sudden high voltage pulse is developed in the coil. If this voltage exceeds the breakdown voltage of the transistor, the transistor will be degraded, and this will lead to damage. It is absolutely necessary to connect a diode in the circuit as a means of preventing damage from the counter emf. As suitable ratings for this diode, the current should be equivalent to the average rectified current to the coil, and the reverse blocking voltage should be about 3 times the value of the power source voltage. Connection of a diode is an excellent way to prevent voltage surges, but there will be a considerable time delay when the relay is open. If you need to reduce this time delay you can connect between the transistor's collector and emitter a Zener diode that will make the Zener voltage somewhat higher than the supply voltage.
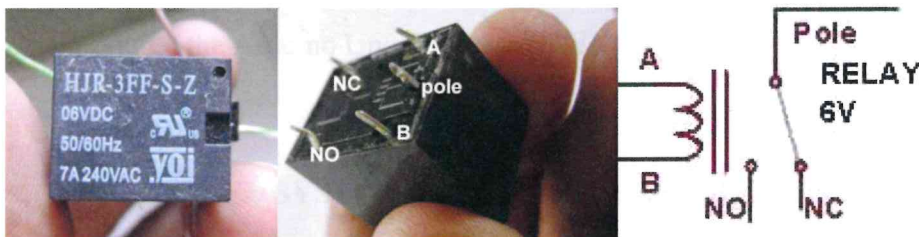

Figure 2.6.1 Relay

CHAPTER 3: METHODOLOGY

3.1 INTRODUCTION

In the previous two chapters, the aims, objectives, outlook and technical perspectives of this project have been introduced and revised. In this chapter, how to use all kinds of materials, circuits and programs to imply the design and achieve the aims and objectives of the project will be introduced. This chapter has two sections: hardware configuration and software configuration. Hardware configuration section introduces the materials and circuit design in the system which is Arduino Uno. Software configuration section introduces the Arduino Uno Software (IDE).

3.2 PROPOSED SYSTEM

By doing this project, we were learnt the way to PCB etching is a print of Proteus using tracing paper. Then stick the tracing paper on the electric board, then place the board that has been affixed to the paper contained a sketch of PCB trace in ultra

violet machine to scan the PCB circuit. Then put the PCB board on the scan that was completed earlier in the container for the purpose of laundering. When completed etching circuit board, we continue to make a hole drilled in the circuit using the machine. Currency drilled 1mm size we use to make holes in the circuit board. After completion of punched holes in the circuit board, soldering process is carried out for soldering electronic components on the circuit board. There are the components that we used in this project.

3.2.1 Resistor

A resistor is a passive two-terminal component that implements electrical resistance as a circuit element. Resistors act to reduce current flow, and, at the same time, act to lower voltage levels within circuits. In electronic circuits, resistors are used to limit current flow, to adjust signal levels, bias active elements, and terminate transmission lines among other uses. High-power resistors, that can dissipate many watts of electrical power as heat, may be used as part of motor controls, in power distribution systems, or as test loads for generators.

Fixed resistors have resistances that only change slightly with temperature, time or operating voltage. Variable resistors can be used to adjust circuit elements (such as a volume control or a lamp dimmer), or as sensing devices for heat, light, humidity, force, or chemical activity. Resistors are common elements of electrical networks and electronic circuits and are ubiquitous in electronic equipment.

Practical resistor as discrete components can be composed of various compounds and forms. Resistors are also implemented within integrated circuits. The electrical function of a resistor is specified by its resistance: common commercial resistors are manufactured over a range of more than nine orders of magnitude. The normal value of the resistance will fall within a manufacturing tolerance.

Figure 3.2.1.1: Resistors with different values.

3.2.2 Arduino Uno

Arduino Uno is a microcontroller board based on the ATmega328P (datasheet). It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analogue inputs, a 16 MHz quartz crystal, a USB connection, a power jack, an ICSP header and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started.. You can tinker with your UNO without worrying too much about doing something wrong, worst case scenario you can replace the chip for a few dollars and start over again. "Uno" means one in Italian and was chosen to mark the release of Arduino Software (IDE) 1.0. The Uno board and version 1.0 of Arduino Software (IDE) were the reference versions of Arduino, now evolved to newer releases. The Uno board is the first in a series of USB Arduino boards, and the reference model for the Arduino platform; for an extensive list of current, past or outdated boards see the Arduino index of boards.
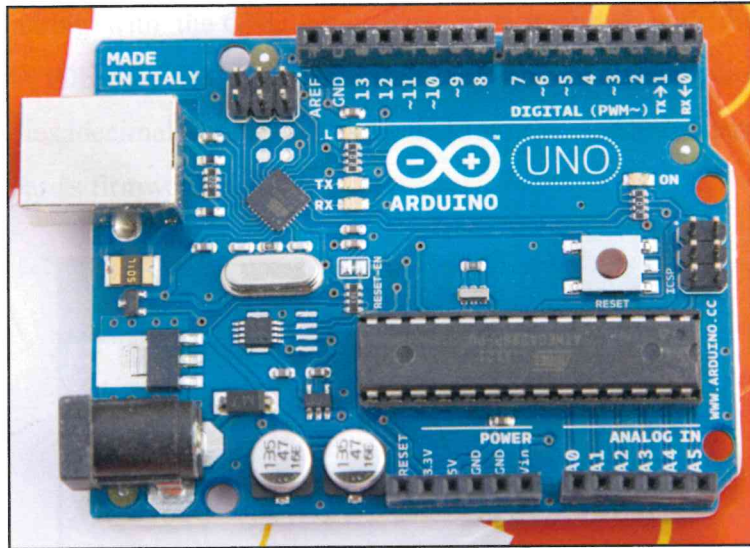
Figure 3.2.2.1: Arduino Uno

3.2.3 ARDUINO SOFTWARE (IDE)

The Arduino project provides the Arduino integrated development environment (IDE), which is a cross-platform application written in the programming language Java. It originated from the IDE for the languages *Processing* and *Wiring*. It is designed to introduce programming to artists and other newcomers unfamiliar with software development. It includes a code editor with features such as syntax highlighting, brace matching, and automatic indentation, and provides simple one-click mechanism to compile and load programs to an Arduino board. A program written with the IDE for Arduino is called a "sketch".

The Arduino IDE supports the languages C and C++ using special rules to organize code. The Arduino IDE supplies a software library called Wiring from the Wiring project, which provides many common input and output procedures. A typical Arduino C/C++ sketch consist of two functions that are compiled and linked with a program stub *main()* into an executable cyclic executive program:

setup(): a function that runs once at the start of a program and that can initialize settings.

loop(): a function called repeatedly until the board powers off.

After compiling and linking with the GNU tool chain, also included with the IDE distribution, the Arduino IDE employs the program *avrdude* to convert the executable code into a text file in hexadecimal coding that is loaded into the Arduino board by a loader program in the board's firmware.
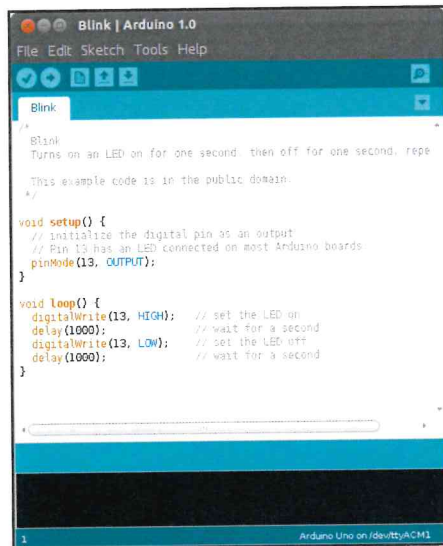

Figure 3.2.3.1: Arduino Software (IDE)

3.2.4   LCD DISPLAY

A liquid-crystal display (LCD) is a flat-panel display or other electronic visual display that uses the light-modulating properties of liquid crystals. Liquid crystals do not emit light directly.

Figure 3.2.4.1: LCD DISPLAY

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3.2.5 RELAY

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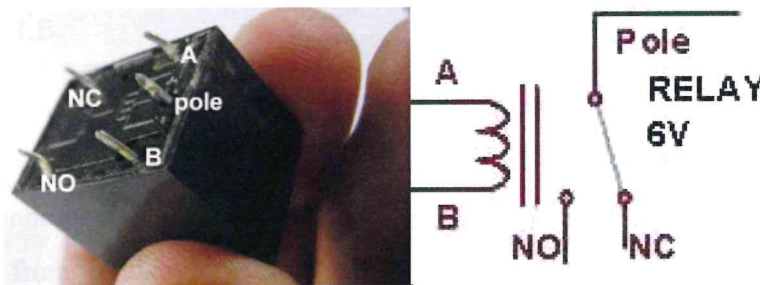

Figure 3.2.5.1: Relay

3.2.6 PIEZO BUZZER

Piezo buzzer is an electronic device commonly used to produce sound. Light weight, simple construction and low price make it usable in various applications like car/truck reversing indicator, computers, call bells etc. Piezo buzzer is based on the inverse principle of piezo electricity discovered in 1880 by Jacques and Pierre Curie. It is the phenomena of generating electricity when mechanical pressure is applied to certain materials and the vice versa is also true. Such materials are called piezo electric

materials. Piezo electric materials are either naturally available or manmade. Piezoceramic is class of manmade material, which poses piezo electric effect and is widely used to make disc, the heart of piezo buzzer. When subjected to an alternating electric field they stretch or compress, in accordance with the frequency of the signal thereby producing sound.

Figure 3.2.6.1: Piezo Buzzer

3.2.7 BULB

An incandescent light bulb, incandescent lamp or incandescent light globe is an electric light with a wire filament heated to such a high temperature that it glows with visible light (incandescence). The filament, heated by passing an electric current through it, is protected from oxidation with a glass or quartz bulb that is filled with inert gas or evacuated. In a halogen lamp, filament evaporation is prevented by a chemical process that redeposits metal vapor onto the filament, extending its life. The light bulb is supplied with electric current by feed-through terminals or wires embedded in the glass. Most bulbs are used in a socket which provides mechanical support and electrical connections.
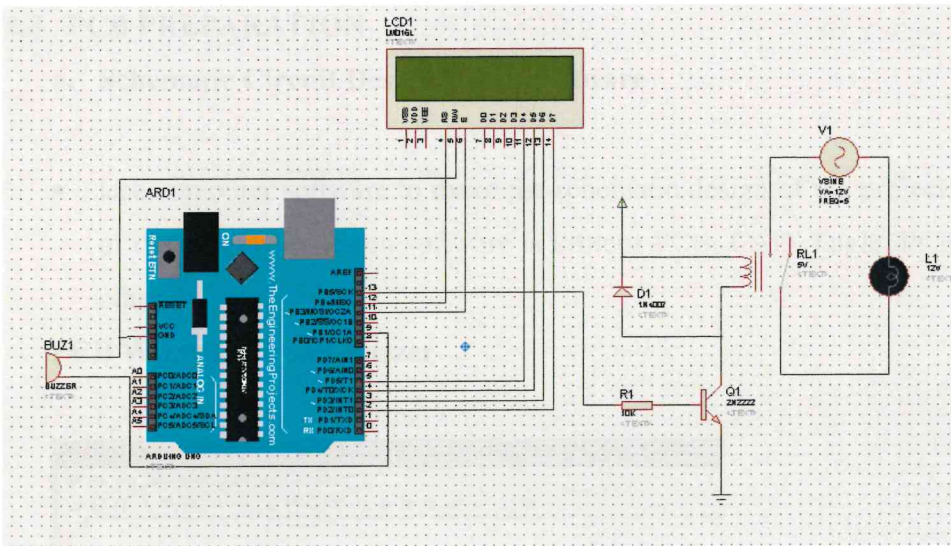

Figure 3.2.7.1: Bulb

3.3   Project Estimated Cost

Table 3.3.1   List Of Component

COMPONENT	PRICE PER UNIT (RM)	QUANTITY	PRICE (RM)
Breadboard	15.00	1	15.00
Arduino Uno	63.00	1	63.00
Jumper	10.00	4	40.00
Resistor, Diode, Transistor	0.20	5	1.00
LCD Display 16x4	22.00	1	22.00
Terminal Block, Relay	3.50	1	3.50
Piezo Buzzer	7.90	1	7.90
Connector Sil	1.50	1	1.50
Bulb	20.00	1	20.00
		Total (RM)	173.90

FULL CIRCUIT SMART MONITORING SYSTEM FOR WASHING MACHINE

GANTT CHART

PROJECT 2 GANTT CHART

	Project Development	WEEK													
		1	2	3	4	5	6	7	8	9	10	11	12	13	14
1.	Student Registration	▨													
2.	Project Briefing		▨	▨											
3.	Sketching Circuit			▨	▨	▨									
4.	Build a circuit on Proteus						▨	▨	▨	▨	▨	▨			
5.	Progress of Project and Build a Prototype									▨	▨	▨	▨	▨	
6.	Preparation for Presentation												▨	▨	
7.	Last Preparation													▨	▨
8.	Final Presentation (Project 2)														▨

Gantt chartillustrates the start and finish dates of the terminal elements of a project. Gant Chart show the summary of the students' activity during this project is carried out. Gantt charts also show the time taken for students to perform all of these activities.