SMART WATER LEAKAGE DETECTION USING WIRELESS SENSOR NETWORKS (SWLD)

A Project submitted in partial fulfillment of the requirements
for the Award of Degree of
Bachelor of Science in Electrical and Electronic Engineering

By
Name: Md.Tariqul Islam Rubel
(ID#: 151-33-2486)

Supervised by

SaikatBasak

Senior Lecturer
Department of
EEE

DEPARTMENT OF ELECTRICAL AND ELECTRONIC ENGINEERING

FACULTY OF ENGINEERING
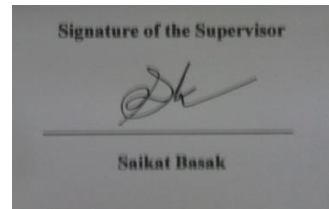
DAFFODIL INTERNATIONAL UNIVERSITY

November 2018

CERTIFICATION

This is to certify that this project and thesis entitled "**Smart Water Leakage Detection Using Wireless Sensor Networks (SWLD)**" is done by Md.Tariqul Islam Rubel, ID No: 151-33-2486, under my direct supervision and this work has been carried out by them in the laboratories of the Department of Electrical and Electronic Engineering under the Faculty of Engineering of Daffodil International University in partial fulfillment of the requirements for the degree of Bachelor of Science in Electrical and Electronic Engineering. The presentation of the work was held on November2018.

Signature ofthe Candidate   **Signature of theSupervisor**

Md.Tariqul Islam Rubel   **SaikatBasak**

ID#: 151-33-2486

DEDICATION

We dedicate this Project to our parents.

iii

CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF ABBREVIATIONS

TDMA   Time Division Multiple Access mechanism

FDMA   Frequency Division Multiple Access mechanism

GPRS   General Packet Radio Services

3G   Third Generation cellular networks

CDMA   Code Division Multiple Access

UMTS   Universal Mobile Telecommunications System

HSPA   High Speed Packet data Access

WCDMA   Wideband Code Division Multiple Access

HSDPA   High Speed downlink Packet Access

LTE   Long Term Evolution

OFDMA   Orthogonal Frequency-Division Multiple Access

PWM   Pulse Width Modulation

IC   Integrated Circuit

SPI   Serial Peripheral Interface

ACKNOWLEDGEMENT

First of all, we give thanks to Allah. It is a great pleasure for authors to express their unfettered gratification, sincere appreciation and profound respect to our respective supervisor SaikatBasak, Senior Lecturer, Department of Electrical & Electronic Engineering, Daffodil International University, for his constructive suggestion, scholastic guidance, constant inspiration, valuable advices and kind cooperation for the successful completion of work on "**Smart Water Leakage Detection Using Wireless Sensor Networks (SWLD)**". This could not be possible without his help. Space does not allow us to mention each person by name, but we are deeply grateful to everyone associated with this project and thesis. We also wish to complement all our respective concern teachers & staffs of our department of their direct and indirect assistance at different times.

ABSTRACT

This paper revolves around an utilization of remote sensor frameworks for spillage acknowledgment underground water channelsLosing the issue to waste the water dispersal frameworks. Spillage balancing activity and breaks recognizing confirmation in water scattering frameworks are major for an acceptable usage of ordinary Wealth

.To address this issue, and streamline the spillage recognizing confirmation process, the makers have arranged a remote framework system making usage of flexible remote sensors prepared to perceive breaks and extra imperativeness, Measure the time and cost of smart water leakage detection (SDD) in the pipeline, measure the water level of the tank and control it in the instructions to turn it on when the water level is low.

It revolves essentially around two segments: The underlying part relies on Mobile Development for Global Development (GSM) to send the Short Message Service (SMS) proprietor. The basic sections of the structure are: Sensor, GSM module, Arduino, Exchange to control devices. The second control is part of the; It uses flexible Android applications to control Saipan. The use of proposed structures is to reduce the cost of delayed maintenance and maintenance pipelines after the spillage area, improving performance efficiency of delayed consequences.

CHAPTER 1

INTRODUCTION

1.1 Introduction

The water is a restricted asset and for the basic farming, for the industry and for animals presence with the world individuals. Heaps of individuals don't understand the genuine significancedrink enough water every day.More is squandered by water numerous unregulated way. This is the problem unobtrusively identified with poor water portion, wasteful use, and absence of sufficient and incorporated water the board. Along with this line, possible use for efficient use and water checking office structures home or office. Every living thing on earth needs water to bear it. More than 60% of human body is formed. We use clean water to drink, develop crops for nutrients, work for industry, and swimming, surfing, analging and cruising. Water is very important in every part of our lives. Observing the nature of water on the surface, our pollution will be protected from pollution. Runners can use and plant data to be able to deal with their region [1]. Our neighborhood, state and national governments verify the data to help control pollution, water expansion and misadventure levels. As a Worldwide Education Attempt Program, the Water Check Day was established in 2003 by the American Water Foundation, which aims to create open mother tongue and collaboration for the safety of water resources worldwide. The World Water Test Day is praised on September 18.

1.2 Problem Statement

When these pipelines are formed, the producer exceeds the greatest weight of assessment when the pipelines are the primary purpose behind the well-planned pipelines spheres. So, it will take a turn on the channels and it will lead the blast in the water running through them. [2] After this incident and after the funnel explodes, the water leaves its original track and leaves the channels and spills will occur [3].

1.3 Objectives

The objective or targets of which the structured gadget is relied upon to achieve is to construct a Smart Water Leakage Detection Using Wireless Sensor Networks (SWLD). In this venture sensors are put at various dimension of the tank and with the guide of these sensors, the IC screens the dimension of the fluid at a specific point in time, a portion of the targets are

1. To structure a Smart water checking framework utilizing remote.

2. To join an intuitive medium between the end client and the machine.

3. To forestall over work of the siphoning machine and keep it from getting awful.

4. To maintain a strategic distance from wastage of water.

1.4 Scopes

In our framework we create a model model as a Soviet framework model. We mastermind the water pipeline and focus on water sensors which have a high probability of water spills. Similarly, a microcontroller (Ardino) to control and process actuators in its yield port, also to get information from the water sensor.Adido collaborates with GDM to reduce water split differences and quickly and remotely reduce water level and then send SMS to the owner. Also, we use the Android application to get this information from GSM and to control the siphon

1.5 Research Methodology

In view of the structure prerequisites and determinations, the framework square outlines appeared in Figure 1.1 are created. This square graph characterizes all the capacity to be performed by the framework. A measured way to deal with framework configuration was taken. Depending on the adrenal chip, the adrenonano is dependent on the microcontroller. On this paper, a part of the necessary concepts of circuits used in structure configuration has been made clear.
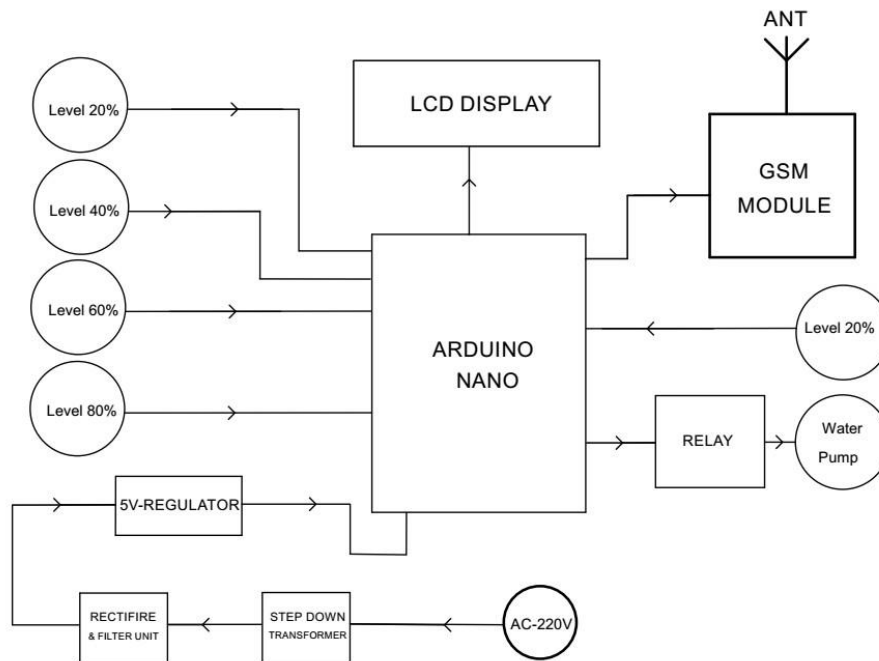
Figure 1.1 Block diagram of Smart water leakageusing wireless sensor networks

Structure The tank contains water sensors that recognize spillage and ultrasonic sensors to gauge the water level. Sensors collect data and the framework is controlled by mega ardino, the controller likes danger and sends the SMS to the proprietor using the GSM module indicated by the sensor data.

The framework additionally comprises of two sections: The first is the alert, if there is any danger, the framework sends an SMS using GSM; It reduces the risk by opening the solenoid valve in the case of spills. The second part is to control the use of Android applications. The app controls siphon and activates the tank has low water levels.

Tanks are discontinued under water level monitoring, flooding and water tank streaming levels. The water control framework makes possible noticeability of the execution home applications.The current robotized technique for level recognition is depicted and that can be utilized to make a gadget on/off. In addition, the normal technique for level control for home apparatus is basically to begin the feed siphon at a low dimension and enable it to keep running until the point when a higher water level is come to in the water tank. This isn't legitimately upheld for satisfactory controlling framework. Other than this, fluid dimension

control frameworks are broadly utilized for observing of fluid dimensions, stores, storehouses, and dams and so on.

1.6 Project Outline

This Project is organized as follows:

Chapter 1: Introduces the project "Smart Water Leakage Detection Using Wireless Sensor Networks". Also explain its objectives and methods.

Chapter 2: Reviews the literature of Smart Water Leakage Detection Using Wireless Sensor Networks.

Chapter 3:Water leak detection analysis and police using wireless sensor components. Circuit diagram gives an overview of the entire system. Then, each element is studied individually. The system is explained along with their ratings and connections to their intentions.

Chapter 4: The project describes hardware development parts of various units. Wireless sensor also describes the basic operation. Step-by-step analyzes are presented in the activities that stop the switching on or off switching through metallic contacts, using the wireless sensor of the pump, starting from the water detection, the radio sensor will accept.

Chapter 5:Presented the results and its discussion. We then use the wireless sensor to read the leakage leakage on the true table. It briefly involves the complete operation of wireless sensors. Wireless sensor that is filled with water filled with OHT and then empty images are illustrated.Separately, various circuit components are being illustrated in the changes in the state. Then we do a comparative study of water leak detection using wireless sensors with commercially available controllers. The full machinery has been discussed and estimated cost.

Chapter 6: The work done so far is over. This work is discussed in the possible limitations of ongoing research. Future work that can improve in the present situation is mentioned. This work line is discussed in future as well as possibilities.

CHAPTER 2

LITERATURE REVIEWS

2.1 Introduction

This framework is designed to operate and manage a Wireless Sensor Network (WSN), which screens water spheres with the information detected by the sensors located on the water and has the ability to take necessary actions to restore contaminated water for keeping the water resources inside the quality represented for local use. Have there.We use Arduino nano microcontroller to plan and construct a water spillage recognition and remote control framework which gives the client new highlights, for example, Discover water spillage by versatile applications and control the water level in the tank. The reason for the structure is to give comfort to our life and to express lively.

2.2 GSM Techonology

The remote voice administrations begun by the original circuit exchanged simple administration, which was for voice just; this innovation did not give SMS or other information administrations. Updating from original to Second advanced framework Generation (2G); this change was presented due on a few administrations given by 2G innovations, for example, information putting away, adapting, encryption and pressure, and allows information transmission without misfortune be supporting mistake rectification.

The Second era innovations 2G, incorporates GSM that depends on both Time Division Multiple Access component (TDMA), and Frequency Division Multiple Access instrument (FDMA), where a range is partitioned into little cuts, too each cut is separated so as to various time cuts, where clients are assigned thus to explicit range cut, and explicit time cut also [4].

Moving from 2G to 2.5G advancements, GSM/GPRS (General Packet Radio Services) that is an information arranged innovation expanding the GSM voice administrations where GPRS hypothetical can give up to 200Kbps; which made a prologue to another progressive change [5].

5

The Third Generation cell systems (3G) were created with the point of offering rapid information and up to 2 Mbps in the served regions or more which enable the administrators to offer a sight and sound network and other information administrations to the end clients. A couple of advances can satisfy the referenced information rate, for example, Code Division Multiple Access (CDMA), Universal Mobile Telecommunications System (UMTS) and others. Fast Packet information Access (HSPA) has been a move up to Wideband Code Division Multiple Access (WCDMA) systems used to expand parcel information execution. The required downloads and information volume request has been as of late expanded per client. The High Speed downlink Packet Access (HSDPA) is created to give more information rates and up to 14.4Mbps to take care of the clients demand. HSDPA utilizing diverse media transmission systems to expand the down-interface information stream by creating distinctive balance and utilizing Multiple-Input and Multiple-Output (MIMO) innovation. In addition, the moving up to the Fourth Generation framework 4G implies that more information request going to blast amid the coming decades, the fourth era which called Long Term Evolution (LTE) is created to take care of the quickly information demand [6, 7].

The fourth era still not using real part in the piece of the overall industry because of the absence of devises that can bolster the LTE Orthogonal Frequency-Division Multiple Access (OFDMA) method and the current system framework required [8].

These days, the LTE as yet supporting the information benefits just and not the voice, but rather it is all the while and improvement to help the voice additionally, from that point onward, it will be called as "cutting edge LTE". The LTE can bolster more than 100 Mbps relies upon the system structure and range utilized [9]. This paper primarily centers around giving security when the client is far from home. SMS is a GSM versatile innovation that can perform remote correspondence wherever they are.

The point of paper is to utilize Arduino microcontroller to structure and manufacture a water spillage location and remote control framework, that give us send quick data to client GSM cell phone utilizing SMS and furthermore actuate - deactivate framework by SMS, which furnishes the client with new highlights, for example, water spillage recognition and water level control in tank by versatile application. The aftereffect of utilizing the proposed framework is enhancing the effectiveness of activity, decreasing defer time and cost of support pipelines after spillage discovery.

2.3 Proposed System

On this paper we create a framework for water spills and hydraulic siphon control which is identified with a residential use and need, so we can apply this framework to a model model that is easy and explain how this structure can be a decent structure. Work The main principle of this paper is to illustrate the structure we have worked for in our framework. Similarly, we use a home model to sort the pipes, in the same way we use the control parts and sensors to identify the water spills and water levels in the upper floors. In addition to the water supply campaign channel and the GATHERER along with Figure 1.1 shows which shows that the engineering configuration framework shows and displays. Figure 1.1 shows the control parts of the board, microcontroller (Ardino), water siphon (activator) and GSM and their associations.
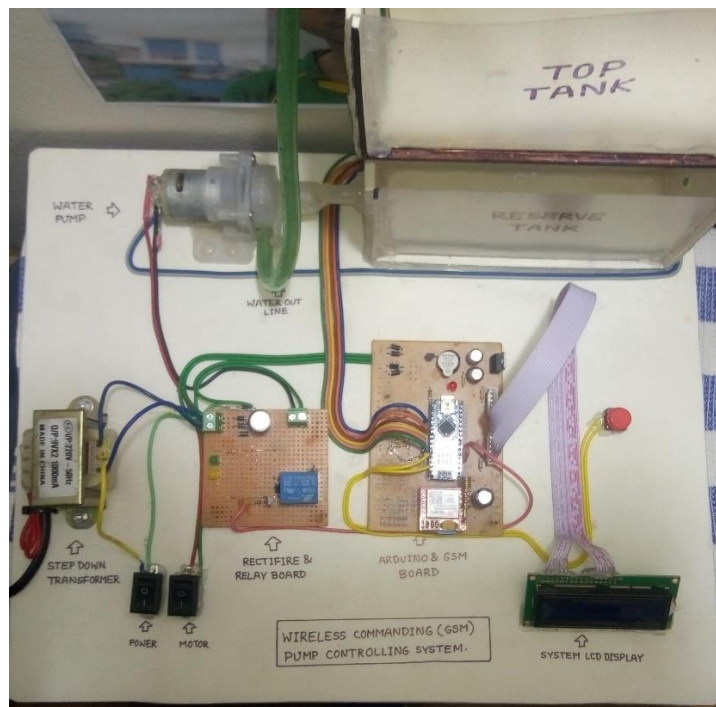
Figure 2.1 Model of SWLD system

Water siphons are formulated by a DC voltage with which all actuators stabilize the 12-volt settlement. When the water level is reduced, water suppliers are used to supply water, when the homeowner uses the Android Multipurpose application to turn on the top tank water level warning carefully to the Saipan collector.

2.4 Summary

©Daffodil International University

This project design Smart Water Leakage Detection Using Wireless Sensor Networks for overhead tank with switching device is to ensure a higher rate of water monitoring and control the pump. The major components used in the project design are fund Arduino NanoMicrocontroller, GSM800 Module Unit, Watersensor, Water pump, Relay 12V,Crystal LED Display

CHAPTER 3

ANALYSIS OF THE SYSTEM COMPONENT

3.1 Introduction

8

In this paper we will demonstrate the entire framework thoughts, strategy, advantages, gadgets and mechanical assembly used to achieve the entire framework in specialized path with high proficiency. The principle thought discusses how to recognize the spillage which happens in water dissemination pipelines and the decline in water level in tank along these lines, this issues causes numerous challenges for home and its proprietors.

By utilizing water checking framework SWLD, we stay away from the water wastage, control utilization and effortlessly keep the water for our age. In the event that our thought connected in completely specialized genuine way, this will be extremely helpful for local condition. This trial framework will set aside extra cash for proprietors and will recognize the spillage in water circulation pipelines and encourages the proprietor to be acquainted with the issues ahead of schedule to make the required support.

3.2 Components

The Water Leakage Detection Using Wireless Sensor Networks has the following main components:

    i.   Arduino Nano Microcontroller.
    ii.   Power Supply.
    iii.   Crystal LED Display.
    iv.   Water Pump.
    v.   Resistor.
    vi.   Connecting wire.
    vii.   Breadboard.
    viii.   GSM800 Module Unit
    ix.   Water Sensor
    x.   Buzar
    xi.   NPN trangistor
    xii.   Relay 12V

3.2.1Arduino Nano Microcontroller Board

Defining Arduino Nano

An Arduino is really a microcontroller based pack which can be either utilized specifically by buying from the merchant or can be made at home utilizing the segments, attributable to its open source equipment include. It is essentially utilized in interchanges and in controlling or

9

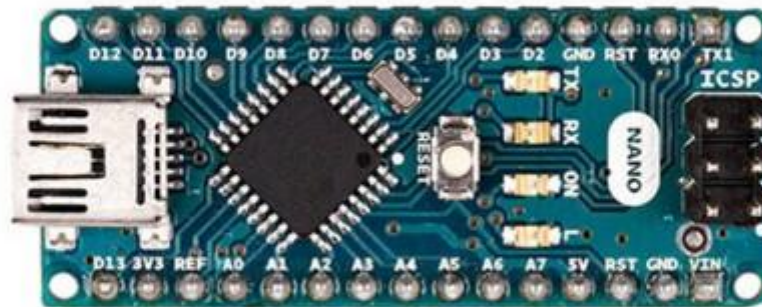working numerous gadgets. It was established by Massimo Banzi and David Cuartielles in 2005.

Figure 3.1. Arduino Nano Microcontroller Board

3.2.1.a**Arduino Pin Diagram**

A run of the mill case of Arduino board is Arduino Uno. It comprises of ATmega328-a 28 stick microcontroller.
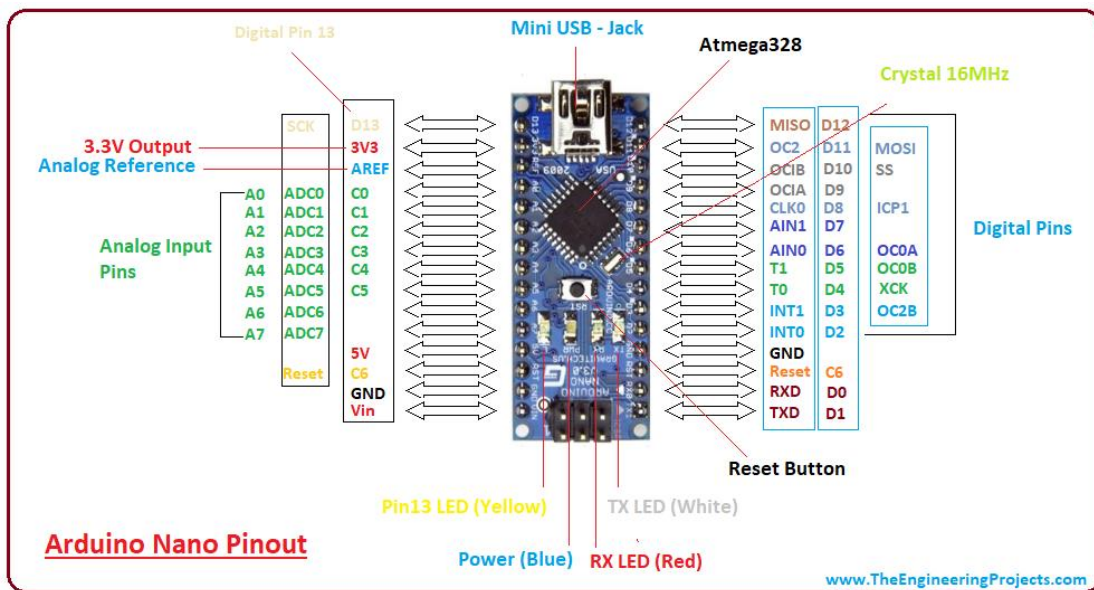
Fig.3.2 Function of Different Pin.

1 Power Jack:

Arduino can be control either from the pc through a USB or through outside source like connector or a battery. It can work on an outer supply of 7 to 12V. Power can be connected remotely through the stick Vin or by giving voltage reference through the IORef stick.

2 Computerized Inputs:

It comprises of 14 advanced data sources/yield sticks, every one of which give or take up 40mA current. Some of them have exceptional capacities like pins 0 and 1, which go about as Rx and Tx individually , for sequential correspondence, pins 2 and 3-which are outside intrudes on, pins 3,5,6,9,11 which gives pwm yield and stick 13 where LED is associated.

3 Simple data sources:

It has 6 simple info/yield sticks, each giving a goals of 10 bits.

4 ARef:

It gives reference to the simple sources of info.

5 Reset:

It resets the microcontroller when low.

Power Pins (3.3v, 5v, GND, Vin)

•3.3V - Supply 3.3 output volt

• 5V - 5 output volts in supply

©Daffodil International University

• Most components used with Ardino boards work fine with 3.3 volts and 5 volts.

• GND (Ground) - Arduino has a few GND pins, one of which can be used to ground your circuit.

• The PIN can also be used to get the Ederdino board from external power sources, such as AC MENE power supply.

Analog pins

There are eight analog input pin A0 through Arduino Nano board A7. This pin can read the signal from an analog sensor like the humidity sensor or temperature sensor, and it can convert it into a digital quality that can be read by a microprocessor.

AT nano (Main microcontroller)

Each Arduino board has its own microcontroller. You can estimate it as the brain of your board. The main IC in Ardino (coordinated circuit) board is slightly different from the board. Microcontrollers are usually ATMEL companies. Before you load a new program from Arduino IDE, your board will know what IC. This information is available at IC top. For more details about IC construction and function, you can refer to the data sheet.

Power LED

This LED should be light when plugging your Arduino into your Power Source to indicate that your board is powered properly. If this does not turn light, there's something wrong with the connection.

Digital Pins

The Arduino Nano boasts 14 digital I / O pins (15) (which gives the output of 6 PWM (Pulse Width Modulation). These pins can be configured to work as input digital pins for logical quality (0 or 1) or digital output pins Such as LEDs, relays, etc. The "labeled" pins can be used to create PWM.

TX and RX LEDs

On your board, you will get two labels: TX (transmit) and RX (Receipt). They are present in two places on the UNU board of Arduino. First, in the digital pin 0 and 1, to indicate the PIN responsible for serial communication. Second, TX and RX LED. While sending serial

©Daffodil International University

information, Texas leads the flash with various speeds. Flashing speed depends on the baud rate used by the board. RX flash time to take.

ICSP Header

In most cases, ICSP is an AVR, a small programming header for Adudino, which includes MOSI, MISO, SCK, RESET, VCC, and GND. It is often referred to as SPI (Serial Peripheral Interface), which can be considered as an "extension" of output. Actually, you slog the output device to the SPI bus master.

3.2.1.b How to program an Arduino

The most imperative preferred standpoint with Arduino is the projects can be specifically stacked to the gadget without requiring any equipment software engineer to consume the program.
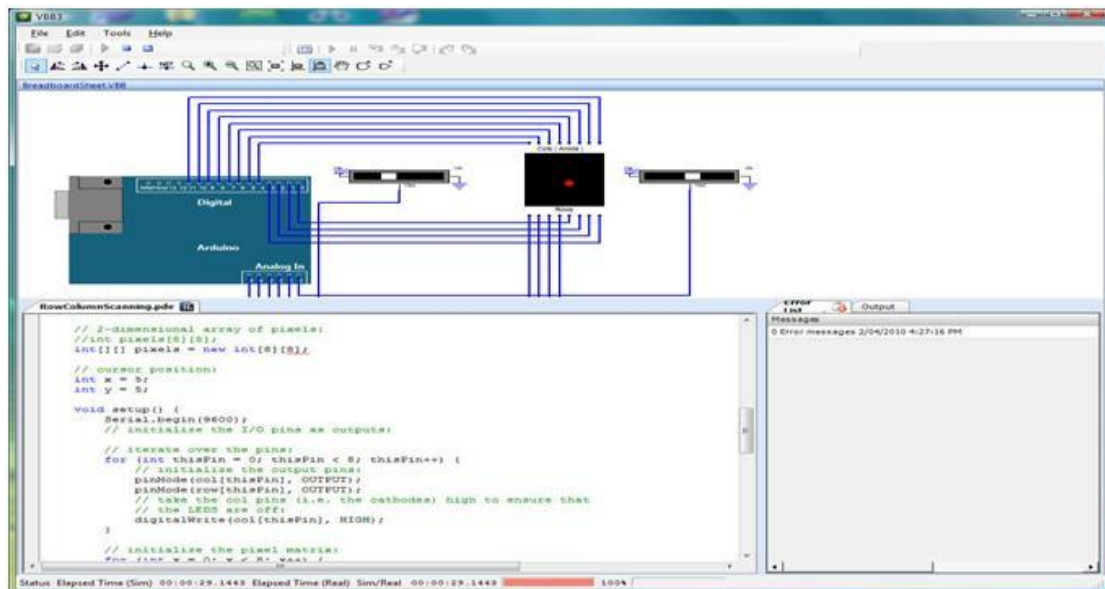
Fig.3.3 Program an Arduino

This is done in view of the nearness of the 0.5KB of Bootloader which enables the program to be singed into the circuit. We should simply to download the Arduino programming and composing the code.

The Arduino device window comprises of the toolbar with the catches like check, transfer, new, open, spare, sequential screen. It additionally comprises of a content manager to compose the code, a message zone which shows the criticism like demonstrating the

©Daffodil International University

blunders, the content support which shows the yield and a progression of menus like the File, Edit, Tools

5 Steps to program an Arduino

Projects written in Arduino are known as representations. An essential outline comprises of 3 sections

1. Revelation of Variables

2. Instatement: It is written in the setup () work.

3. Control code: It is written tuned in () work.

The portray is spared with .ino expansion. Any activities like checking, opening a portray, sparing a draw should be possible utilizing the catches on the toolbar or utilizing the apparatus menu.

The outline ought to be put away in the sketchbook registry.

Picked the correct board from the instruments menu and the sequential port numbers.

Tap on the transfer catch or picked transfer from the apparatuses menu. In this manner the code is transferred by the bootloader onto the microcontroller.

Maybe a couple of essential Adruino capacities are:

digitalRead(pin): Reads the advanced an incentive at the given stick.

digitalWrite(pin, esteem): Writes the computerized an incentive to the given stick.

pinMode(pin, mode): Sets the stick to information or yield mode.

analogRead(pin): Reads and returns the esteem.

analogWrite(pin, esteem): Writes the incentive to that stick.

serial.begin(baud rate): Sets the start of sequential correspondence by setting the bit rate.

How to Design your own Arduino?

We can likewise structure our own Arduino by following the schematic given by the Arduino merchant and furthermore accessible at the sites. All we require are the accompanying segments A breadboard, a drove, a power jack, an IC attachment, a microcontroller, couple of resistors, 2 controllers, 2 capacitors.

The IC attachment and the power jack are mounted on the board.

Include the 5v and 3.3v controller circuits utilizing the blends of controllers and capacitors.

14

Add legitimate power associations with the microcontroller pins.

Interface the reset stick of the IC attachment to a 10K resistor.

Interface the precious stone oscillators to pins 9 and 10

Interface the prompted the proper stick.

Mount the female headers onto the board and interface them to the particular sticks on the chip.

Mount the line of 6 male headers, which can be utilized as a choice to transfer programs.

Transfer the program on the Microcontroller of the readymade Adruino and after that pry it off and put back on the client unit.

7 Reasons why Arduino is being favored nowadays

It is cheap

It accompanies an open source equipment highlight which empowers clients to build up their own pack utilizing effectively accessible one as a kind of perspective source.

The Arduino programming is good with a wide range of working frameworks like Windows, Linux, and Macintosh and so on.

It additionally accompanies open source programming highlight which empowers experienced programming designers to utilize the Arduino code to converge with the current programming dialect libraries and can be broadened and adjusted.

It is anything but difficult to use for novices.

We can build up an Arduino based venture which can be totally remain solitary or tasks which include coordinate correspondence with the product stacked in the PC.

It accompanies a simple arrangement of associating with the CPU of the PC utilizing sequential correspondence over USB as it contains worked in power and reset hardware.
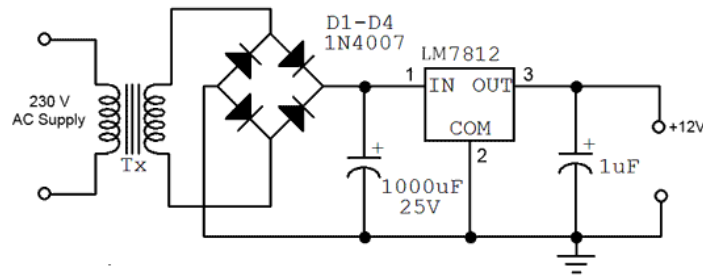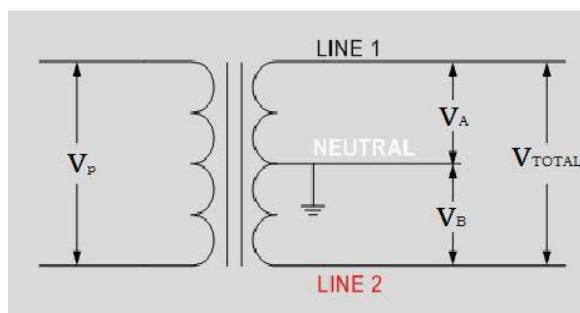
3.2.2 Power Supply

Fig. 3.4 AC-DC Power Supply & Circuit Diagram.

A power supply is an electronic gadget that supplies an electrical load electric power. The essential power of electricity is one of the changes in electrical life. Thus, at the time of supply, the electric energy is identified as the converter. Some power supply isolated, independent gadgets, others are associated with their heap as well as larger gadgets.

Examples of the latest supply power supply available at workstation and crepe hardware gadgets. The wellspring of this power can emerge out of various source like the fundamental AC voltage ,a battery or even from an inexhaustible power source like sun based board wind turbine or energy unit to give some examples. The most widely recognized wellspring of intensity is normally the principle AC

3.2.2a Transformer

©Daffodil International University

Fig.3.5 Transformer circuit representation

A transformer is a device that consists of two closely connected coils called primary and secondary coil. An AC voltage is applied to the primary, which is displayed in seconds with the voltage quality ratio of the transformer, and in contrast to the densest ratioRation = VP / VS = NP / NS and Power Out = Power in or V.

3.2.2.b Working of this Transformer

The two voltages, between line 1 and unbiased and among nonpartisan and line 2 can be named as VA and VB individually. At that point the scientific connection of these two voltages demonstrates that they are needy upon the essential voltage and additionally the turn proportion of the transformer.

$$VA = (NA/NP) * VP$$

$$VB = (NB/NP) * VP$$

One thing that ought to be noted here is that both the yields VA and VB individually are equivalent in size however inverse in bearing, which implies that they are 180 degrees out of stage with one another. For this reason, we additionally utilize a full wave rectifier with an inside tapped transformer, to make both the voltages in stage with one another.
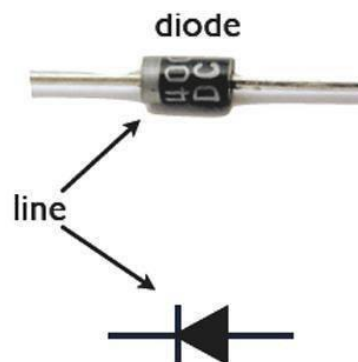
3.2.2.c Diode

Fig. 3.6 Diode and symbol

The term diode for the most part suggests a little flag gadget with current regularly in the milliamp run. A semiconductor diode comprises of a PN unction and has two (2) terminals, an anode (+) and cathode (-) current streams from anode to cathode inside the diode.

17

Diodes are semiconductor gadget that may be portrayed as passing current one way as it were. The last piece of that announcement applies similarly vacuum tube diodes. Diodes anyway are undeniably more amazingly flexible truth be told. Diode can be utilized as rectifier, voltage controllers, turning gadgets in radio recurrence tuned circuit, recurrence duplicating gadget in radio recurrence circuit, blending gadgets application or can be utilized to settle on rationale choice in advanced circuit.
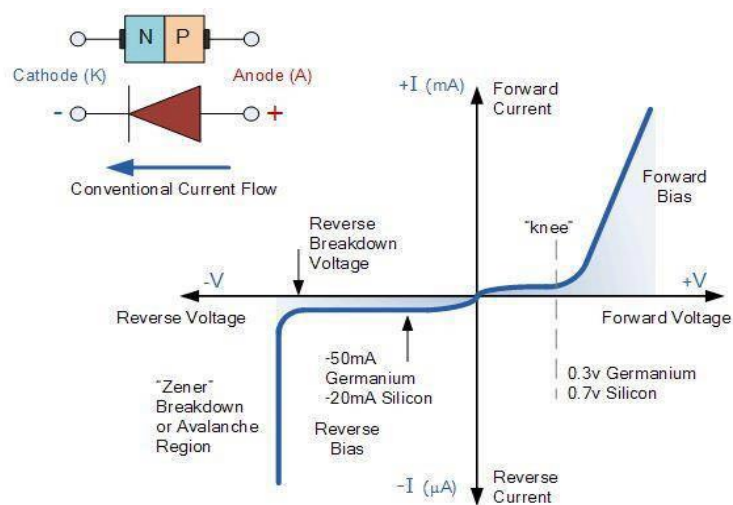
3.2.2.d Characteristics

Fig. 3.7 Junction diode symbol and static I-V characteristics

There are two working areas and three conceivable "biasing" conditions for the standard Junction Diode and these are:

1.Zero Bias - No external voltage is connected to potential PN cycle diodes

2. Inverted bias - P-type material on N-type elements on potential native voltages and positive, (- ve) potentially negative of voltage (+ ve), which have the effect of increasing the width of the PN interaction diode diode.

3. Forward Bias - The probability of voltage is positive, (+ ve) P-type material and negative, (-y) diode is associated with n-type elements which can reduce the width of PN interaction diode.

3.2.2.e Full-Wave Rectifiers

A rectifier is an electronic circuit that changes over AC voltage to DC voltage. It very well may be executed utilizing a capacitor diode blend. The exceptional property of diodes, allowing the current to stream in a solitary course is used in here. It changes over an air conditioner voltage into a throbbing dc voltage utilizing both half cycles of the connected air conditioning voltage. Scaffold rectifier is a full wave rectifier circuit utilizing the blend of four diodes to frame an extension. It has the preferred standpoint that it changes over both the half cycles of AC contribution to DC yield.
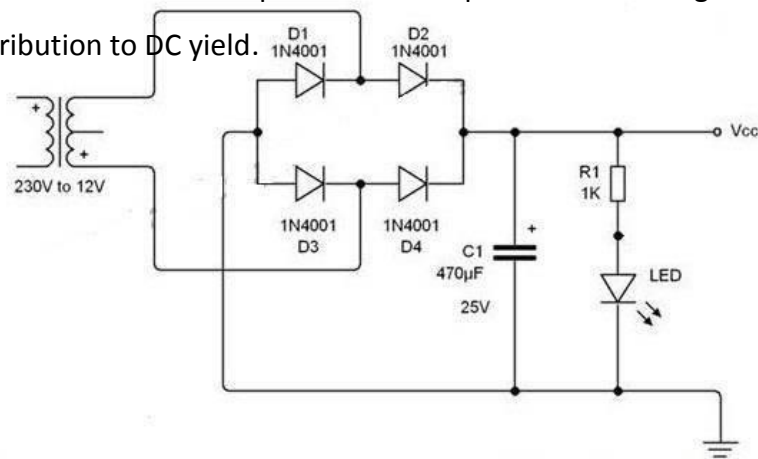

Fig. 3.8 Bridge rectifier circuit

3.2.2.f Working of a Bridge Rectifier

•During the positive half cycle of optional voltage, diodes D2 and D3 are forward one-sided and diodes D1 and D4 are invert one-sided. Presently the present courses through D2–>Load–>D3.

•During the negative half cycle of the auxiliary voltage, diodes D1 and D4 are forward one-sided and rectifier diodes D2 and D3 are turn around one-sided. Presently the present
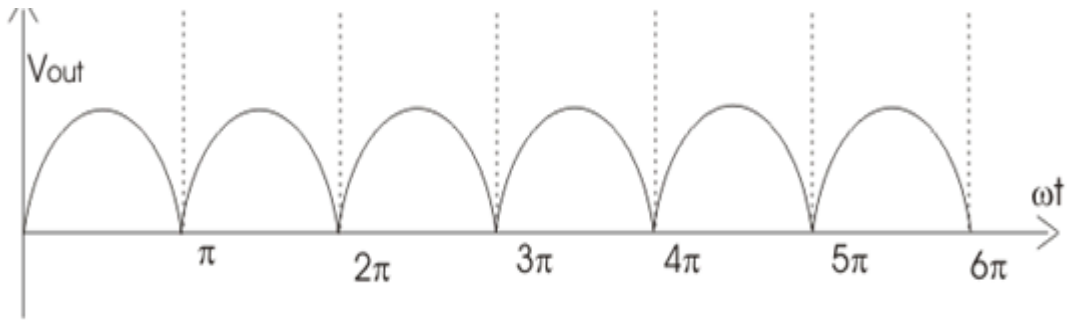
courses through D4– >Load>D1 .

Fig. 3.9 Input sine wave

•In both the cycles, stack current streams a similar way. Henceforth we get a throbbing DC voltage as appeared in fig (3.9,3.10).
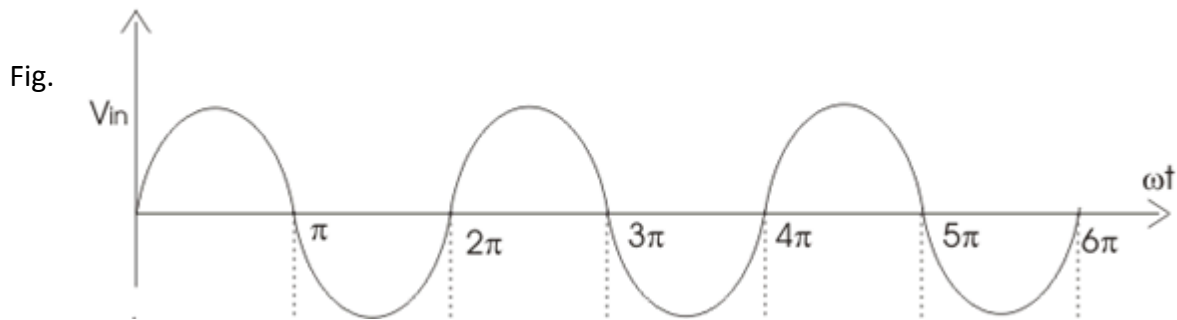
3.10 Pulsating DC output

•Addition of a capacitor at the yield changes over the throbbing DC voltage to settled DC voltage.

©Daffodil International University

Fig. 3.11 Filtered output

•Up to a day and age of t=1s input voltage is expanding, so the capacitor energizes to top estimation of the information. After t=1s input begins to diminish, at that point the voltage over the capacitor invert inclinations the diodes D2 and D4 and in this way it won't lead. Presently capacitor releases through the heap, at that point voltage over the capacitor diminishes.
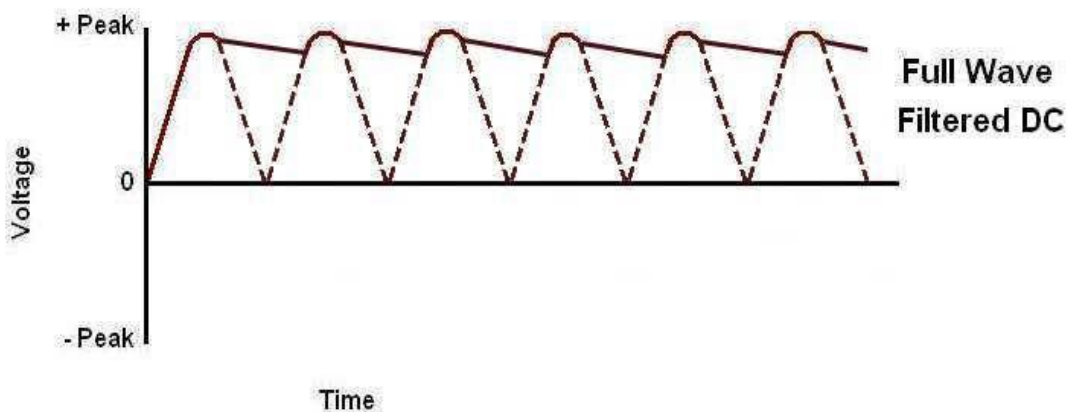
•When the pinnacle voltage surpasses the capacitor voltage, diodes D2 or D4 forward predispositions and subsequently capacitor again charges to the pinnacle esteem. This procedure proceeds. Thus we get relatively smooth DC voltage as appeared in fig (3.10).

3.2.2.g Capacitor

Capacitor is an aloof two-terminal electrical part used to store vitality in an electric field. The types of handy capacitors change generally, however all contain somewhere around two conductors isolated by a non-conductor. Capacitors utilized as parts of electrical frameworks, for instance comprise of metal soils isolated by a layer of protecting film. A capacitor is latent electronic part comprising of a couple of conduits isolated by a dielectric (protector)
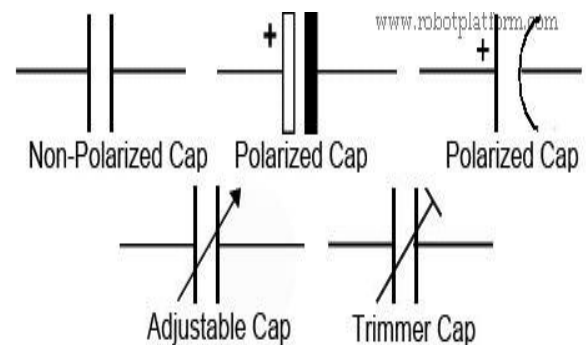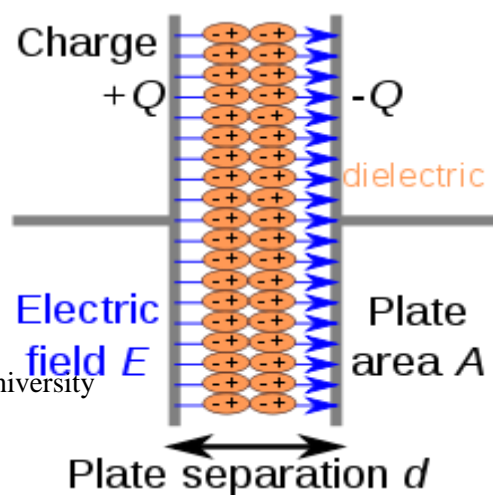

when there is a potential distinction (voltage) over the distinguished on one plate and negative charge on the other plate. Vitality is put away in the electrostatic field and is estimated in farads.

Fig. 3.12 Capacitors &   Capacitor symbols.

3.2.2.h   Theory   of   Operation

Fig 3.13 Internal constriction of capacitors

A capacitor comprises of two conductors isolated by a non-conductive area. The non-conductive area is known as the dielectric. In more straightforward terms, the dielectric is only an electrical cover. Instances of dielectric media are glass, air, paper, vacuum, and even a semiconductor consumption district synthetically indistinguishable to the conveyors. A capacitor is thought to act naturally contained and segregated, with no net electric charge and no impact from any outer electric field. The conveyors subsequently hold equivalent and inverse charges on their confronting surfaces, and the dielectric builds up an electric field. In SI units, a capacitance of one farad implies that one coulomb of charge on every conductor causes a voltage of one volt over the gadget.

A perfect capacitor is completely described by a consistent capacitance C, characterized as the proportion of charge ±Q on every conductor to the voltage V between them:

$$C = QV$$

Since the channels (or plates) are near one another, the contrary charges on the transmitters draw in each other because of their electric fields, enabling the capacitor to store more charge for a given voltage than if the conduits were isolated, giving the capacitor a vast capacitance. Now and then energize construct influences the capacitor mechanically, making its capacitance change. For this situation, capacitance is characterized as far as steady changes:

$$C = dQdV$$

3.2.2.i Voltage Regulator

A voltage controller likewise called a "controller" has just three legs give off an impression of being a similarly basic gadget however it is really a complex in coordinated circuit. A controller changes over fluctuating information volt and produces a consistent "directed"

yield voltage. Voltage controllers are accessible in an assortment of yield. Last two digits in the name show the yield voltages in the table underneath.
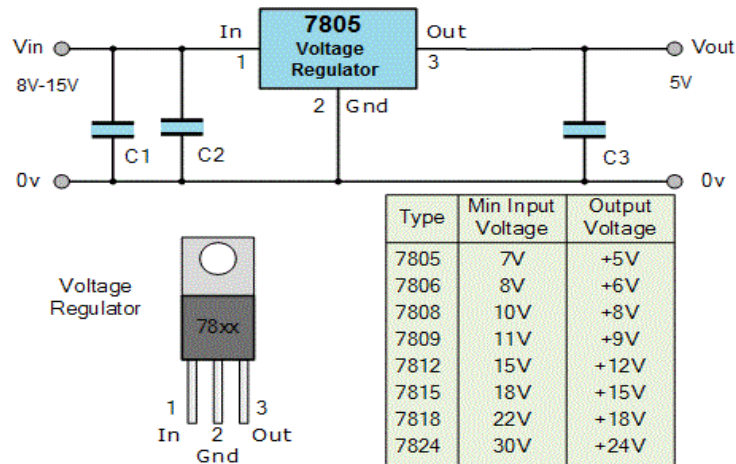
3.2.2.j Voltage Regulators Output Voltages

Type	Min Input Voltage	Output Voltage
7805	7V	+5V
7806	8V	+6V
7808	10V	+8V
7809	11V	+9V
7812	15V	+12V
7815	18V	+15V
7818	22V	+18V
7824	30V	+24V

Fig. 3.14 Voltage regulator output voltages.

3.2.3 **SIM800L GSM Unit**

The GSM modem unit is constructed utilizing SIMCOM SIM800 modem that particular for Arduino controller and bolster GPS innovation as appeared in Figure 3.15. This unit can send SMS to client cell phone and furthermore can get SMS from client.

Figure 3.15 SIM800 for Arduino controller

Small scale GSM/GPRS module :

SIM800L is a small scale cell module which takes into account GPRS transmission, sending and getting SMS and making and accepting voice calls. To make the ideal answer to this module for any undertaking that requires minimal effort and little impression and the quad band repeat balloster's availability of long range. Interfacing power module boots up,

©Daffodil International University

organize cell and consequently scan for login. LED Show Association Express on board (no system inclusion - quick scanning, sign-in-medium flashing).

NOTICE: Be set up to deal with colossal power utilization with look up to 2A. Most extreme voltage on UART in this module is 2.8V. Higher voltage will slaughter the module.

Two recieving wires!

This module have two recieving wires included. First is made of wire (which binds straightforwardly to NET stick on PCB) - extremely helpful in restricted spots. Second - PCB recieving wire - with twofold sided tape and joined braid link with IPX connector. This one have better execution and permits to put your module inside a metal case - as long the reception apparatus is outside.

Particular

Supply voltage: 3.8V - 4.2V

Suggested supply voltage: 4V

Power utilization:

rest mode < 2.0mA

inert mode < 7.0mA

GSM transmission (avg): 350 mA

GSM transmission (look): 2000mA

Module estimate: 25 x 23 mm

Interface: UART (max. 2.8V) and AT directions

SIM card attachment: microSIM (base side)

Upheld frequencies: Quad Band (850/950/1800/1900 MHz)

Recieving wire connector: IPX

Status flagging: LED

Working temperature go: - 40 do + 85 ° C

The AT commands for GSM-GPRS support is as follows in Table 3.1:

©Daffodil International University

Table 3.1 ATcommands for GSM-GPRS

• +CMTI : SMS has been received
• +CREG: Network registration indication
• +CMGS : To send the message
• +CMSS : To Send Message from Storage
• +CMGW: command writes an SMS to the first location available
• +CPMS: command allows the message storage area to be selected (for reading, writing, etc.)
• +CMGR : Read Message
• +CCLK : Clock Management
• +CUSD : Unstructured Supplementary Service Data

Since numerous GSM organize administrators have wandering concurrences with remote administrators, clients can frequently keep on utilizing their cell phones when they travel to different nations. SIM cards (Subscriber Identity Module) holding home system get to arrangements might be changed to those will metered nearby access, fundamentally diminishing wandering expenses while encountering no decreases in administration.

To associate the GSM 800 with Arduino super we will do the associations as pursues:

Ÿ RX of GSM - > TX of Arduino

Ÿ TX of GSM - > RX of Arduino

Ÿ GND of GSM - > GND of Arduino

3.2.4. Water Sensor

Water sensor block is intended for water location, which can be generally utilized in detecting the precipitation, water level, even the liquate spillage. The block is for the most part included three sections: an electronic block connector, a 1 Mω resistor, and a few lines of uncovered leading wires.

This sensor works by having a progression of presented follows associated with ground and joined between the grounded follows are the sense follows. The sensor follows have a powerless draw up resistor of 1 Mω. The resistor will pull the sensor follow esteem high until a drop of water shorts the sensor follow to the grounded follow. Trust it or not this circuit will

25

work with the advanced I/O pins of your Arduino or you can utilize it with the simple pins to recognize the measure of water prompted contact between the grounded and sensor follows.

This thing can pass judgment on the water level through with a progression of uncovered parallel wires join to quantify the water bead/water measure. The thing can without much of a stretch change the water size to simple flag, and yield simple esteem can straightforwardly be utilized in the program work, at that point to accomplish the capacity of water level alert. The thing has low power utilization, and high affectability, which are the greatest attributes of this module. The thing can be perfect with Arduino UNO, Arduino mega2560, Arduino ADK and so forth.

Figure 3.16Physical representation of water sensor

The accompanying figures demonstrates the physical portrayal of water sensor and interfacing chart of water sensor, Table 3.2 demonstrates the particular of water sensor.

Table 3.2 Specification of water sensor

• Working voltage: 5V.
• Working Current: < 20ma.
• Interface: Analog.
• Width of detection: 40mm×16mm.
• Working Temperature: 10°C~30°C.
• Weight: 3g.
• Size: 65mm×20mm×8mm.
• Arduino compatible interface.
• Low power consumption.
• High sensitivity
• Output voltage signal: 0~4.2V.

3.2.5. Water Pump

High weight miniaturized scale stomach water siphon, programmed switch 3.6L/min, DC 12V, 45W, this is a brilliant DC small scale stomach siphon, broadly utilized when all is said in done industry hardware, cultivating, visit vehicles, extraordinary vehicle, dispatch, refreshment, vehicle cleaning, cover cleaning, ground cleaning, water filtration and water treatment gear [3].

The accompanying figures demonstrate the segments of the water siphon and control circuit of the water siphon, Table 3.3 demonstrates the particular of water siphon.
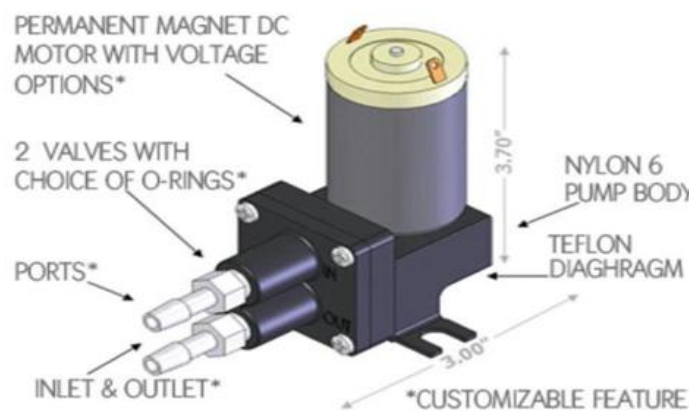

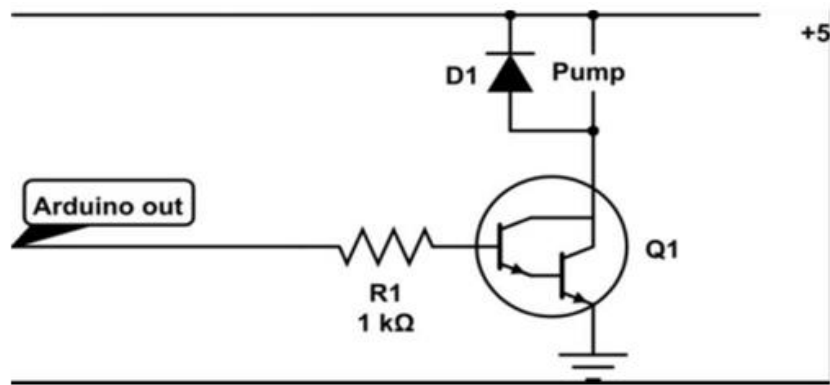Figure 3.17 Components of the water pump

Figure 3.18 Control circuit of the water pump

Table 3.3 Water pump features

• Working temperature: 0°C ~ 60°C.
• Multi-purpose: can be widely used for garden sprinklers, shower, water taps in the boat, caravan or motor.
• Agricultural purposes: spray for farm chemical, pesticide.
• Corrosion resistant.
• Automatic switch.
• Rubber bracket can absorb vibration from the pump.
• Working Voltage: 12V DC.
• Current Range: 1.6~3.0A.
• Power: 45W.
• Working Pressure: 0.4~0.55Mpa; Max Pressure: approx.0.8Mpa.
• Flow Rate: 3.6 L/min.
• Suction Distance: 2.5m, Lift: 30m and Outlets: Fixed 10mm (3/8) diameter.

3.2.6 Relay 12V

Figure 3.18 transfers an electrical switch which opens and closes in the control of other electrical circuits. In the first frame, contacts with an electromagnet works to stop or close one or more contacts.
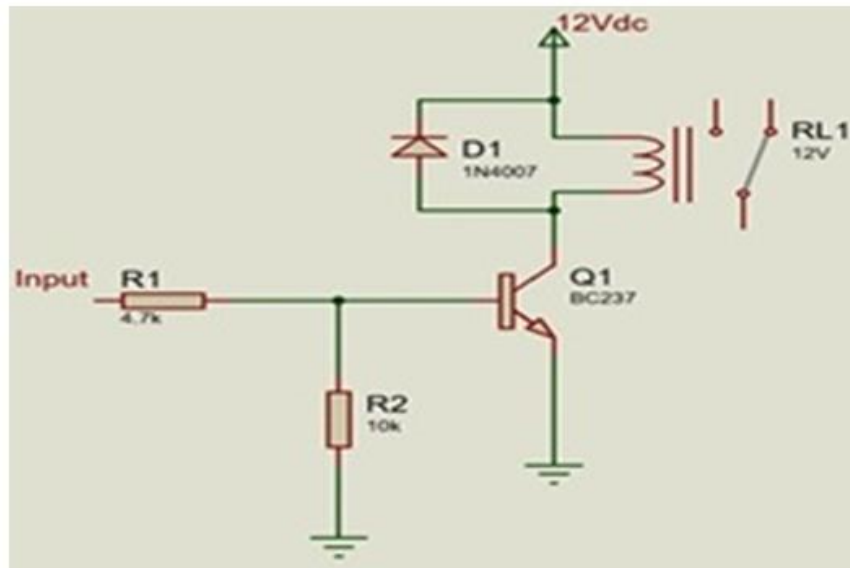
28

Figure 3.19 Equivalent circuit for relay

3.2.7 Liquid Crystal Display (LCD)

The presentation of a liquid precious stone or the LCD draw its definition from its name itself. It is two powerful, fluid and liquid mixtures of the problem. LCD uses a liquid gem to provide a notification picture. Liquid valuable stone presentations are super-thin novelty display screens which are commonly used in workstations, TVs, mobile phones, and versatile computer games.The permission of the LCD's progress when reversed with the cathode beam tube (CRT) invention is much more slim. The permission of the LCD's progress when reversed with the cathode beam tube (CRT) invention is much more slim. The Fluid Mim Show is made from several layers which include two captive board channels and nodes. LCD elements are used for small scale computers, such as note pad images or small electronic gadgets.
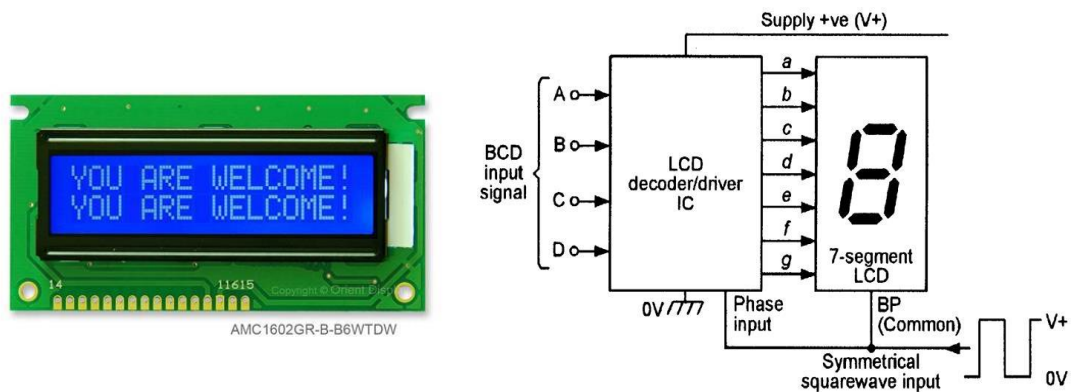
Fig. 3.20 Light emitting diodes symbol and circuit representation

A layer of light liquid gem is expected from a focal point. An LCD is comprised of a functional framework show matrix or a hidden showcase network. With the innovation of LCD shows, dynamic network shows are used in larger parts of the smartphone, but a part of more fun shows is still using hidden showcase matrix plans. The majority of electronic gadgets in most parts depend on the invention of liquid precious stone representation for their showcase.A suitable optical position is to use less electricity than a liquid LED or cathode beam tube. In light of the light production, the fluid precious stone showcases take a shot at the ideal of blocking the light. LCD requires their backdrop illumination because they do not send light by them. We usually use gadgets that create showcases of LCD which uses cathode beam pipe. The cathode beam tube attracts more power in contrast with the LCD and is likewise heavy and big. [8]

3.2.8 Connecting Wires

A wire is a solitary, typically round and hollow, adaptable strand or pole of metal. Wires are utilized to hold up under mechanical burdens or power and broadcast communications signals. Wire is regularly framed by illustration the metal through a gap in a bite the dust or draw plate. Wire measures come in different standard sizes, as communicated as far as a check number.
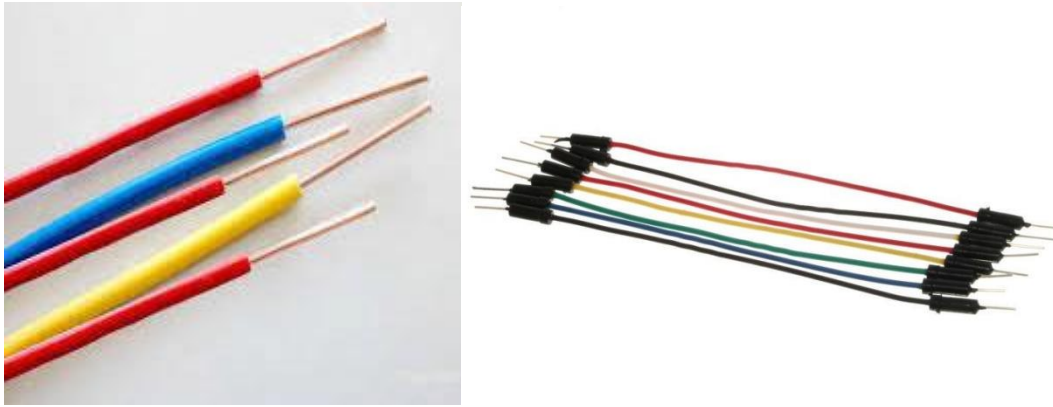
©Daffodil International University

Fig. 3.21Connecting wire

The term wire is likewise utilized all the more freely to allude to a heap of such strands, as in 'multi stranded wire', which is all the more effectively named a wire rope in mechanics, or a link in power.

3.2.9 Vero Board Copper DIL Strip Board

Strip board is the conventional name for a generally utilized sort of hardware prototyping board described by a 0.1 inch (2.54 mm) customary (rectangular) network of openings, with wide parallel portions of copper cladding running one way the distance crosswise over one side of the board. It is usually likewise known by the name of the first item Vero board, which is a trademark, in the UK, of British organization Vero Technologies Ltd and Canadian organization Pixel Print Ltd. In utilizing the board, breaks are made in the tracks, ordinarily around openings, to partition the strips into different electrical hubs. With consideration, it is conceivable to break between openings to take into account parts that have two stick pushes just a single position separated, for example, twin line headers for IDCs.
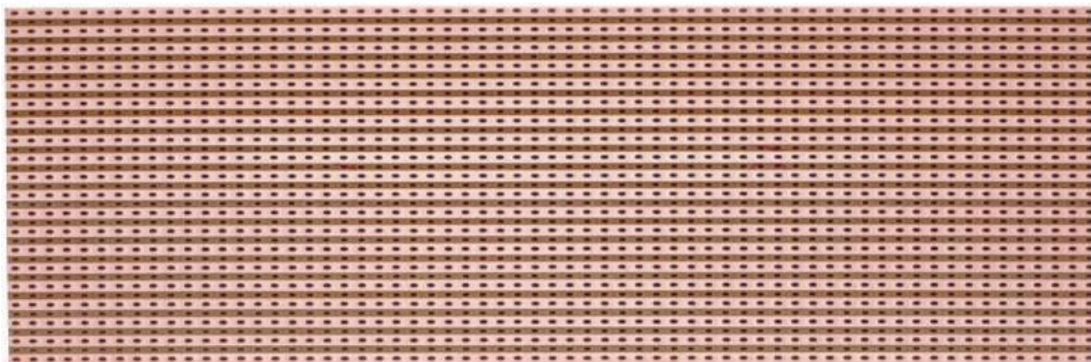

Fig. 3.22 Vero board copper DIL strip board

Strip board isn't intended for surface-mount segments, however it is conceivable to mount numerous such segments on the track side, especially if tracks are cut/formed with a blade or little cutting plate in a rotating apparatus.

3.3 Summary

The components used are studied individually. Their purpose in the system is explained along with their ratings and connections.

CHAPTER 4

# HARDWARE DEVELOPMENT

4.1 Introduction

This chapter will be explaining about the construction of seven main section of this project,

    i.   Hardware Design

    ii.   Driving Circuitry

    iii.   Software Design And Implementation

    iv.   Alarm Part

    v.   Control Part

    vi.   Flowchart of Android Application

    vii.   UML Diagram

4.2 Hardware Design

We mentioned parts of equipment that were displayed in Figure 1.1, in this paper, we will make the setup of the structure of the equipment with the well-known commands with the appropriate manufacturers so that they can be combined to form the ideal instruments and to cooperate with the parts of the machine. Product instructions to get mechanical detection units and actuators.The framework tools tool was simple and straightforward, and it has controllers that control Ardino Nano, Water Split sensor, LED display, Registry, Water Siphone, electric transfers, valve starters and seaphone collectors. From the sensor and we use controller yield pin interface buzzer with electric transfer.

The accompanying areas illustrate all equipment categories and its determination and documentation.
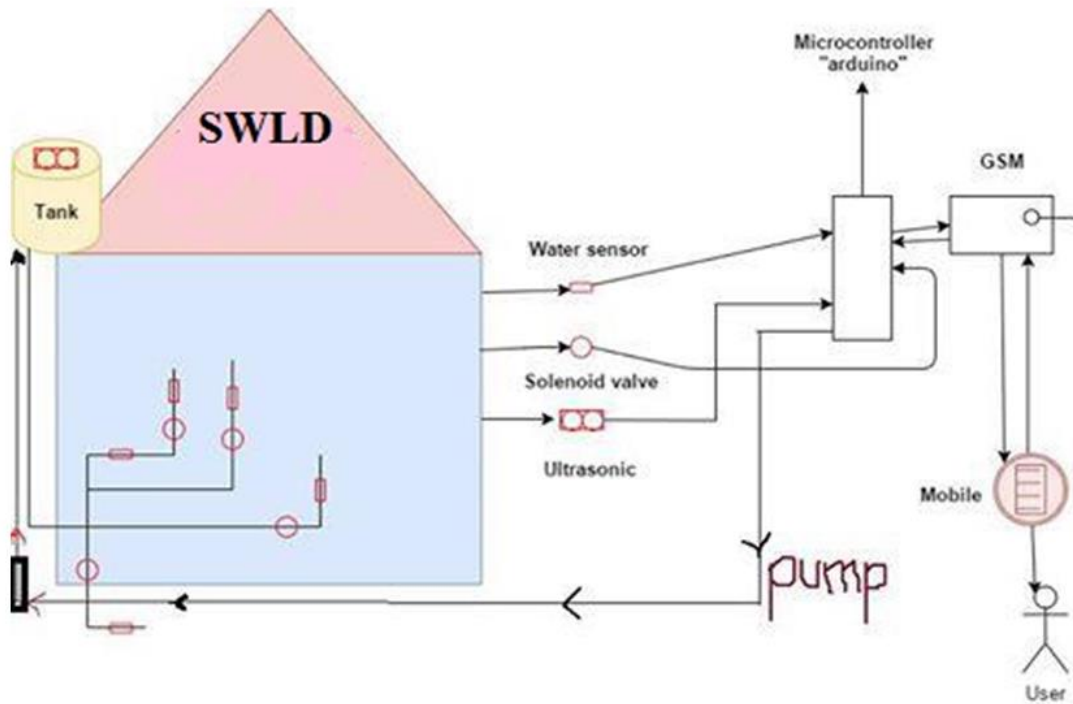
1

Figure 4.1 General purpose scheme of SWLD system

4.3 Driving Circuitry

We have planned and built a driving circuit given in Figure 4.1 so that the SWLD framework can work. Driving hardware is used in an Arduino Nano microcontroller. It manages and manages the clear capabilities that our structures and how each molecules are located and to rely on the standard structure we use to use them.

These driving circuits, as we appeared on the data sticks carrying sensors and we combined their electrical supply and ground. Likewise, we replace the solvoid valve and water siphon, which is not accessible to the framwork manufacturer in the breeding program of DC engines.

Using the protas reenactment program we got the accompanying driving circuit.

4.4 Software Design And Implementation

On this paper we have illustrated the framework approach to product framework configuration, programmability and SMD framework for improving chip programming. Product program to handle information and guidance, to implement individual instruction, functional terminal control, and support information input / yield port.Discuss schedules

34

and subroutines as these paper products. For most parts, the product consists of two parts, one control part, and another warning part. It is planned to give the program the general idea of stream and execution.

4.4.1 Arduino

This framework is used to create programs for Arduino programming Arduino controller from Arduino Designer. An Inclusion Improvement Condition (IDE) of ArduinoIDE is used in PC programming. It has a base workspace and an extensible module framework for changing the world.Ordinoynite is usually written in Java, but it can also create applications using modules in other programming dialects, such as: ADA, ABAP, C, C ++, etc. The world is written in C ++ and is dependent on handling and others. Open source programming. This product can be used with any ARDUINO board.

4.4.2 Android Application Development

It's an open-source Android application that includes a graphical interface. An Android app is an item app that runs Android system. An Android app is recommended for a mobile phone or tablet running on the Android OS. Java programming is used in android application written in android and java focus library.Customers can expand their skills by presenting a ready-made module for example, for example, progress toolbars for other programming languages, and a similar module modules can be created and contributed.

For our system programming, there are several limitations run by the structure circuits to get our sensor data, process information, process information and get information, convert data, and send yield banners for module production.

For our framework, the Android Compact application will connect the Ordino on the framework and force the customers to control all the systems and the heading will be issued to the exchange by the microcontroller. Android versatile applications can work and a control part of the off / off of the siphon.
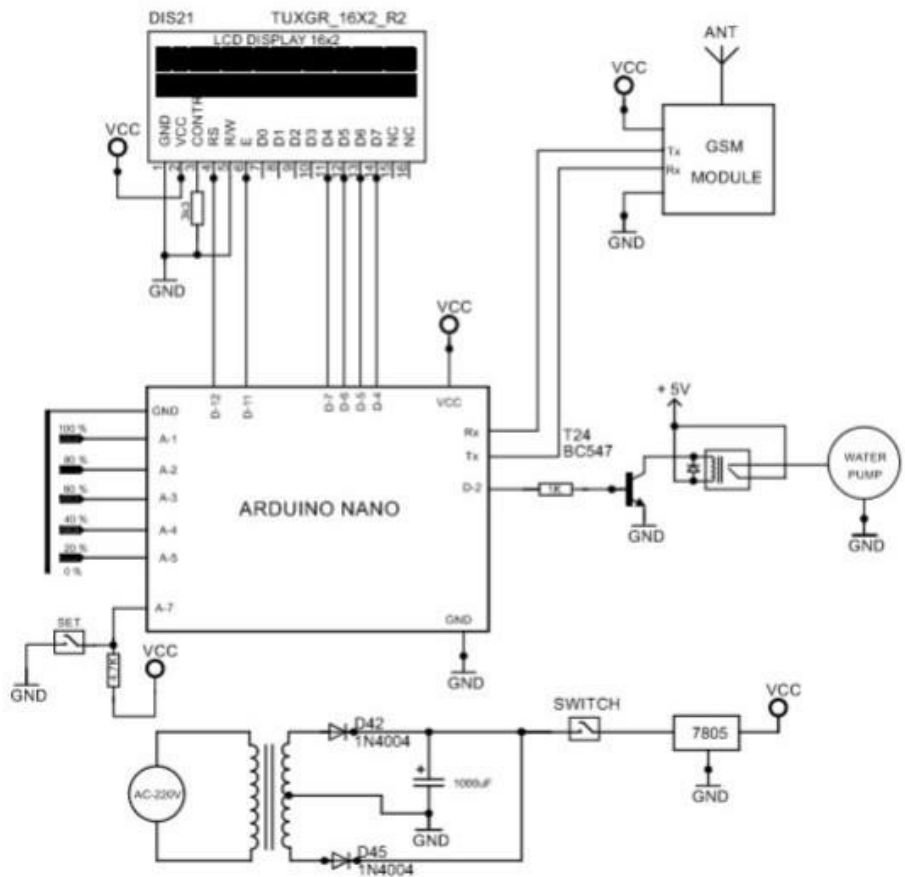
Figure 4.2 Circuit diagram

4.5 Alarm Part

The structure consists of two parts: the first warning, if there is any danger, the framework sends an SMS using GSM; It reduces the danger by opening water in spillage incidents.

4.5.1 Water Sensor

Flowchart for water sensor is shown in Figure 4.3, when the water is swelling, the water sensor separates the danger and sending the periidon to Aridiono, the Arundino warns the client that there is a spell in his house.
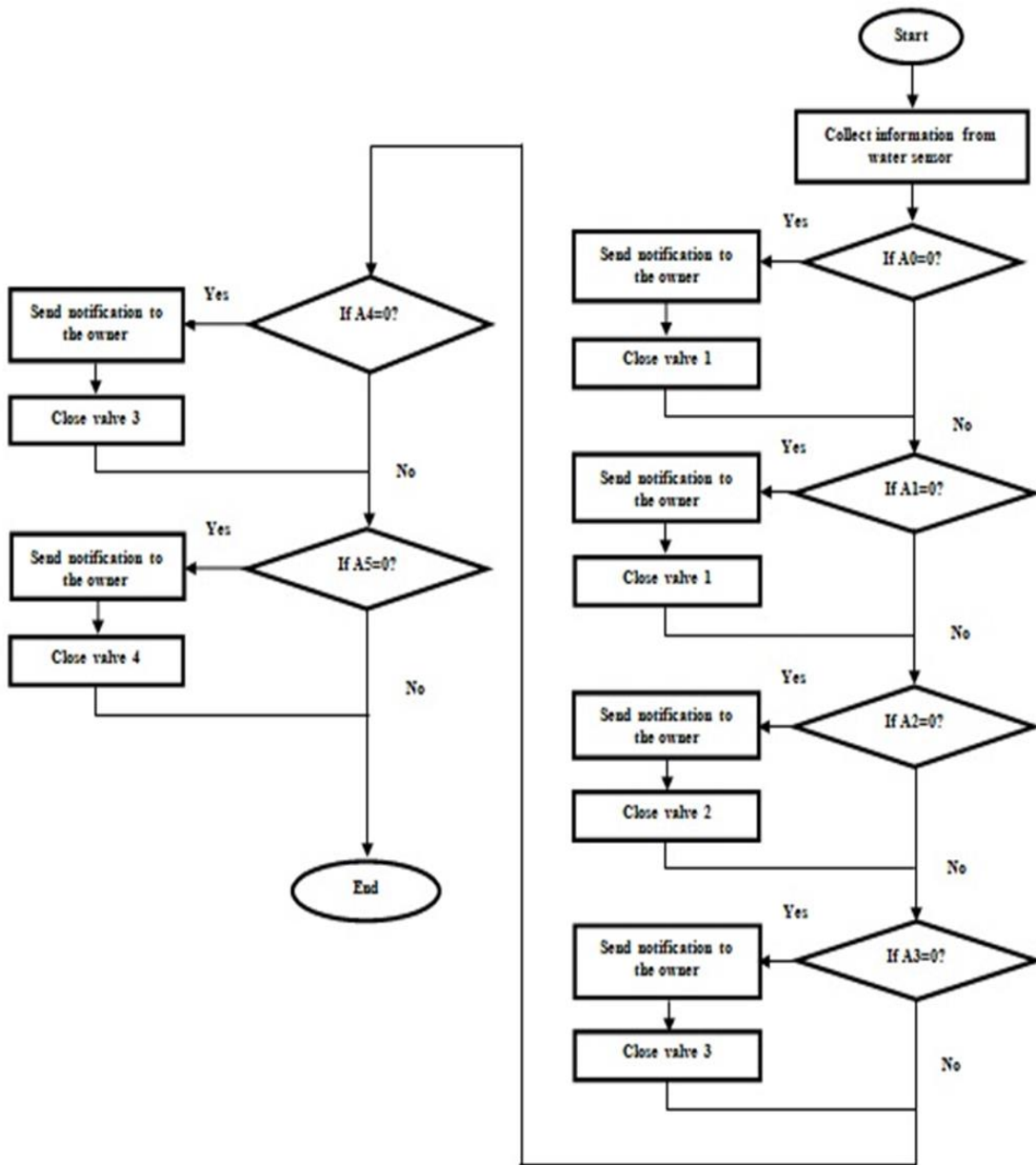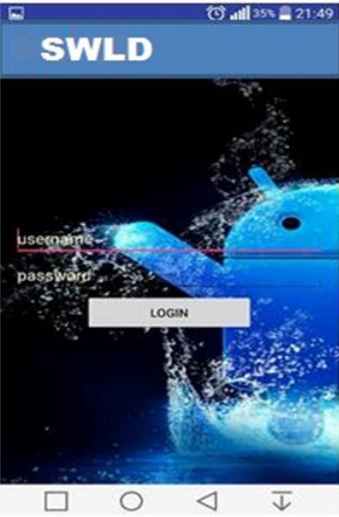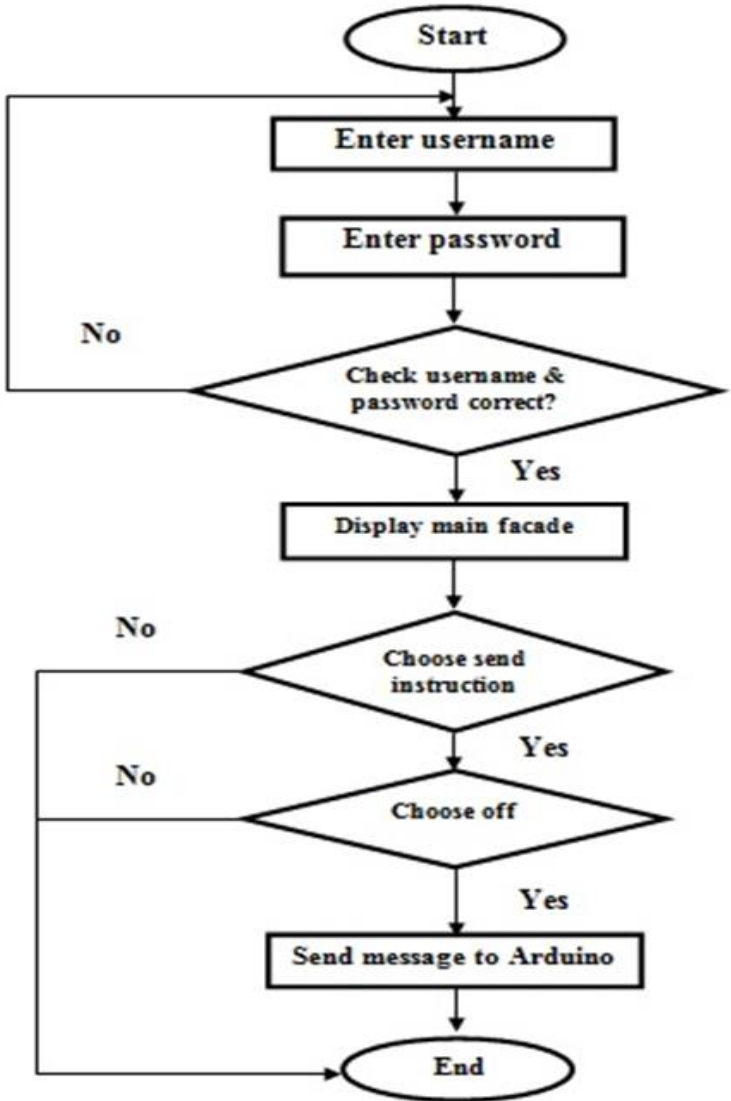
Figure 4.3 Flowchart for water sensor

4.6 Control Part

The second part is to control the use of Android applications. The app controls siphon and activates the tank has low water levels.

4.6.1 Pump

©Daffodil International University

Firstly, when the property holder needs to turn it on, the ciphone will stop, the correct username and secret word should be entered as shown in Figure 4.4, at that moment the basic arm has three primary parts: Send alerts, instructions and about us, when the customer sends instructions He will be able to see two sub-sections: On and off, at that time he will decide on the seaplane,When he handles this work Arduino which controls all the framework, Arduino Saipan then makes an impression on a Sifon. Figure 4.5 shows a trail for opening / closing the siphon.

Figure 4.4 Interface for enter username and password	Figure 4.5 Flowchart for pump

©Daffodil International University

4.7 Flowchart of Android Application

The Android Multifunctional application for our framework will be able to control all the structures by making an impression on the system in Ardineo and those instructions will be directed towards the transfer by the microcontroller. The Android portable application can work in seven control segments and a control section on Siphone on / off, for the Android application Flachchart, was shown in Figure 4.6.
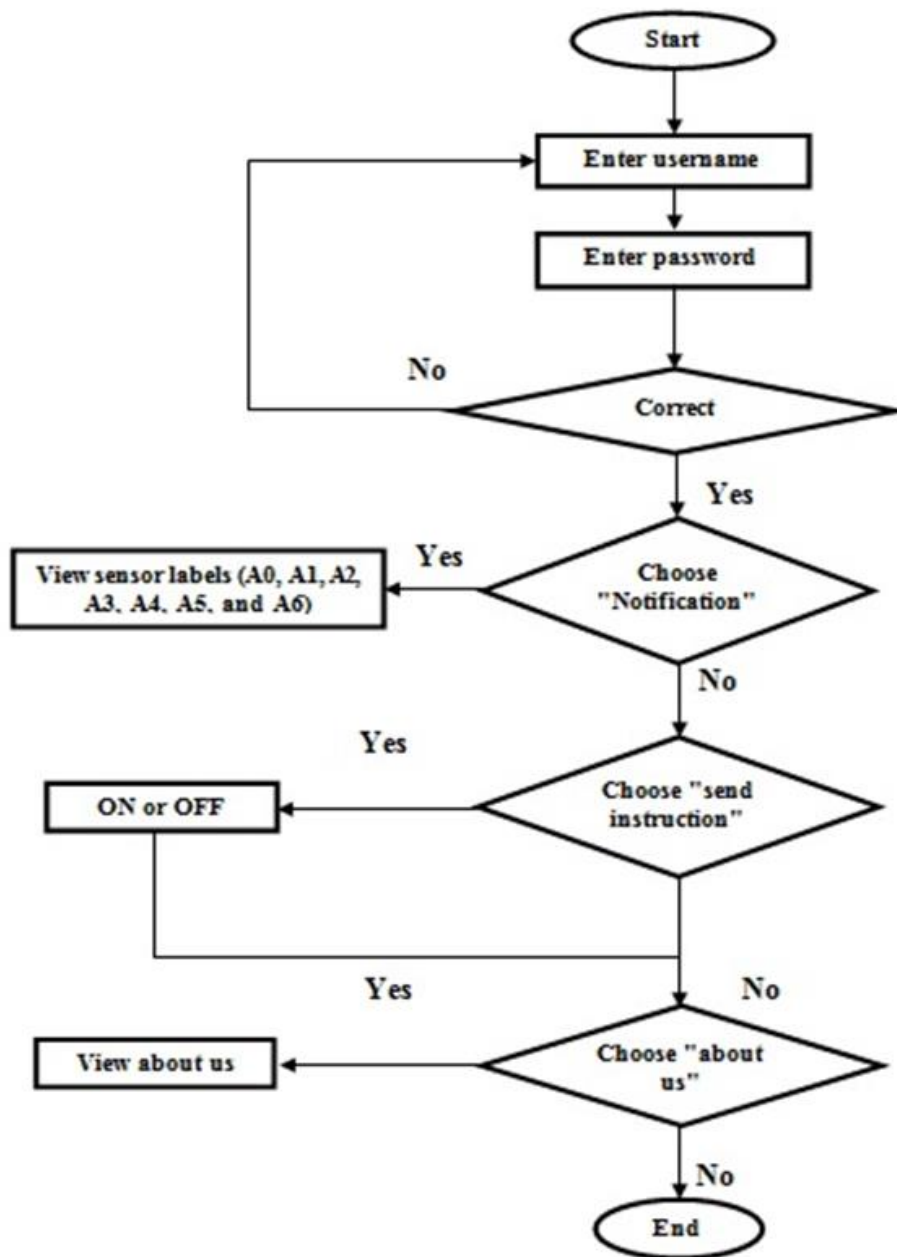

Figure 4.6 Flowchart for Android

4.8 Flowchart of The Total System

Figure 4.7 shows the flow of collective frameworks, which extra sends and sends the siphon and valves by sending an SMS to the client cell phone more easily. The structure will check water sensor, and water level sensor. As a split or reduction in the water level of the tank, the framework will take the necessary steps to illuminate the homeowner.Due to any risk, the offer will be alert to the proprietor by sending an SMS to the owner. In the controlled area, if the owner has to get an SMS from the gadget in his home, then the owner can control it by turning on / off the siphon.
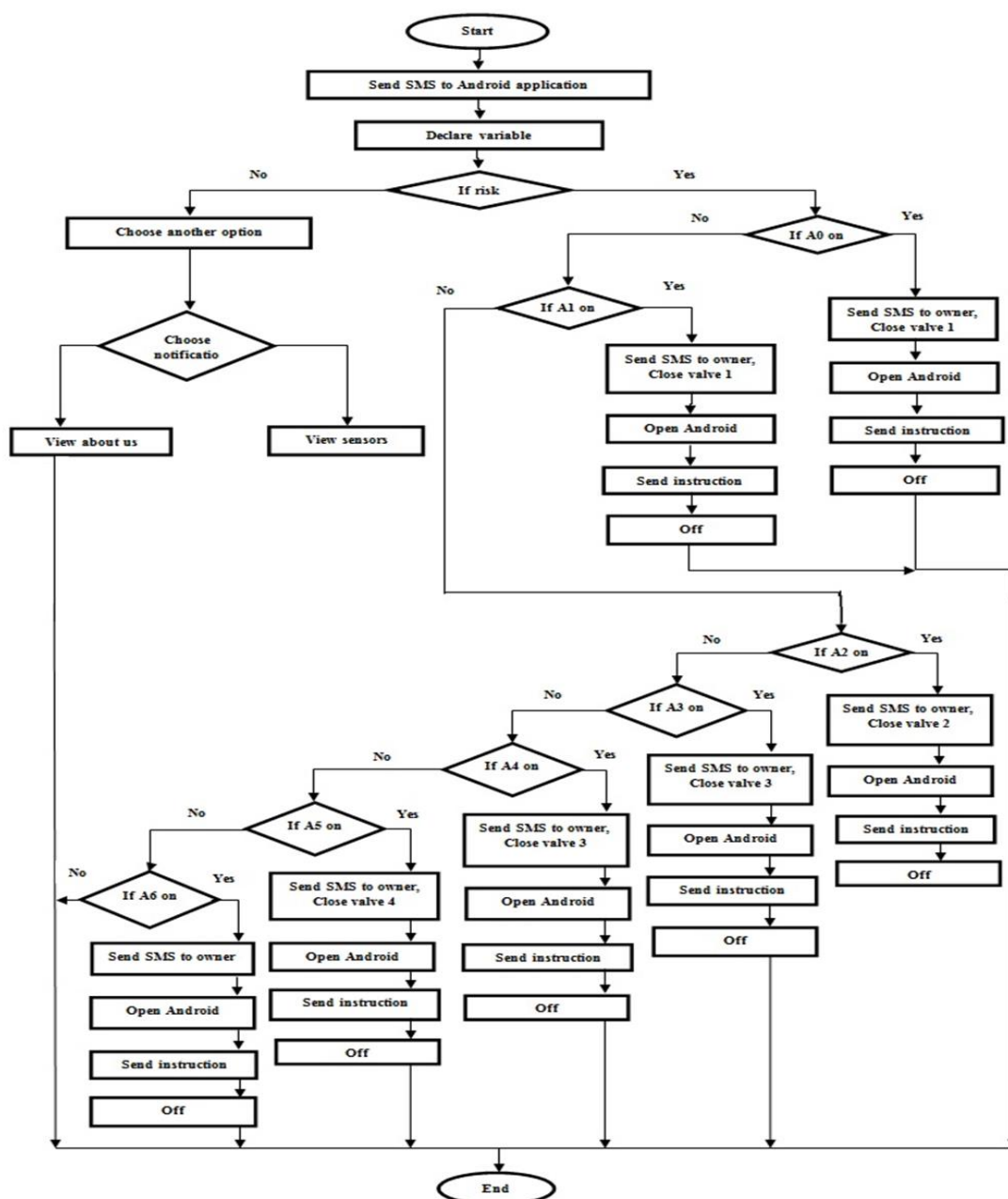
©Daffodil International University

Figure 4.7 Flowchart of the total system

4.9 UML Diagram

4.9.1 Use case Diagram

Figure 4.8 shows that the mortgage holder must first log in first, make a decision that displays the policy show (warning, send guidance and about us), when he makes the main decision, it includes seven categories (A0, A1, A2, A3, A4, A5, A6) and separates the risk by completing two of our structures and sends the SMS.

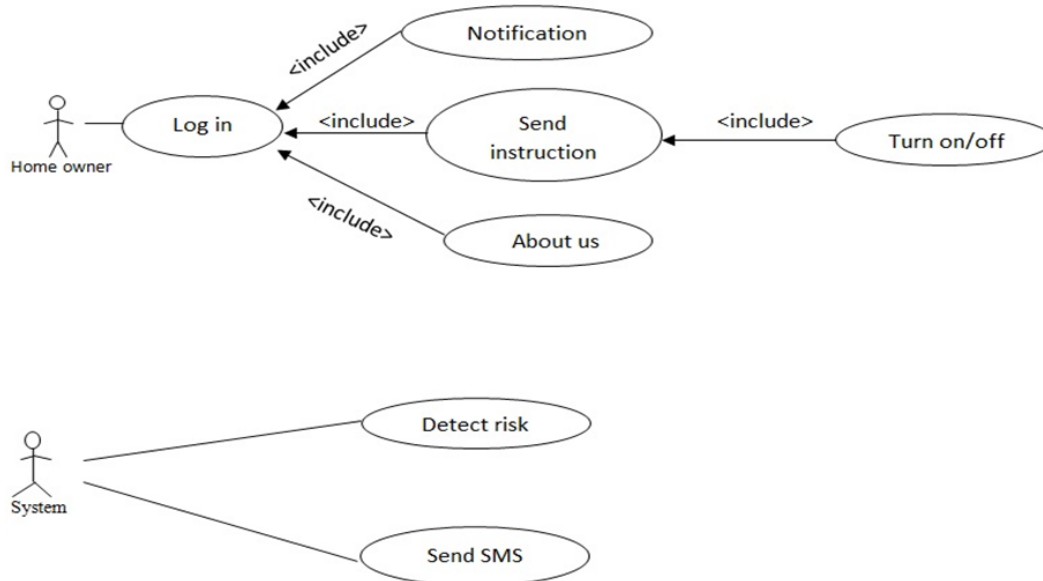Figure 4.8 Use case diagram

4.9.2 Activity Diagram

Figure 4.9 shows outline the movement for our structure. Firstly, the sensor separates the sprayage from sprayage, if the gadget warns the proprietor by sending an SMS to a spillage owner. In the controlled area, the owner has to get SMS from his gadget in his home but can control the owner and turn on / off.

©Daffodil International University

Figure 4.9 Activity diagram
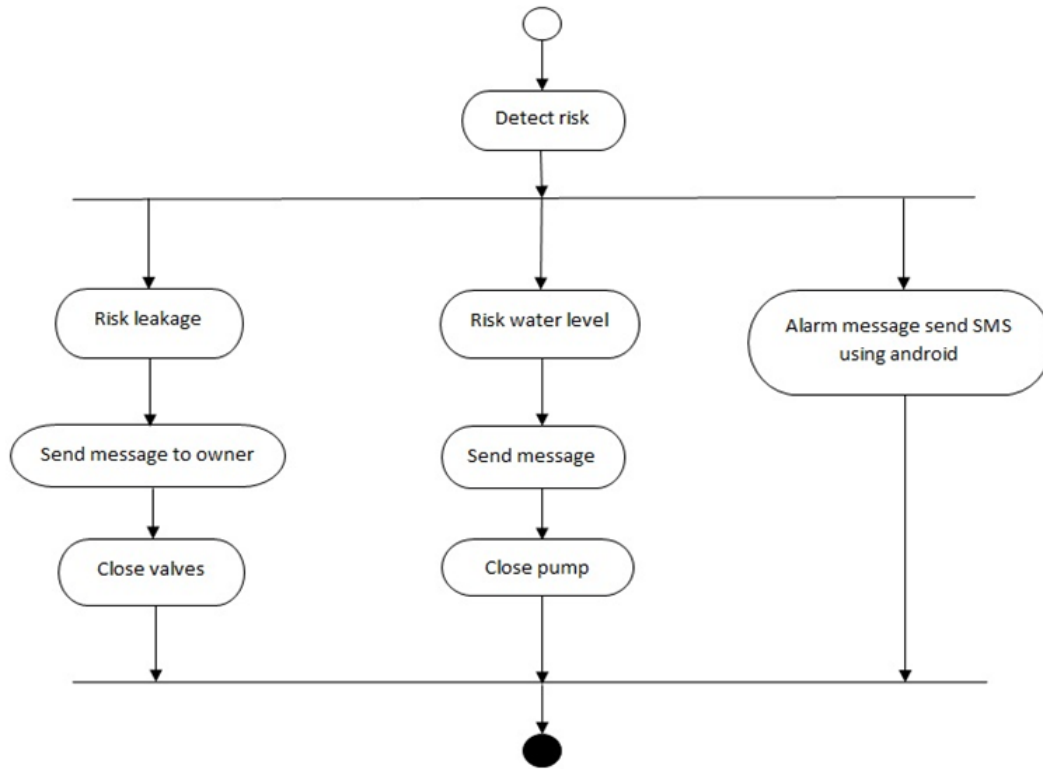
4.9.3 Sequence Diagram

Figure 4.10 show the succession chart for our structure. GSM sends an alert to the client where the split occurs and the tank has less water levels. GSM send messages to this framework, to send client GSM or to send instructions to Saipan.

Note: Alt is utilized to depict elective situations of a work process. Just a single of the 1choices will be executed.
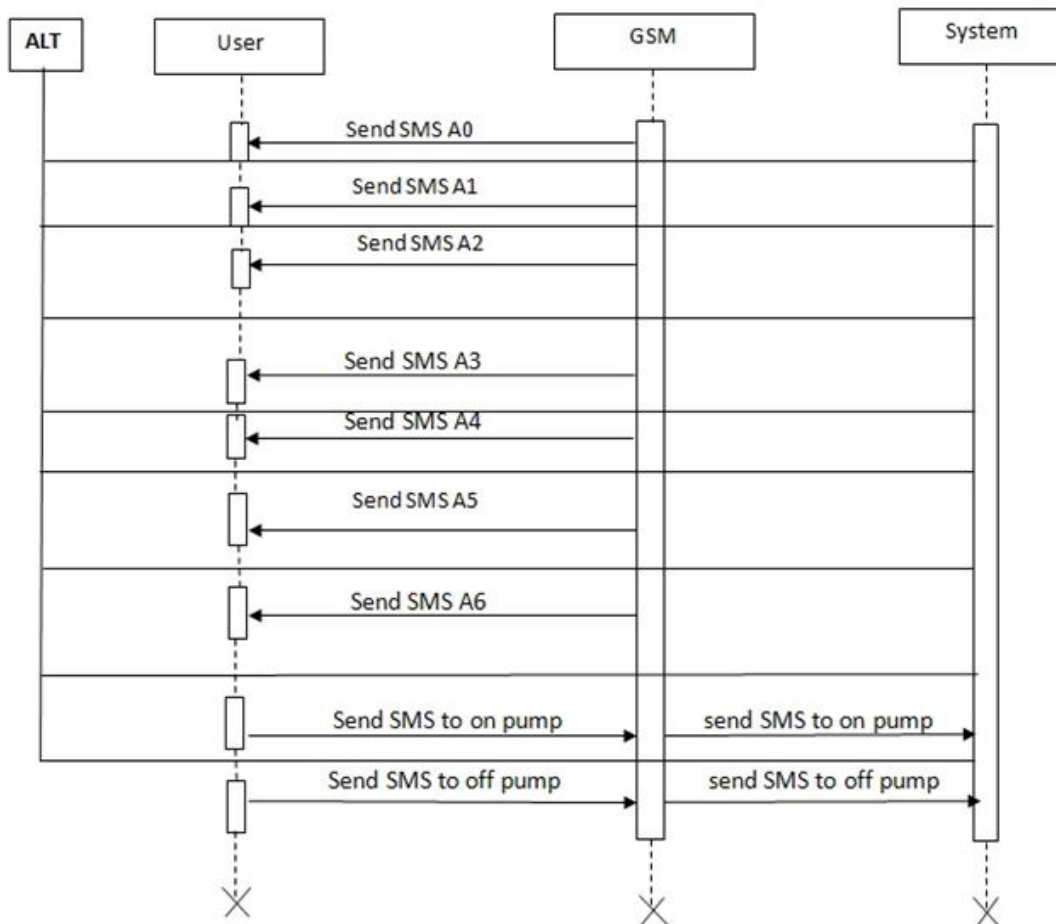
Figure 4.10 Sequence diagram

4.10 Summary

A circuit outline (electrical chart, rudimentary graph, electronic schematic) is a graphical portrayal of an electrical circuit. A pictorial circuit chart utilizes straightforward pictures of segments, while a schematic outline demonstrates the parts and interconnections of the circuit utilizing institutionalized emblematic portrayals. The introduction of the interconnections between circuit parts in the schematic graph does not really relate to the physical courses of action in the completed gadget.

CHAPTER 5

RESULTS AND DISCUSSIONS

5.1 Introduction

In the wake of completing the majority of the SWLD framework associations and programming, we've done a various tests; the created GSM based framework gives great reaction to the sensor and sends SMS when it identifies spillage in water where the water sensor was settled. The time taken by the framework to convey the SMS is subject to the inclusion territory or scope of the predefined portable system. In the event that the versatile is in the scope of the framework, the SMS is conveyed in 4 seconds.

5.2 Test Case

We recorded the response of the gadget when the spillage was happening and the outcomes were as per the following:

Test 1:

Headline: Water leakage

Framework: SWLD

Information Instructions: Check the Water Sensor (A0) of the garden pipe 1 spheres.

Yield: The Android adapter app and the Closing Valve 1 send an SMS to the customer in its convenient places.

Result: The test is successful.

Figure 5.1 Result when leakage detected in region 1

©Daffodil International University

Test 2:

Headline: Water leakage

Framework: SWLD

Information Instructions: Check the water sensor (A1) and show when the garden pipe 2 had a spledge.

Yield: Android offers flexible applications and closing valve 1 by sending an SMS to the customer in their compact alert.

Result: The test is successful.

Figure 5.2 Result when leakage detected in region 2

Test 3:

Headline: Water leakage

Framework: SWLD

Information Instructions: Check Water Sensor (A2) while having spies in kitchen channels.

Yield: Please alert the customer to adapt it by sending an SMS to the Android Convenient Applications and Intimate Valve 2.

Result: The test is successful

Figure 5.3 Result when leakage detected in region 3

Test 4:

45

Headline: Water leakage

Framework: SWLD

Information Instructions: Achieving scrutinizing water sensor (A3) when living bathrooms were spillage on channel.

Yield: The Android adaption app and Closing Valve 3 send an SMS to the subscriber to alert his compact.

Result: The test is successful.

Figure 5.4 Result when leakage detected in region 4

Test 5:

Headline: Water leakage

Framework: SWLD

Information Instructions: Check Water Sensor (A4) while having spheres on channels in the main washroom.

Yield: The Android adapter app and the Closing Valve 3 send a SMS to the customer in its convenient places.
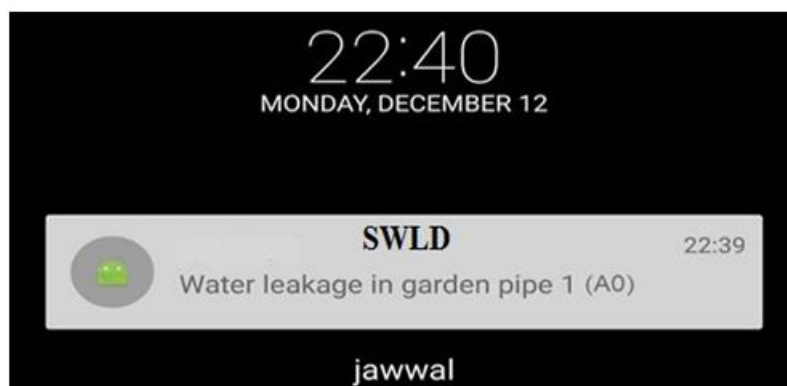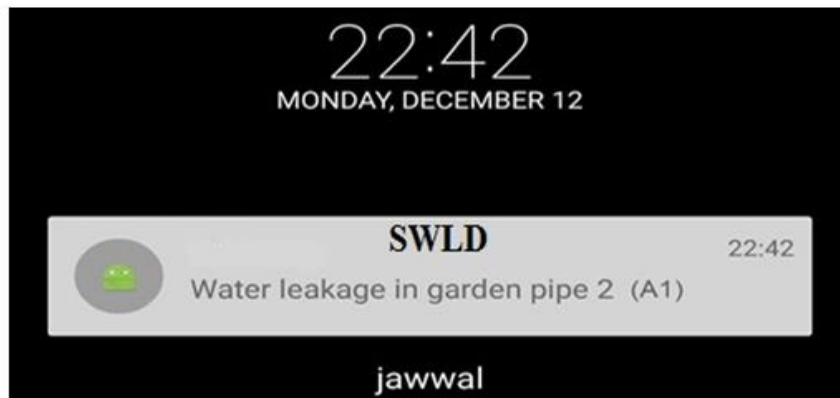
Result: The test is successful.

Figure 5.5 Result when leakage detected in region 5

Test 6:

©Daffodil International University

Headline: Water leakage

Framework: SWLD

Information Instructions: Rules were found in the spillage on the washer channel when water sensor (A5) obtained scrutinizing.

Yield: The Android adaption app and the close valve 4 send a SMS to the subscriber to alert his compact.

Result: The test is successful.

Figure 5.6 Result when leakage detected in region 6

Test 7:

Headline: Water level

Framework: SWLD

Information Instructions: Check the water level sensor (A6) when reducing the water level.

Yield: Android sends an AdPublish application to the subscriber by alerting him at his convenient location and allowing the home loan holder to close the aroodino or send an SMS to the siphon to control the directory through multipurpose applications.
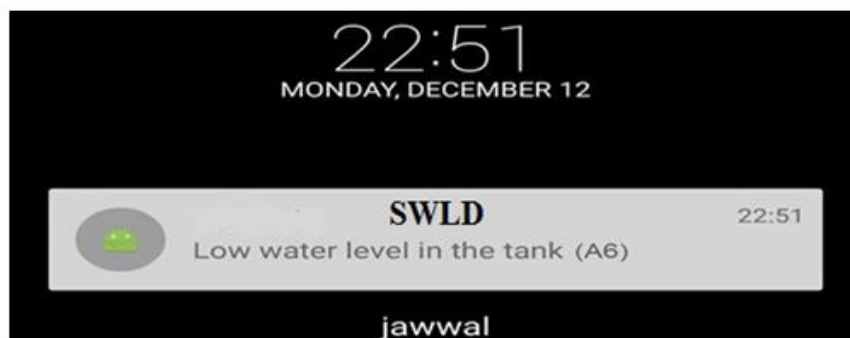
Result: The test is successful.

Figure 5.7 Result when decrease detected in water level in tank

5.3 Common reason for water leakage

©Daffodil International University

Fig. 5.9 is coming, we have many components that increase the cause of the plumbing and the structure of the house and structure, and these variables discuss this problem, which discusses this problem, we have every layer of factor.As it is seen there are numerous mechanical infrastructures that can create spelljies, but there is a high probability that land development, channel costs, high structure weight, hajj and pipe have plenty of stacking and funnel ages.

Figure 5.8 The choice to turn on/off the pump

Figure 5.9 Percentages to the factors that causes leakage

5.4 The Response Of The Solenoid Valve

©Daffodil International University

Appears as shown in Figure 5.10, which method will be solved when the image is rotated on channels and when the pipe hose hole in the house responds. We have preferred that honor using spillage sensor 80 mL (microliter); The time of detecting water splasens sensors by 80 milliseconds or more, the controller will initiate the solenoid valve, which means that the solenoid will be closed, which will prevent the supply of water in the trilogy.
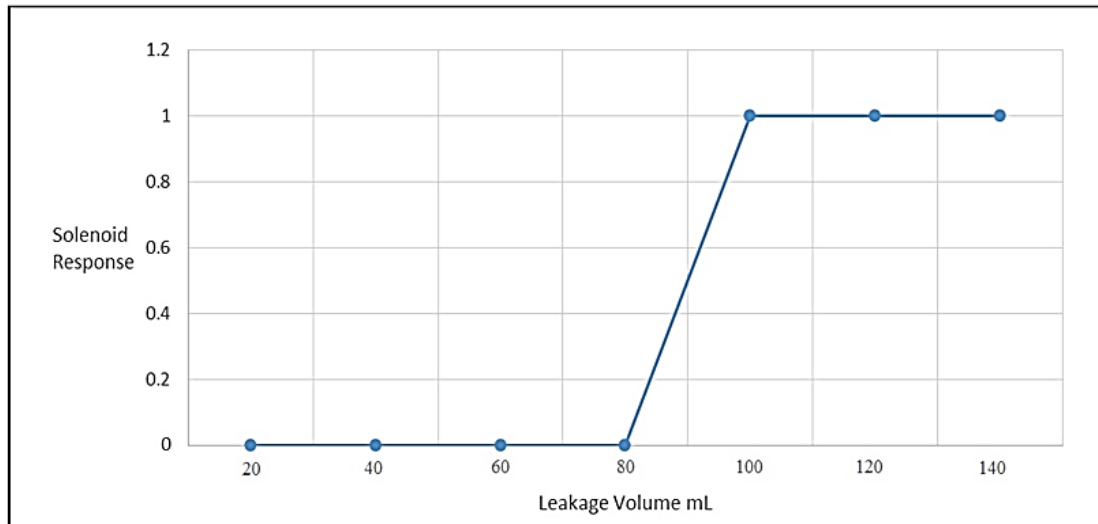
Figure 5.10 Solenoid valve response due to leakage volume

5.5 Summary

The ordinary Water Leakage recognition Using in market for the most part use Wireles Sensor Network and microcontrollers. These expansion the expense and the multifaceted nature of the framework. We have built up a fairly less complex however proficient model of a water Leakage discovery Using Wireles Sensor Network.

CHAPTER 6

©Daffodil International University

CONCLUSIONS

6.1 Conclusions

The proposed frameworks are tried on the model of SWLD which is appeared in Figure 1.1 This framework include is required to attract much consideration the following decades.

Water is a standout amongst the most critical essential requirements for every living being. Be that as it may, shockingly an enormous measure of water is being squandered by uncontrolled use and uncontrolled spillage. The principle issue that is being tended to in this framework is tied in with utilizing a productive remote sensor dependent on water checking framework. Two diverse approaches to screen the water, for example, water level checking and water pipeline spillage observing. At long last, the water checking arrangement of homes/workplaces inquire about idea will be finished by utilizing remote sensor innovation. By utilizing the observing framework, we can undoubtedly keep the water and the water will spare our age.

6.2 Limitations of the Work

In our framework we for the most part rely upon specialized strategy which manages control and includes and viable techniques for observing the pipes at homes. In light of microcontroller Arduino nano and GSM innovation we accomplished the fundamental broadly useful of this framework theme thought which is water spillage discovery and remote control of the water siphon. Utilizing GSM innovation makes the work increasingly proficient and facilitate the information deciphering. Right off the bat, this make the mortgage holder ready to be informed when spillage happened specifically, additionally the solenoid valves will be shut straightforwardly. Furthermore, utilizing GSM which manages versatile enables the property holder to control the water siphon at whatever point the water level is diminished in the tank which will be provided from the primary region supply utilizing the siphon.

6.3 Future Scopes of the Work

The future work which can be added and enhanced to the framework structure of our framework is enhance a protection framework that will be utilized to cover and ensure the electrical wires which are for the electrical supply and flag of the water sensors, these sensors are circulated on the household plumping system.

This protection is essential to maintain a strategic distance from harm between water hoses and the electrical wires of the sensors. Additionally, identified with the future work of this framework, we can apply this specialized strategy for recognizing water spillage in the upkeep organizations to permit them have the capacity to screen the plumping systems in the structures and homes faraway. Also this application which was created for the framework can be utilized with upkeep designer to be told when and where the spillage jumped out at fix the issue specifically.

REFERENCES

[1]   ZulhaniRasin and Mohd Abdullah International Journal Engineering and Technology, "Water spillage
        Monitoring System Using Zigbee Based Wireless Sensor Network", 2005.

[2]   Misiunas, D., Lambert, M., Simpson, An., Olsson, G. "Burst identification and area in water dissemination
        systems," Water Science and Technology: Water Supply, 5(3– 4), 71– 80. (2005).

[3]   Bowling, Michael. "Spillage testing strategy for a plate warm exchanger." U.S. Patent 6,062,068, issued
        May 16, 2000.

[4]   Daadoo, M., Tarapiah, S., and Atalla, S. (2016). Assessing Efficiency of Multi-Layered Switch Architecture
        on the whole Optical Networks. Global Journal of Applied Engineering Research, 11(22), 11030-11036.

[5]   Daraghmi, Y. An., and Daadoo, M. (2016). Savvy Smartphone based framework for identifying hindrances
        and lessening vehicle speed. In MATEC Web of Conferences (Vol. 77, p. 09006). EDP Sciences.

[6]   MotazDaadoo, Shadi M.A Atallah and SaedTarapiah. "Advancement of Low Cost Safety Home Automation
        System utilizing GSM Network." European Journal of Scientific Research ISSN 1450-2267 Vol. 53 No 3
        November, 2016, pp.338-353.

[7]   MotazDaadoo, SaedTarapiah and Shadi M.A Atallah. "Examination and Performance of a Low Cost

Multiple Alarm Security System for Smart Home Based on GSM Technology and Controlling Based on Android Smartphone." European Journal of Scientific Research ISSN 1450-216X/1450-202X Vol. 143 No 2 November, 2016, pp.136-165.

[8]   Daadoo, M., and Daraghmi, Y. (2015, August). Seeking of ideal qualities of multi-layer exchanging engineering taking all things together optical systems. In Heterogeneous Networking for Quality, Reliability, Security and Robustness (QSHINE), 2015 eleventh International Conference on (pp. 50-55). IEEE.

[9]   Tarapiah, S., Atalla, S., Hashim, K. F. B., and Daadoo, M. (2016). Portable Network Planning Process Case Study-3G Network. PC and Information Science, 9(3), 115.

Appendix

```
#include<LiquidCrystal.h>
LiquidCrystallcd(7,8,9,10,11,12);
#define BUZ 13
#define LCTR 2

int A,B,C,D,E;

void setup()
{
```

```
pinMode(A1,INPUT);
pinMode(A2,INPUT);
pinMode(A3,INPUT);
pinMode(A4,INPUT);
pinMode(A5,INPUT);
pinMode(BUZ, OUTPUT);
pinMode(LCTR, OUTPUT);

lcd.setCursor(0,0);
lcd.print(" GSM BASED AUTO   ");
lcd.setCursor(0,1);
lcd.print(" PUMP CONTROLLER  ");
delay(3000);

lcd.setCursor(0,0);
lcd.print(" SUBMITTED BY:   ");
lcd.setCursor(0,1);
lcd.print("             ");
delay(1500);

lcd.setCursor(0,0);
lcd.print(" TORIQUL ISLAM    ");
lcd.setCursor(0,1);
lcd.print("             ");
delay(1000);

digitalWrite(BUZ, LOW);
delay(60);
digitalWrite(BUZ, HIGH);
delay(60);
digitalWrite(BUZ, LOW);
delay(60);
digitalWrite(BUZ, HIGH);
delay(60);
digitalWrite(BUZ, LOW);
delay(600);

lcd.setCursor(0,0);
lcd.print("  System Ready..   ");
SendMessage1();
}
/////////////////////////////////////////////////////////////////////
/////////////////////////////////////////////////////////////////////
```

```
void loop()
{

   E = analogRead(A1);
delay(1);
   D = analogRead(A2);
delay(1);
   C = analogRead(A3);
delay(1);
   B = analogRead(A4);
delay(1);
   A = analogRead(A5);

}
//////////////////////////////////////////////////////////////////////
//////////////////////////////////////////////////////////////////////
void DISPLAY1()
{
lcd.setCursor(0, 0);
lcd.print("LEVEL:");
lcd.print(LEV );
lcd.print("%  ");

if(A==1)
   {
     LEV=0;
digitalWrite(LCTR, HIGH);
lcd.setCursor(0, 1);
lcd.print("MOTOR:ON  ");

SendMessage2();
   }
if(A == 0)
   LEV=20;
if(B == 0)
   LEV=40;
if(C == 0)
   LEV=60;
if(D == 0)
   LEV=80;

if(E == 0)
   {
```

```
    LEV=100;
digitalWrite(LCTR, LOW);
lcd.setCursor(0, 1);
lcd.print("MOTOR:OFF  ");

SendMessage3();
  }
}


if(Serial.find("#A."))
 {
digitalWrite(BUZ, HIGH);
delay(100);
digitalWrite(BUZ, LOW);
SendMessage4();
 }


void SendMessage1()                 // fan on
{
Serial.println("AT+CMGS=\"+8801686318230\"\r");
Serial.println("SYSTEM READY");
}
void SendMessage2()                 // FAN OFF
{
Serial.println("AT+CMGS=\"+8801686318230\"\r");
Serial.println("WATER LEVEL < 10 % . MOTOR ON");

}
void SendMessage3()                 // FAN OFF
{
Serial.println("AT+CMGS=\"+8801686318230\"\r");
Serial.println("WATER LEVEL 100 % . MOTOR OFF");
}
void SendMessage4()                 // FAN OFF
{
Serial.println("AT+CMGS=\"+8801686318230\"\r");
Serial.println("WATER LEVEL:");
Serial.println(LEV);
}
```