School of Engineering and Technology
Anjuman-IIslam's
Kalsekar Technical Campus Plot No.23
Sector -16, Near Thana Naka, Khanda Gaon,
New Panvel, Navi Mumbai. 410206
Department of Electronics and
Telecommunications

SMART AGRICULTURE SYSTEM

Submitted By:
SARFRAZ KHAN
(16DET116)
SAYYED SULTAN
(14DET104)
MAYUR PATIL
(16DET110)
FAROOQUI DANISH
(16DET82)

Guided By:
Prof.RIZWAN ALVI

Contents

1 CERTIFICATE 2

2 PROJECT I APPROVAL FOR BACHELOR OF ENGINEERING 3

3 DECLARATION 4

4 ABSTRACT 5

1 CERTIFICATE

This is to certify that the project entitled "SMART AGRICULTURE SYSTEM" is the bonafide work carried out by,

Mr. SARFRAZ NAFIS KHAN
Mr. SAYYED MOHAMMAD SULTAN
Mr. PATIL MAYUR PANDURANG
Mr. FAROOQUI DANISH

students of ANJUMAN-I-ISLAM'S KALSEKAR TECHNICAL CAMPUS during the year 2018-19 in partial fulfillment of the requirements for the award of the Degree of B.E in EXTC and that the project has not formed the basis for the award previously of any degree, diploma, associateship, fellowship or any other similar title.

.....
Prof.Rizwan Alvi
(Project Guide)

.....
Prof.Shaikh Afzal
(H.O.D)

.....
(EXTERNAL)

2 PROJECT I APPROVAL FOR BACHELOR OF ENGINEERING

This project entitled "SMART AGRICULTURE SYSTEM" by Sarfraz Nafis Khan(Roll No-16DET116), Sayyed Mohammad Sultan(Roll No-14DET104), Patil Mayur Pandurang(Roll No-16DET110) and Farooqui Danish(Roll No-16DET082) is approved for the degree of Bachelor of Engineering in Department of Electronics and Telecommunications Engineering.

. . . .
. . . .
(Examiners)

. . . .
. . . .
(Supervisers)

. . . .
(Chairman)

3 DECLARATION

I declare that this written submission represents my ideas in my own words and where others ideas or words have been included, I have adequately edited and referenced the original sources. I also declare that I have adhered to all principles of academic honesty and integrity and have not misrepresented or fabricated or falsified any idea/data/fact/source in my submission. I understand that any violation of the above will be cause for disciplinary action by the Institute and can also evoke penal action from the sources which have thus not been properly cited or from whom proper permission has not been taken when needed.

Submitted By:
SARFRAZ NAFIS KHAN
SAYYED MOHD SULTAN
MAYUR PATIL
FAROOQUI DANISH

4 ABSTRACT

Internet of Things (IoT), plays a crucial role in innovative farming. Innovative farming is an emerging concept, because IoT sensors capable of providing information about their agriculture fields. The paper aims making use of evolving technology i.e. IoT and innovation in farming using automation. Monitoring environmental factors is the major factor to improve the yield of the efficient crops. The feature of this paper includes monitoring moisture lalvel, temperature and humidity in agricultural field through sensors using Moisture Sensor, DHT11 and PIR sensor for monitoring the animals and peoples inside the farm and these sensors are connected to Arduino.

Keywords: Arduino, Moisture sensor, DHT11, PIR sensor,ultrasonic sensor

SCHOOL OF ENGINEERING AND TECHNOLOGY ANJUMAN-I-ISLAM'S KALSEKAR TECHNICAL CAMPU KHANDA GAON,NEW PANVEL, NAVI MUMBAI 410206.

ACADEMIC YEAR 2018-19

SMART AGRICULTURE SYSTEM

Submitted By:
SARFRAZ KHAN
(16DET116)
SAYYED SULTAN
(14DET104)
MAYUR PATIL
(16DET110)
FAROOQUI DANISH
(16DET082)

Guided By:
Prof.RIZWAN ALVI

Contents

1 CERTIFICATE 3

2 Project I Approval for Bachelor of Engineering 4

3 DECLARATION 5

4 ABSTRACT 6

5 ACKNOWLEDGEMENT 7

6 INTRODUCTION 8

7 LITERATURE REVIEW 9

8 WEAKNESSES/GAPS IN LITERATURE REVIEW 11

9 HOW TO OVERCOME THE GAPS 11

10 HARDWARE SPECIFICATION 12

ESP8266-01 12

ARDUINO-UNO 13

MOISTURE SENSOR 17

DHT11 19

PIR 19

ULTRASONIC SENSOR 22

BUZZER 24

WATER PUMP 25

11 SOFTWARE SPECIFICATIONS 26

12 PROPOSED SYSTEM 33

13 FLOWCHART 34

14 WORKING: 36

15 ADVANTAGES AND DISADVANTAGES **38**

16 APPLICATIONS **40**

17 FUTURE SCOPE **41**

18 CONCLUSION **42**

19 REFERENCES **43**

20 LIST OF FIGURES **45**

1 CERTIFICATE

2 Project I Approval for Bachelor of Engineering

3 DECLARATION

4 ABSTRACT

5 ACKNOWLEDGEMENT

We are extremely fortunate to be involved in an exciting and challenging project like "INNOVATIVE FARMING USING RASPBERRY PI" It has enriched our life, giving us an opportunity to work in field of programming and automation. This project increased our thinking and understanding capability and after the completion of this project, we experience the feeling of achievement and satisfaction.

We should like to express our greatest gratitude and respect to our guide Prof.RIZWAN ALVI for his excellent guidance, valuable suggestion and endless support. He has not only been wonderful guide but also a genuine person. We consider ourselves extremely lucky to be able to work under guidance of such a dynamic personality. Also we would like to thanks our HOD Prof. SHAIKH AFZAL For guiding us with the designing and helping us to improve our project. Actually he is one such genuine person for whom our words will not be enough to express.

It was impossible for us to complete our project without their help. We are also grateful to our Director Mr.ABDUL RAZZAK HONNUTAGI for their encouragement. We like to express our grateful thanks to our classmates, all staffs and faculty members of electronics and telecommunication engineering department who willingly rendered us their unselfish help and support Last but not least, we want to convey our heartiest thanks to our parents for their immeasurable love, support and encouragement.

6 INTRODUCTION

1.1 Project Overview

In our country Agriculture is major source of food production to the growing demand of human population. In agriculture, irrigation is an essential process that influences crop production. Generally farmers visit their agriculture fields periodically to check soil moisture level and based on requirement water is pumped by motors to irrigate respective fields. Farmer need to wait for certain period before switching off motor so that water is allowed to flow in sufficient quantity in respective fields. This irrigation method takes lot of time and sort particularly when a farmer need to irrigate multiple agriculture fields distributed in different geographical areas. previous farmers will present in their fields to do irrigation process. But nowadays farmers need to manage their agricultural activity along with other occupations. Automation in irrigation system makes farmer work much fast and comfortable. Sensor based automated irrigation system provides promising solution to farmers where presence of farmer in field is not compulsory. A small processor programmed for control a valve and also compare to valve operate motor to start irrigation. Really INDIAN farmers need cheap and simple user interface for controlling sensor based automated irrigation system. Now a day's internet is widely used. Using net connection farmer know about the agriculture field irrigation status on android mobile app. This helps farmers to know the status of farm field watering direction through a message whether the farmer is far away from field know the status of water motor is ON or OFF and direction of watering.

In this project we present a sub part of fully automation accessing of irrigation motor where it is includes number of sensor node placed in different region of farm field. For experimentation we have abstracted number of soil moisture sensor used in different direction of the farm fields. The moisture level in each direction of field is sensed by sensor node and the sensed data is sent to ARDUINO. On receiving sensor value the controller node checks it with required soil moisture value. When soil moisture in a specific field is not up to required level then controller node switch ON the motor to irrigate farm. The ARDUINO process all data and notification SMS is send to BLYNK mobile phone app.

7 LITERATURE REVIEW

Paper 1

Paper Title:

IOT BASED AGRICULTURE SYSTEM

Author Name:

RAMAN KUMAR and ANANT GARGMANJEET KAUR

Work Done:

In this project time wasted in monitoring the field is reduce with the help of sensor and alert system

Paper 2

Paper Title:

ARDUINO INTERFACE WITH SMART FARMING SYSTEM

Author Name:

MS. G. REKHA and S. MUTHU SELVI

Work Done:

In this project the sensed data will be processed and stored in database for future reference due to which threshold value can be set for controlling purpose.

Paper 3

Paper Title:

ANDROID BASED IOT FOR AGRICULTURE AUTOMATION

Author Name:

KRISHNA CHAITANYA, KARTHIKEYAN, KOTI MUNI TEJA REDDY

Work Done:

In this project, motor is turned on automatically when moisture level is less than threshold through relay and turned off when moisture level cross the threshold and data is available in mobile application as well as on LCD display

Paper 4

Paper Title:

SMART IRRIGATION SYSTEM USING RASPBERRY PI

Author Name:

BHAGYASHREE K.CHATE, PROF J G RANA

Work Done:

In this project, the live streaming of crops using android phones and automatic motor On/Off

8 WEAKNESSES/GAPS IN LITERATURE REVIEW

•The overall survey from the literature review is that they have not display water lavel of watertank.

•To display the output they used LCD display and webpage.

•As per the survey they have not detect the presence of human or animal in farm area .

9 HOW TO OVERCOME THE GAPS

•By using ultrasonic sensor wecan detect he water level of the tank.

•For display purpose we use the BLTNK mobile application.

•By using PIR sensor we can detect presence of humans or animals in farm area.

10 HARDWARE SPECIFICATION

Main component:

ESP8266-01

Arduino Uno

Moisture sensor

DHT11 sensor

PIR sensor

ULTRASONIC sensor

Buzzer

Water Pump

ESP8266-01

The ESP8266 is a low-cost Wi-Fi microchip with full TCP/IP stack and microcontroller capability produced by manufacturer Espressif Systems in Shanghai, China. The chip first came to the attention of western makers in August 2014 with the ESP-01 module, made by a third-party manufacturer Ai-Thinker. This small module allows microcontrollers to connect to a Wi-Fi network and make simple TCP/IP connections using Hayes-style commands. However, at first there was almost no English-language documentation on the chip and the commands it accepted. The very low price and the fact that there were very few external components on the module, which suggested that it could eventually be very inexpensive in volume, attracted many hackers to explore the module, chip, and the software on it, as well as to translate the Chinese documentation. The ESP8285 is an ESP8266 with 1 MiB of built-in flash, allowing for single-chip devices capable of connecting to Wi-Fi. The successor to these microcontroller chips is the ESP32, released in 2016.

FEATURES
Processor: L106 32-bit RISC microprocessor core based on the Tensilica Xtensa Diamond Standard 106Micro running at 80 MHz
Memory:
32 KiB instruction RAM
32 KiB instruction cache RAM
80 KiB user-data RAM
16 KiB ETS system-data RAM

External QSPI flash: up to 16 MiB is supported (512 KiB to 4 MiB typically included)
IEEE 802.11 b/g/n Wi-Fi
Integrated TR switch, balun, LNA, power amplifier and matching network
WEP or WPA/WPA2 authentication, or open networks
16 GPIO pins
SPI
I^2C (software implementation)
I^2S interfaces with DMA (sharing pins with GPIO)
UART on dedicated pins, plus a transmit-only UART can be enabled on GPIO2
10-bit ADC (successive approximation ADC)

Pinout of ESP-01:

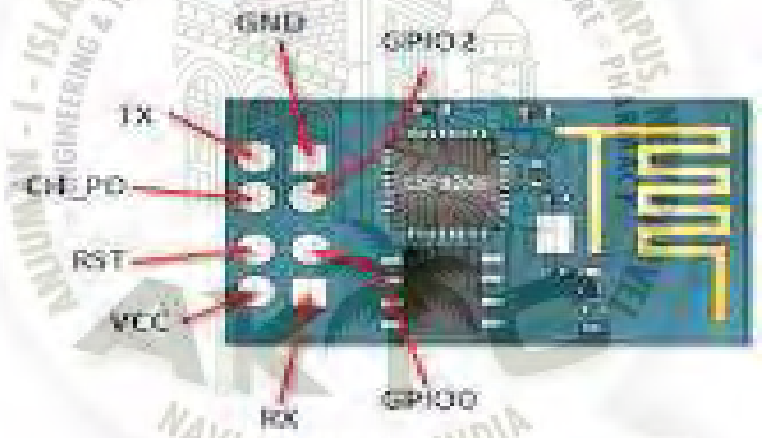


Figure 01: Pinout of ESP-01

The pinout is as follows for the common ESP-01 module:
VCC, Voltage (+3.3 V; can handle up to 3.6 V)
GND, Ground (0 V)
RX, Receive data bit X
TX, Transmit data bit X
$CH_PD, Chippower - down$
$RST, Reset$
$GPIO0, General - purposeinput/outputNo.0$
$GPIO2, General - purposeinput/outputNo.2$

ARDUINO UNO

The Arduino UNO is an open-source microcontroller board based on the Microchip ATmega328P microcontroller and developed by Arduino.cc. The board is equipped with sets of digital and analog input/output (I/O) pins that may be interfaced to various expansion boards (shields) and other circuits. The board has 14 Digital pins, 6 Analog pins, and programmable with the Arduino IDE (Integrated Development Environment) via a type B USB cable. It can be powered by a USB cable or by an external 9 volt battery, though it accepts voltages between 7 and 20 volts. It is also similar to the Arduino Nano and Leonardo. The hardware reference design is distributed under a Creative Commons Attribution Share-Alike 2.5 license and is available on the Arduino website. Layout and production files for some versions of the hardware are also available. "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. The ATmega328 on the Arduino Uno comes preprogrammed with a bootloader that allows uploading new code to it without the use of an external hardware programmer. It communicates using the original STK500 protocol. The Uno also differs from all preceding boards in that it does not use the FTDI USB-to-serial driver chip. Instead, it uses the Atmega16U2 (Atmega8U2 up to version R2) programmed as a USB-to-serial converter.

Figure 02: ARDUINO UNO

Technical specifications

Microcontroller: Microchip ATmega328P [7]

Operating Voltage: 5 Volts
Input Voltage: 7 to 20 Volts
Digital I/O Pins: 14 (of which 6 provide PWM output)
Analog Input Pins: 6
DC Current per I/O Pin: 20 mA
DC Current for 3.3V Pin: 50 mA
Flash Memory: 32 KB of which 0.5 KB used by bootloader
SRAM: 2 KB
EEPROM: 1 KB
Clock Speed: 16 MHz
Length: 68.6 mm
Width: 53.4 mm
Weight: 25 g

Pins
General Pin functions
LED: There is a built-in LED driven by digital pin 13. When the pin is HIGH value, the LED is on, when the pin is LOW, it's off.

VIN: The input voltage to the Arduino/Genuino board when it's using an external power source (as opposed to 5 volts from the USB connection or other regulated power source). You can supply voltage through this pin, or, if supplying voltage via the power jack, access it through this pin.

5V: This pin outputs a regulated 5V from the regulator on the board. The board can be supplied with power either from the DC power jack (7 - 20V), the USB connector (5V), or the VIN pin of the board (7-20V). Supplying voltage via the 5V or 3.3V pins bypasses the regulator, and can damage the board.

3V3: A 3.3 volt supply generated by the on-board regulator. Maximum current draw is 50 mA.

GND: Ground pins.

IOREF: This pin on the Arduino/Genuino board provides the voltage reference with which the microcontroller operates. A properly configured shield can read the IOREF pin voltage and select the appropriate power source or enable voltage translators on the outputs to work with the 5V or 3.3V.

Reset: Typically used to add a reset button to shields which block the one on the board.

Special Pin Functions

Each of the 14 digital pins and 6 Analog pins on the Uno can be used as an input or output, using pinMode(),digitalWrite(), and digitalRead() functions. They operate at 5 volts. Each pin can provide or receive 20 mA as recommended operating condition and has an internal pull-up resistor (disconnected by default) of 20-50k ohm. A maximum of 40mA is the value that must not be exceeded on any I/O pin to avoid permanent damage to the microcontroller.The Uno has 6 analog inputs, labeled A0 through A5, each of which provide 10 bits of resolution (i.e. 1024 different values). By default they measure from ground to 5 volts, though is it possible to change the upper end of their range using the AREF pin and the analogReference() function. In addition, some pins have specialized functions:

Serial / UART: pins 0 (RX) and 1 (TX). Used to receive (RX) and transmit (TX) TTL serial data. These pins are connected to the corresponding pins of the ATmega8U2 USB-to-TTL Serial chip.

External Interrupts: pins 2 and 3. These pins can be configured to trigger an interrupt on a low value, a rising or falling edge, or a change in value.

PWM (Pulse Width Modulation): 3, 5, 6, 9, 10, and 11 Can provide 8-bit PWM output with the analogWrite() function.

SPI (Serial Peripheral Interface): 10 (SS), 11 (MOSI), 12 (MISO), 13 (SCK). These pins support SPI communication using the SPI library.

TWI (Two Wire Interface) / I^2C: A4 or SDA pin and A5 or SCL pin. Support TWI communication using the Wire library.

AREF (Analog REFerence): Reference voltage for the analog inputs.

Communication

The Arduino/Genuino Uno has a number of facilities for communicating with a computer, another Arduino/Genuino board, or other microcontrollers. The ATmega328 provides UART TTL (5V) serial communication, which is available on digital pins 0 (RX) and 1 (TX). An ATmega16U2 on the board channels this serial communication over USB and appears as a virtual com port to software on the computer. The 16U2 firmware uses the standard USB COM drivers, and no external driver is needed. However, on Windows, a .inf file is required. The Arduino Software (IDE) includes a serial monitor which allows simple textual data to be sent to and from the board. The RX and TX LEDs on the board will flash when data is being transmitted via the USB-to-serial chip and USB connection to the computer (but not for serial communication on pins 0 and 1). A SoftwareSerial library allows serial communication on any of the Uno's digital pins.

MOISTURE SENSOR

The soil moisture sensor or the hygrometer is usually used to detect the humidity of the soil. So, it is perfect to build an automatic watering system or to monitor the soil moisture of your plants. The sensor is set up by two pieces: the electronic board (at the right), and the probe with two pads, that detects the water content (at the left).

Figure 03: MOISTURE SENSOR

The sensor has a built-in potentiometer for sensitivity adjustment of the digital output (D0), a power LED and a digital output LED, as you can see in the following figure.

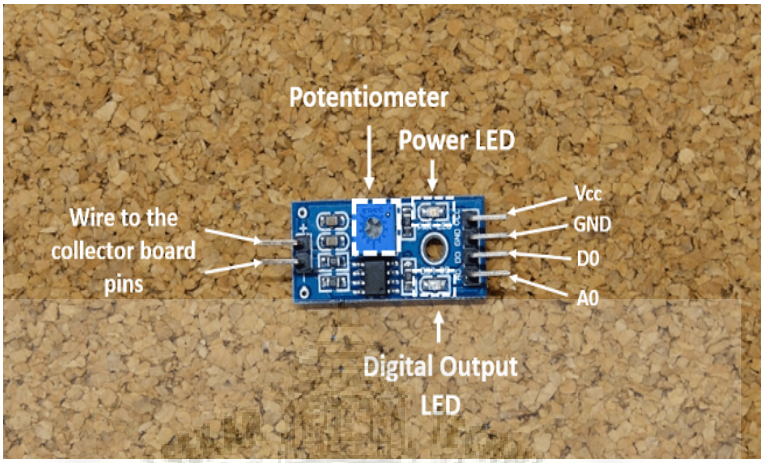


Figure 04: MOISTURE SENSOR PINS

How does it work?

The voltage that the sensor outputs changes accordingly to the water content in the soil.

When the soil is::://www.overleaf.com/project/5bc899c54e5016724dc1b503 Wet: the output voltage decreases

Dry: the output voltage increases

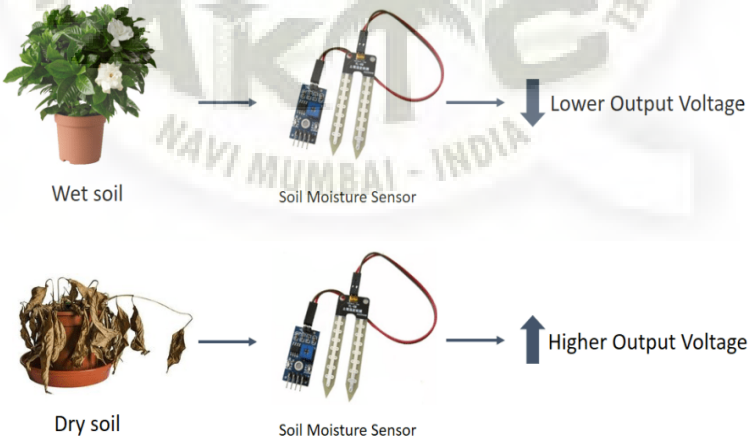


Figure 05: Moisture Sensor Working

The output can be a digital signal (D0) LOW or HIGH, depending on the water content. If the soil humidity exceeds a certain predefined threshold value, the modules outputs LOW, otherwise it outputs HIGH. The threshold value for the digital

signal can be adjusted using the potentiometer.
The output can be a analog signal and so you'll get a value between 0 and 1023.

DHT11 SENSOR
This DHT11 Temperature and Humidity Sensor features a calibrated digital signal output with the temperature and humidity sensor capability. It is integrated with a high-performance 8-bit microcontroller. Its technology ensures the high reliability and excellent long-term stability. This sensor includes a resistive element and a sensor for wet NTC temperature measuring devices. It has excellent quality, fast response, anti-interference ability and high performance.

Each DHT11 sensors features extremely accurate calibration of humidity calibration chamber. The calibration coefficients stored in the OTP program memory, internal sensors detect signals in the process, we should call these calibration coefficients. The single-wire serial interface system is integrated to become quick and easy. Small size, low power, signal transmission distance up to 20 meters, enabling a variety of applications and even the most demanding ones. The product is 4-pin single row pin package. Convenient connection, special packages can be provided according to users need.

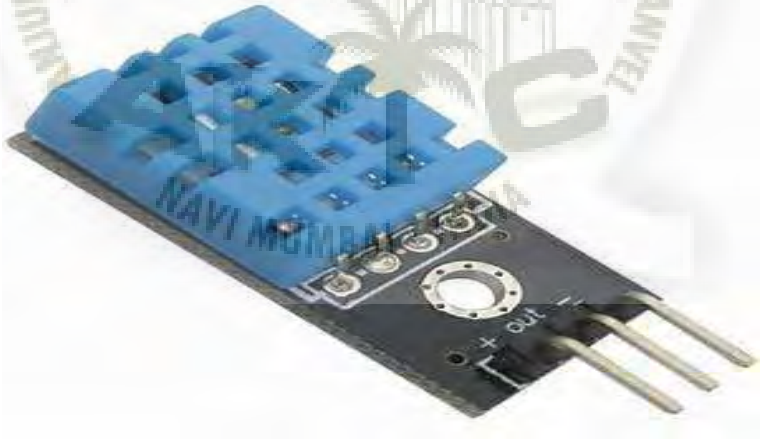


Figure 06: DHT11 SENSOR

Specification
Supply Voltage: +5 V
Temperature range :0-50 °C error of ± 2 °C
Humidity :20-90Interface: Digital

PIR SENSOR:

Overview

PIR sensors allow you to sense motion, almost always used to detect whether a human has moved in or out of the sensors range. They are small, inexpensive, low-power, easy to use and don't wear out. For that reason they are commonly found in appliances and gadgets used in homes or businesses. They are often referred to as PIR, "Passive Infrared", "Pyroelectric", or "IR motion" sensors.

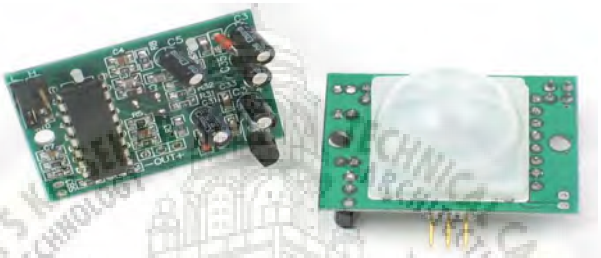


Figure 07: PIR SENSOR

PIRs are basically made of a pyroelectric sensor (which you can see below as the round metal can with a rectangular crystal in the center), which can detect levels of infrared radiation. Everything emits some low level radiation, and the hotter something is, the more radiation is emitted. The sensor in a motion detector is actually split in two halves. The reason for that is that we are looking to detect motion (change) not average IR levels. The two halves are wired up so that they cancel each other out. If one half sees more or less IR radiation than the other, the output will swing high or low.

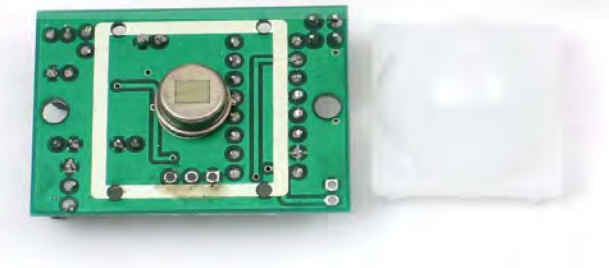


Figure 08: PYROELECTRIC SENSOR

Along with the pyroelectic sensor is a bunch of supporting circuitry, resistors and capacitors. It seems that most small hobbyist sensors use the BISS0001 ("Micro

Power PIR Motion Detector IC"), undoubtedly a very inexpensive chip. This chip takes the output of the sensor and does some minor processing on it to emit a digital output pulse from the analog sensor.
PIRs have more adjustable settings and have a header installed in the 3-pin ground/out/power pads

.

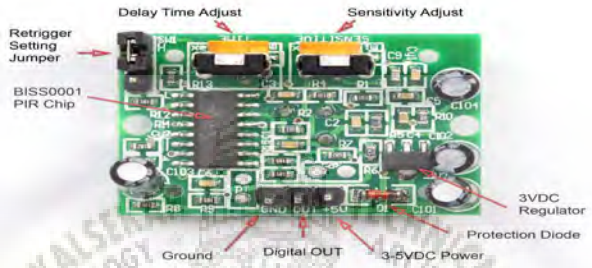


Figure 09: PIR SENSOR WITH LABELED

For many basic projects or products that need to detect when a person has left or entered the area, or has approached, PIR sensors are great. They are low power and low cost, pretty rugged, have a wide lens range, and are easy to interface with. Note that PIRs won't tell you how many people are around or how close they are to the sensor, the lens is often fixed to a certain sweep and distance (although it can be hacked somewhere) and they are also sometimes set off by housepets. Experimentation is key!

Spesification
Size: Rectangular
Price: $10.00 at the Adafruit shop$
$Output : Digital pulse high (3V) when triggered (motion detected) digital low when idle (no motion detecte$
$Sensitivity range : up to 20 feet (6 meters) 110° x 70° detection range$
$Power supply : 5V - 12V input voltage for most modules (they have a 3.3V regulator), but 5V is ideal in cas$

$How PIRs Work$

.

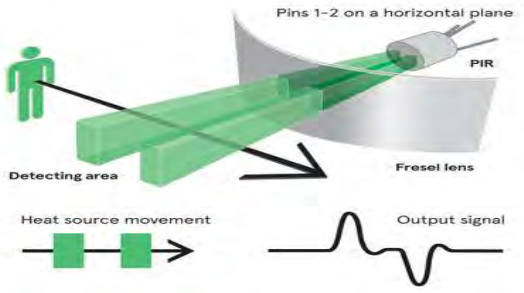


Figure 10: PIR WORKING

The PIR sensor itself has two slots in it, each slot is made of a special material that is sensitive to IR. The lens used here is not really doing much and so we see that the two slots can 'see' out past some distance (basically the sensitivity of the sensor). When the sensor is idle, both slots detect the same amount of IR, the ambient amount radiated from the room or walls or outdoors. When a warm body like a human or animal passes by, it first intercepts one half of the PIR sensor, which causes a positive differential change between the two halves. When the warm body leaves the sensing area, the reverse happens, whereby the sensor generates a negative differential change. These change pulses are what is detected.

ULTRASONIC SENSOR

What is an ultrasonic sensor? An ultrasonic sensor is an instrument that measures the distance to an object using ultrasonic sound waves. An ultrasonic sensor uses a transducer to send and receive ultrasonic pulses that relay back information about an object's proximity. High-frequency sound waves reflect from boundaries to produce distinct echo patterns.

Figure 11: ULTRASONIC SENSOR

How Ultrasonic Sensors Work. Ultrasonic sound vibrates at a frequency above the range of human hearing. Transducers are the microphones used to receive and send the ultrasonic sound. Our ultrasonic sensors, like many others, use a single transducer to send a pulse and to receive the echo. The sensor determines the distance to a target by measuring time lapses between the sending and receiving of the ultrasonic pulse.

.

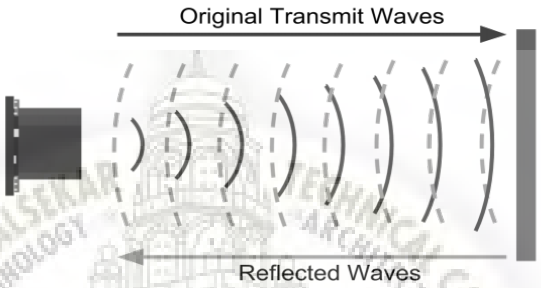


Figure 12: ULTRASONIC SENSOR WORKING

Why use an Ultrasonic Sensor?
Ultrasound is reliable in any lighting environment and can be used inside or outside. Ultrasonic sensors can handle collision avoidance for a robot, and being moved often, as long as it isn't too fast. Ultrasonics are so widely used, they can be reliably implemented in grain bin sensing applications, water level sensing, drone applications and sensing cars at your local drive-thru restaurant or bank. Ultrasonic rangefinders are commonly used as devices to detect a collision.
Ultrasonic Sensors are best used in the non-contact detection of:
Presence
Level
Position
Distance
Non-contact sensors are also referred to as proximity sensors.
Ultrasonics are Independent of:
Light
Smoke
Dust
Color
Material (except for soft surfaces, i.e. wool, because the surface absorbs the ultrasonic sound wave and doesn't reflect sound.)
Long range detection of targets with varied surface properties. Ultrasonic sen-

sors are superior to infrared sensors because they aren't affected by smoke or black materials, however, soft materials which don't reflect the sonar (ultrasonic) waves very well may cause issues. It's not a perfect system, but it's good and reliable.
Applications Involving Ultrasonic Detection:
Ultrasonic Distance Measurement
Ex. Distance measurement would be applied in a garage parking application, sensing when a vehicle is pulled completely into a garage.
Ultrasonic Sensors for water level detection
Tank level measurement, Fuel gauging, irrigation control.
Ultrasonic Obstacle Detection
Our UAV Sensors for Drones as well as our proximity sensors that are used for robots are for obstacle detection.

BUZZER:

A buzzer is a mechanical, electromechanical, magnetic, electromagnetic, electroacoustic or piezoelectric audio signalling device. A piezo electric buzzer can be driven by an oscillating electronic circuit or other audio signal source. A click, beep or ring can indicate that a button has been pressed. There are several different kinds of buzzers. At Future Electronics we stock many of the most common types categorized by Type, Sound Level, Frequency, Rated Voltage, Dimension and Packaging Type. The parametric filters on our website can help refine your search results depending on the required specifications. The most common sizes for Sound Level are 80 dB, 85 dB, 90 dB and 95 dB. We also carry buzzers with Sound Level up to 105 dB. There are several types available including Electro-Acoustic, Electromagnetic, Electromechanic, Magnetic and Piezo, among others.

.

Figure 13: BUZZER

WATER PUMP:

Submersible water pump for aquarium, fountain, fish pond, etc Flow rate is adjustable with knob in front of the pump. With 2 suction cups at the bottom and to be used in water only Input Voltage: DC 5v' Power: 2w.

.

Figure 14: WATER PUMP

11 SOFTWARE SPECIFICATIONS

ARDUINO SOFTWARE:

- What is Arduino?
- Arduino is an open-source electronics platform based on easy-to-use hardware and software. Arduino boards are able to read inputs - light on a sensor, a finger on a button, or a Twitter message - and turn it into an output - activating a motor, turning on an LED, publishing something online. You can tell your board what to do by sending a set of instructions to the microcontroller on the board. To do so you use the Arduino programming language (based on Wiring), and the Arduino Software (IDE), based on Processing.
- Over the years Arduino has been the brain of thousands of projects, from everyday objects to complex scientific instruments. A worldwide community of makers - students, hobbyists, artists, programmers, and professionals - has gathered around this open-source platform, their contributions have added up to an incredible amount of accessible knowledge that can be of great help to novices and experts alike.
- Arduino was born at the Ivrea Interaction Design Institute as an easy tool for fast prototyping, aimed at students without a background in electronics and programming. As soon as it reached a wider community, the Arduino board started changing to adapt to new needs and challenges, differentiating its offer from simple 8-bit boards to products for IoT applications, wearable, 3D printing, and embedded environments. All Arduino boards are completely open-source, empowering users to build them independently and eventually adapt them to their particular needs. The software, too, is open-source, and it is growing through the contributions of users worldwide.

- Why Arduino?
- Thanks to its simple and accessible user experience, Arduino has been used in thousands of different projects and applications. The Arduino software is easy-to-use for beginners, yet flexible enough for advanced users. It runs on Mac, Windows, and Linux. Teachers and students use it to build low cost scientific instruments, to prove chemistry and

physics principles, or to get started with programming and robotics. Designers and architects build interactive prototypes, musicians and artists use it for installations and to experiment with new musical instruments. Makers, of course, use it to build many of the projects exhibited at the Maker Faire, for example. Arduino is a key tool to learn new things. Anyone - children, hobbyists, artists, programmers - can start tinkering just following the step by step instructions of a kit, or sharing ideas online with other members of the Arduino community.There are many other microcontrollers and microcontroller platforms available for physical computing. Parallax Basic Stamp, Netmedia's BX-24, Phidgets, MIT's Handyboard, and many others offer similar functionality. All of these tools take the messy details of microcontroller programming and wrap it up in an easy-to-use package. Arduino also simplifies the process of working with microcontrollers, but it offers some advantage for teachers, students, and interested amateurs over other systems:

- Inexpensive - Arduino boards are relatively inexpensive compared to other microcontroller platforms. The least expensive version of the Arduino module can be assembled by hand, and even the pre-assembled Arduino modules cost less than 50 doler.
- Cross-platform - The Arduino Software (IDE) runs on Windows and Linux operating systems.
- clear programming environment - The Arduino Software (IDE) is easy-to-use for beginners, yet flexible enough for advanced users to take advantage of as well. For teachers, it's conveniently based on the Processing programming environment, so students learning to program in that environment will be familiar with how the Arduino IDE works.
- Open source and extensible software - The Arduino software is published as open source tools, available for extension by experienced programmers. The language can be expanded through C++ libraries, and people wanting to understand the technical details can make the leap from Arduino to the AVR C programming language on which it's based. Similarly, you can add AVR-C code directly into your Arduino programs if you want to.
- Open source and extensible hardware - The plans of the Arduino boards are published under a Creative Commons license, so experienced circuit

designers can make their own version of the module, extending it and improving it. Even relatively inexperienced users can build the breadboard version of the module in order to understand how it works and save money.

Getting Started with Arduino on Windows
steps:-
1-Get an Arduino board and USB cable
2-Download the Arduino Software (IDE)
3-Connect the board
4-Install the drivers
5-Launch the Arduino application
6-Open the blink example
7-Select your board
8-Select your serial port
9-Upload the program

- Get an Arduino board and USB cable
  In this tutorial, we assume you're using an Arduino Uno, Arduino Duemilanove, Nano, Arduino Mega 2560 , or Diecimila. If you have another board, read the corresponding page in this getting started guide.
  You also need a standard USB cable (A plug to B plug): the kind you would connect to a USB printer, for example. (For the Arduino Nano, you'll need an A to Mini-B cable instead.)

- Download the Arduino Software (IDE)
  Get the latest version from the download page. When the download finishes, unzip the downloaded file.

- Connect the board
  The Arduino Uno, Mega, Duemilanove and Arduino Nano automatically draw power from either the USB connection to the computer or an external power supply. If you're using an Arduino Diecimila, you'll need to make sure that the board is configured to draw power from the USB connection. The power source is selected with a jumper, a small piece of plastic that fits onto two of the three pins between the USB and power jacks. Check that it's on the two pins closest to the USB port.

- Install the drivers

Installing drivers for the Arduino Uno or Arduino Mega 2560 with Windows 7, Vista, or XP:
Plug in your board and wait for Windows to begin it's driver installation process. After a few moments, the process will fail, despite its best efforts
Click on the Start Menu, and open up the Control Panel.
While in the Control Panel, navigate to System and Security. Next, click on System. Once the System window is up, open the Device Manager.
Look under Ports (COM LPT). You should see an open port named "Arduino UNO (COMxx)". If there is no COM LPT section, look under "Other Devices" for "Unknown Device".
Right click on the "Arduino UNO (COmxx)" port and choose the "Update Driver Software" option. Next, choose the "Browse my computer for Driver software" option.
Finally, navigate to and select the driver file named "arduino.inf", located in the "Drivers" folder of the Arduino Software download (not the "FTDI USB Drivers" sub-directory). If you are using an old version of the IDE (1.0.3 or older), choose the Uno driver file named "Arduino UNO.inf"
Windows will finish up the driver installation from there.
See also: step-by-step screenshots for installing the Uno under Windows XP.

Installing drivers for the Arduino Duemilanove, Nano, or Diecimila with Windows7, Vista, or XP:

When you connect the board, Windows should initiate the driver installation process (if you haven't used the computer with an Arduino board before).

On Windows Vista, the driver should be automatically downloaded and installed. (Really, it works!)

On Windows XP, the Add New Hardware wizard will open:

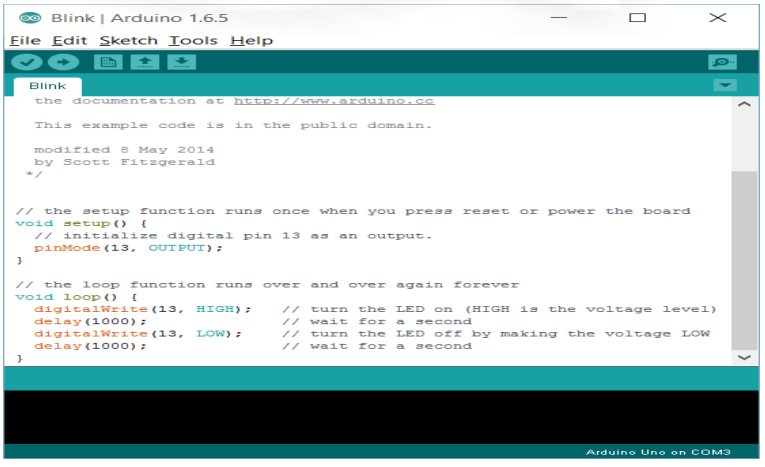
When asked Can Windows connect to Windows Update to search for software? select No, not this time. Click next.
Select Install from a list or specified location (Advanced) and click next.

Make sure that Search for the best driver in these locations is checked; uncheck Search removable media; check Include this location in the search and browse to the drivers/FTDI USB Drivers directory of the Arduino distribution. (The latest version of the drivers can be found on the FTDI website.) Click next.
The wizard will search for the driver and then tell you that a "USB Serial Converter" was found. Click finish.
The new hardware wizard will appear again. Go through the same steps and select the same options and location to search. This time, a "USB Serial Port" will be found.
You can check that the drivers have been installed by opening the Windows Device Mananger (in the Hardware tab of System control panel). Look for a "USB Serial Port" in the Ports section; that's the Arduino board.

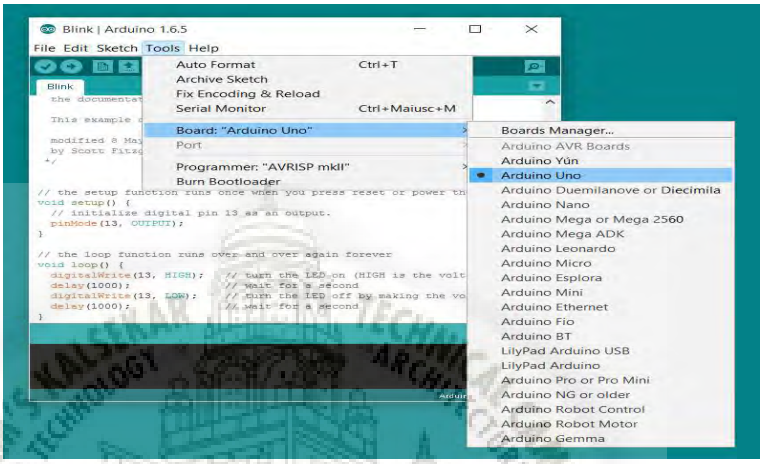
- Connect the Arduino board to your computer using the USB cable. The green power LED (labelled PWR) should go on.

- Launch the Arduino application
  Double-click the Arduino application (arduino.exe) you have previously downloaded . (Note: if the Arduino Software loads in the wrong language, you can change it in the preferences dialog. See the Arduino Software (IDE) page for details.)

- Open the blink example
  Open the LED blink example sketch: File ¿ Examples ¿01.Basics ¿ Blink.



- Select your board
  You'll need to select the entry in the Tools ¿ Board menu that corresponds to your Arduino.



  For Duemilanove Arduino boards with an ATmega328 (check the text on the chip on the board), select Arduino Duemilanove or Nano w/ ATmega328. Previously, Arduino boards came with an ATmega168; for those, select Arduino Diecimila, Duemilanove, or Nano w/ ATmega168. (Details of the board menu entries are available on the environment page.)

- Select your serial port
  Select the serial device of the Arduino board from the Tools — Serial Port menu. This is likely to be COM3 or higher (COM1 and COM2 are usually reserved for hardware serial ports). To find out, you can disconnect your Arduino board and re-open the menu; the entry that disappears should be the Arduino board. Reconnect the board and select that serial port.

- Upload the program
  Now, simply click the "Upload" button in the environment. Wait a few seconds - you should see the RX and TX leds on the board flashing. If the upload is successful, the message "Done uploading." will appear in the status bar. (Note: If you have an Arduino Mini, NG, or other board, you'll need to physically press the reset button on the board immediately before clicking the upload button on the Arduino Software.)

A few seconds after the upload finishes, you should see the pin 13 (L) LED on the board start to blink (in orange). If it does, congratulations! You've gotten Arduino up-and-running. If you have problems, please see the troubleshooting suggestions.

BLYNK APP

Blynk is a Platform with iOS and Android apps to control Arduino, Raspberry Pi and the likes over the Internet. It's a digital dashboard where you can build a graphic interface for your project by simply dragging and dropping widgets. It's really simple to set everything up and you'll start tinkering in less than 5 mins. Blynk is not tied to some specific board or shield. Instead, it's supporting hardware of your choice. Whether your Arduino or Raspberry Pi is linked to the Internet over Wi-Fi, Ethernet or this new ESP8266 chip, Blynk will get you online and ready for the Internet Of Your Things.

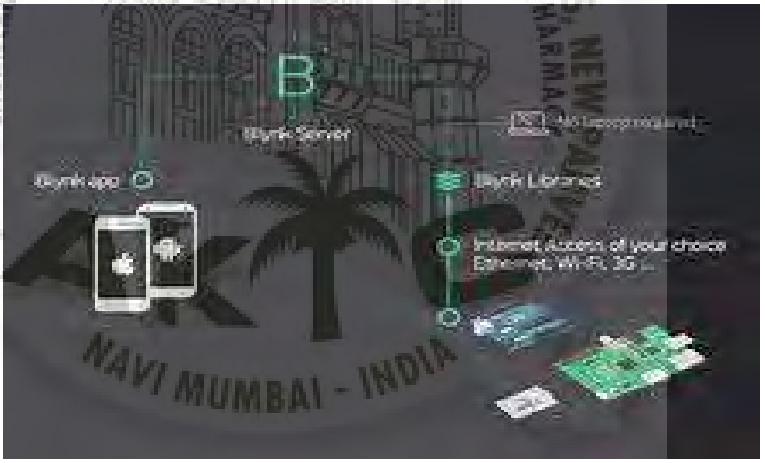


Figure 15: BLYNK APP

12 PROPOSED SYSTEM

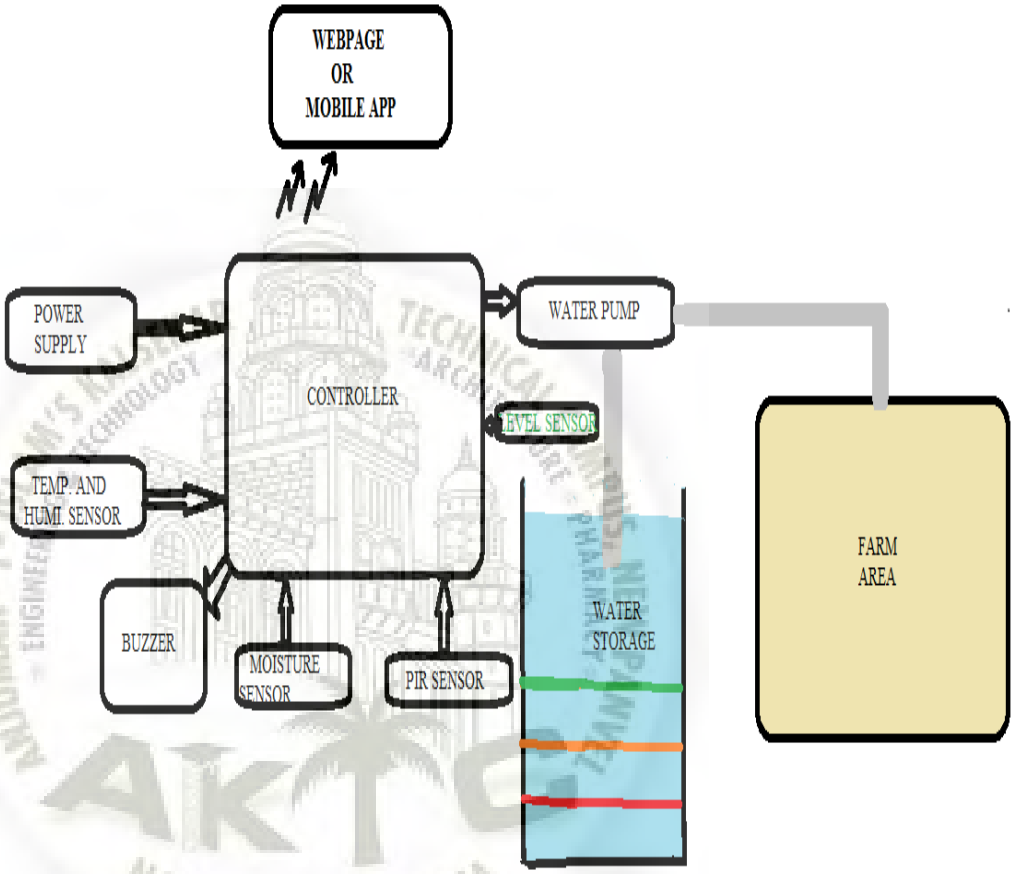
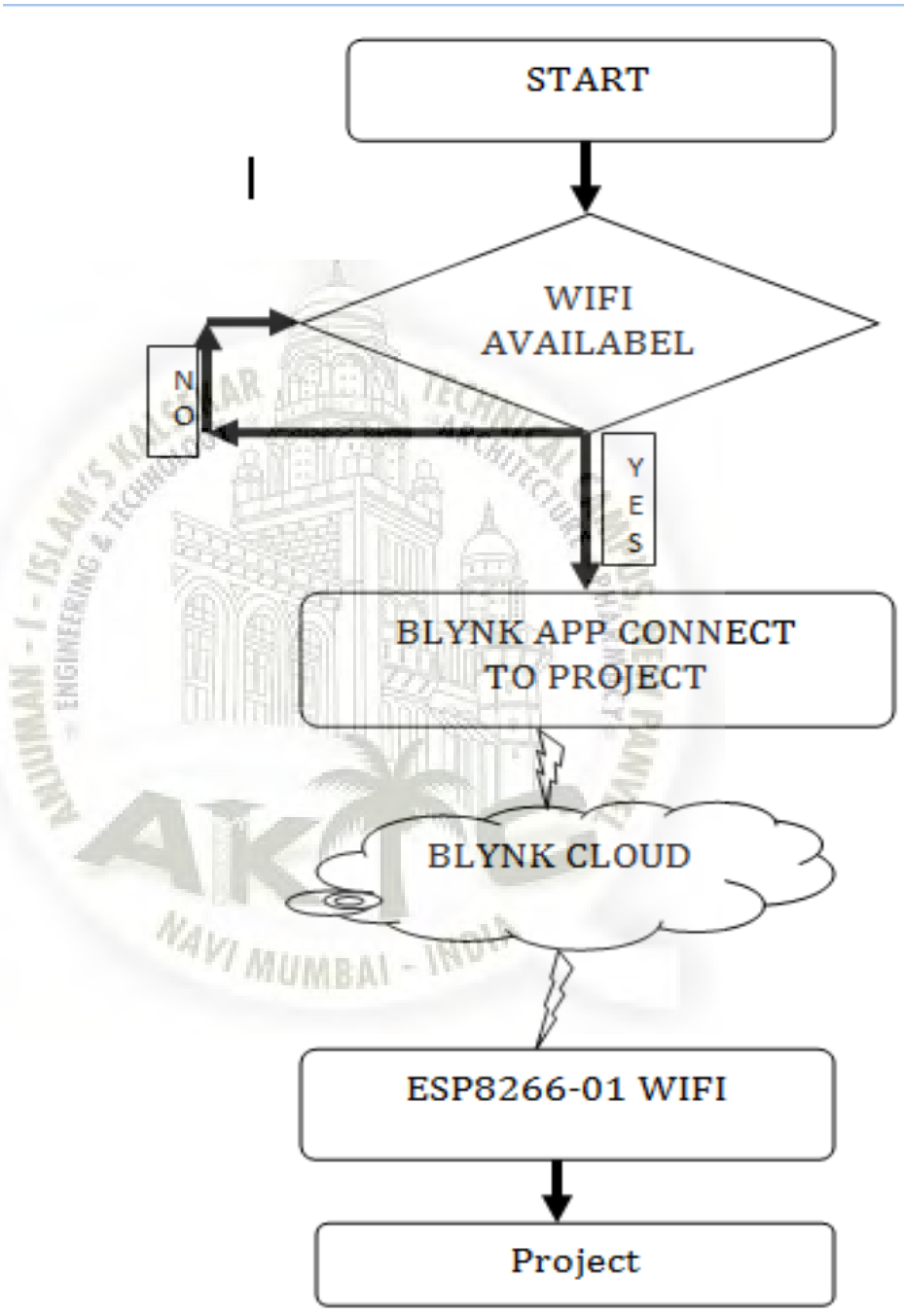
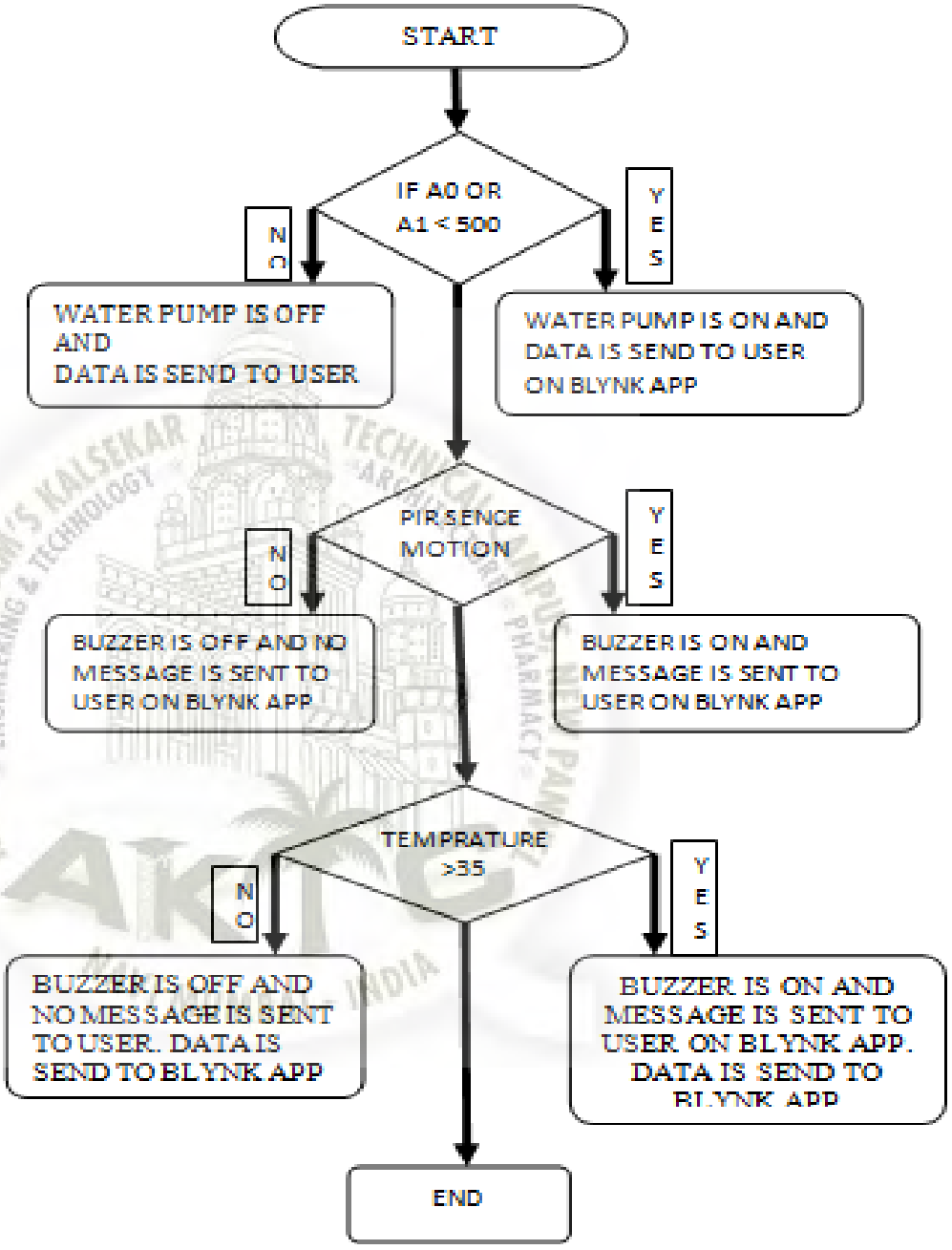


Figure 16: BLOCK DIAGRAM

13 FLOWCHART





14 WORKING:

First supply voltage to Raspberry Pi through any mobile charger or USB cable and for Arduino through USB cable or 9volt adapter. When the supply is provided then system turns ON. Now ESP8266-01 wifi module try to connect to the wifi which one is describe in program. To connect our Blynk app on which we design an app for our project run that project then hardware project is connected to the Blyn app. All the data through various sensors values and notifications are send to the app and on web page.

Moisture sensor: When the moisture level is below the set point then motor pump is on and in blynk app on LCD is shows "MOISTURE IS LOW PUMP IS ON". It also shows the level of moisture on value display. When the moisture level is above the set point then motor pump is off and in blynk app on LCD is shows "MOISTURE IS HIGH PUMP IS OFF". It also shows the level of moisture on value display.

PIR SENSOR: It detects the motion of animals and people. When motion is detect the buzzer turn on and one message is send to the user. When motion is not detect the buzzer turn off.

DHT11 sensor: It sense temperature and humidity. When temperature is above the set point due to fire then buzzer is on. One alert message is srnt to user. The values of humidity and temperature are display on value display in blynk app. If the wifi connection is disconnected then communication between hardware and software is failed.If the hard ware is tuns off then alert message is sent to user that is "SYSTEM IS DISCONNECTED".

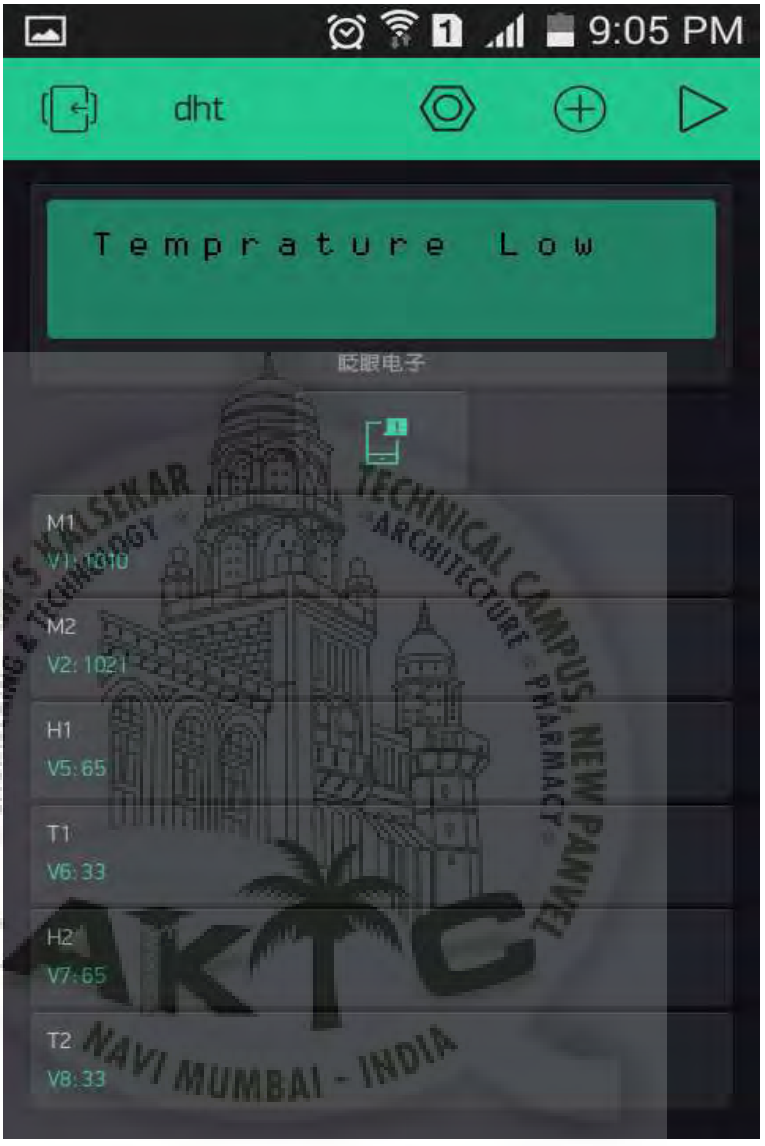


Figure 17: OUTPUT ON BLYNK APP

15 ADVANTAGES AND DISADVANTAGES

ADVANTAGES:

- Increased Production – Optimized crop treatment such as accurate planting, watering, pesticide application and harvesting directly affects production rates.

- Water Conservation – Weather predictions and soil moisture sensors allow for water use only when and where needed.

- Real-Time Data and Production Insight – Farmers can visualize production levels, soil moisture, sunlight intensity and more in real time and remotely to accelerate decision making process.

- Lowered Operation Costs – Automating processes in planting, treatment and harvesting can reduce resource consumption, human error and overall cost.

- Accurate Farm and Field Evaluation – Accurately tracking production rates by field over time allows for detailed predicting of future crop yield and value of a farm.

- Reduced Environmental Footprint – All conservation efforts such as water usage and increased production per land unit directly affect the environmental footprint positively.

- Remote Monitoring – Local and commercial farmers can monitor multiple fields in multiple locations around the globe from an internet con-

nection. Decisions can be made in real-time and from anywhere.

- Equipment Monitoring – Farming equipment can be monitored and maintained according to production rates, labor effectiveness and failure prediction. The Internet of Things has truly enhanced many industries by providing data collection, real-time insight and process automation through low cost sensors and IoT platform implementation. As seen in the above benefits, the farming and agriculture industry overall can really benefit from implementation of such an IoT solution or platform. Not only is a smart agriculture solution the innovative farming method of today, it is the key solution to the growing concern of the global population's food consumption and environmental footprint.

Figure 18: ADVANTAGE OF PROJECT

DISADVANTAGES:
However advantageous the movement is, it comes with disadvantages as well. Smart farming requires skills in robotics, and computer based intelligence, skills the average farmer would not necessarily have. Not only are farmers not proficient in robotics and computer intelligence the language of the Internet of Things would need to dramatically change in order for both farmers and information technology professionals to communicate to each other. Finally farming is a low margin industry so the willingness to invest in innovation is low as well.

16 APPLICATIONS

- Green House
- Garden Area
- Farm Area

Figure 19: APPLICATION OF PROJECT

17 FUTURE SCOPE

- We can install camera for live stremming the farm area.

.

Figure 20: FUTURE SCOPE

- We can also used droan for live streaming. .

Figure 21: FUTURE SCOPE1

18 CONCLUSION

Agriculture is base for all the industries for raw material and cultivation requires different water levels at different periods, so for minimizing and maintaining water level we have implemented this system. Automation in agriculture reduces labour, and difficulties, as most important in irrigation i.e., supplying water is done automatically by ARDUINO UNO based IOT, as IOT made life interesting and easy.Farming involves sophisticated activities, so emerged technology replaced complex systems, and software tools and have made provision to act through internet . Thus, the IoT agricultural applications are making it possible for ranchers and farmers to collect meaningful data. Large landowners and small farmers must understand the potential of IoT market for agriculture by installing smart technologies to increase competitiveness and sustainability in their productions. The demand for growing population can be successfully met if the ranchers as well as small farmers implement agricultural IoT solutions in a successful manner.

-

19 REFERENCES

- Vinita Tyagi1, Raman kumar 2, Gopal Fartyal 3, Anant Garg 4, Dr. Janakkumar .B. Patel5, Manjeet kaur6 " IOT Based Agriculture System " Student1, 2, 3, 4, Professor5, Assistant Professor6 Department of ECE Amity University Haryana, India
- Ms. G. Rekha M.E1, S. Muthu Selvi "Arduino Interface with Smart Farming System "1 Assistant Professor, Department of ECE, K.L.N. College of Information Technology,Pottapalayam, Sivaganga district-630612rekha.g@klncit.ed 2 Department of ECE, K.L.N. College of Information Technology, Pottapalayam, Sivaganga district-630612 muthuselvi1605ece@gmail.com
- Krishna Chaitanya S 2 K.T. Ilayarajaa 3 Karthikeyan 4 Koti Muni Teja Reddy " Android based IoT for Agriculture Automation " ECE department Sathyabama University,Chennai
- Bhagyashree K.Chate 1, Prof.J.G.Rana " Smart Irrigation System using Raspberry Pi " PG student, EC, JNEC, Maharashtra, India 2HOD, ETC, JNEC, Maharashtra, India

https://en.wikipedia.org/wiki/Arduino$_{U}no$

$https://randomnerdtutorials.com/guide-for-soil-moisture-sensor-yl-69-or-hl-69-with-the-arduino/$

$https://www.overleaf.com/learn/latex/Inserting_{I}mages$

$https://www.overleaf.com/learn/latex/Table_{o}f_{c}ontents$

$https://www.robot-r-us.com/vmchk/sensor-temp/humid/dht11-temperature-and-humidity-sensor.html$

$https://www.google.co.in/search?q=pir+sensorsource=lnmstbm=ischsa=Xved=0ahUKEwjCm7qztczhAhXkmeYKHUzyBgMQ_{A}UIDigBbiw=1366bih=576imgdii=KWEL7v9zK8z3MM:imgrc=VYmuzHo_{j}oUO_{M}:$

$https://learn.adafruit.com/pir-passive-infrared-proximity-motion-sensor?view=all$

$https://www.maxbotix.com/articles/how-ultrasonic-sensors-$

work.htm

https : *//www.google.co.in/search?q* = *ultrasonic* + *sensorsource* = *lnmstbm* = *ischsa* = *Xved* = 0*ahUKEwiwxo*67*vszhAhXi*8*XMBHa*6*LAVoQ*$_A$*UIDigE* 1366*bih* = 576*imgrc* = 3*ymHOOgPI*7*mSpM* :

https : *//en.wikipedia.org/wiki/ESP*8266

https : *//www.google.co.in/search?ei* = 6*ZCxXILWKOzgz*7*sP*8*qy*84*A*0*q* = *esp*8266+01+*pinoutoq* = *esp*8266+01*gs*$_l$ = *psy*−*ab*.1.1.0*l*10.3092.3830..5728...0.0..0.109.3 *wiz*.....0*i*71*j*35*i*39*j*0*i*67*j*0*i*131*i*67.*X*4*zy*$_{HWm8I}$

20 LIST OF FIGURES

- Figure 01: Pinout of ESP-01 [13]
- Figure 02: ARDUINO UNO [14]
- Figure 03: MOISTURE SENSOR [17]
- Figure 04: MOISTURE SENSOR PINS [18]
- Figure 05: Moisture Sensor Working [18]
- Figure 06: DHT11 SENSOR [19]
- Figure 07: PIR SENSOR [20]
- Figure 08: PYROELECTRIC SENSOR [20]
- Figure 09: PIR SENSOR WITH LABELED [21]
- Figure 10: PIR WORKING [22]
- Figure 11: ULTRASONIC SENSOR [22]
- Figure 12: ULTRASONIC SENSOR WORKING [23]
- Figure 13: BUZZER [25]
- Figure 14: WATER PUMP [25]
- Figure 15: BLYNK App [32]
- Figure 16: BLOCK DIAGRAM [33]
- Figure 17: OUTPUT ON BLYNK APP [37]
- Figure 18: ADVANTAGE OF PROJECT [39]
- Figure 19: APPLICATION OF PROJECT [40]
- Figure 20: FUTURE SCOPE [41]
- Figure 21: FUTURE SCOPE1 [41]