IOT BASED FISHERMAN BORDER ALERT SYSYTEM USING GPS.

A PROJECT REPORT

Submitted by

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BONAFIDE CERTIFICATE

Certified that this project report **"IOT BASED FISHERMAN BORDER ALERT SYSYTEM USING GPS."** is the bonafide work of **"JEEVANANDHAM N (211420105310), VANJINATHAN V (211420105337), MUKESH KRISHNA S (211420105318), MANOJ KUMAR M (211420105317) "** who carried out the project work under my supervision.

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INTERNAL EXAMINAR **EXTERNAL EXAMINAR**

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ABSTRACT

In our regular day to day existence, we have overcome many incidents on Indian fishermen caught arrested or even killed by Sri Lankan navy. However, it's an "unsubstantiated allegation". Asserting that its personnel is not authorized to open fire in such situations, the major cause set to be the negligence of the anglers who aren't aware of the Maritime borders. Indian fishermen enter Sri Lankan boundary unknowingly.

The fastest growth of technology has made our lifestyle Comfort. The technology also increased the traffic risks and the accidents take place frequently which causes huge loss of life because inadequate of emergency facility our project will help this displacement.

The project concludes when a vehicle meets with an accident, the mems sensor will analyze the signal and this signal to transferred to the microcontroller

In major areas it's impossible to know the exact border without the help of the GPS. the GPS gets the coordinates from the NODE MCU microcontroller and wireless transmission of information is transferred from IOT tracking unit to the monitoring unit that store the coordinate of the exact location and if the anglers cross the border the microcontroller signals the ignition to set off, so that the anglers don't have to cross the maritime border as well as the life of the fishermen's is saved and the coordinates of the anglers is sent to the listed members or the naval officers as web page who can rescue the fishermen's on time.

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CHAPTER 1

INTRODUCTION

The Internet of things (IoT) describes the network of physical objects “things” that are embedded with sensors, software, and other technologies for the purpose of connecting and exchanging data with other devices and systems over the Internet.

Things have evolved due to the convergence of multiple technologies, real-time analytics, machine learning, commodity sensors, and embedded systems. Traditional fields of embedded systems, wireless sensor networks, control systems, automation (including home and building automation), and others all contribute to enabling the Internet of things.

The coastal area people are purely depending on fishing occupation in the sea. If the fisherman crosses the coastal border, it should be treated as a serious offence.

Due to unawareness about the boundary limits, the fisherman crosses the maritime borders. While fisherman crossed the border, the boats are being captured by the neighborhood countries coastal guards.

Under such situation lives of fisherman are in danger. In such cases our border alert system for fisherman will help to overcome the project.

Using GPS, the current latitude and longitude values can be determined and it compare the current location and predefined latitude and longitude values.

1.1 EXISTING SYSTEM:

The coastal area people are purely depending on fishing occupation in the sea. If the fisherman crosses the coastal border, it should be treated as a serious offence. Due to unawareness about the boundary limits, the fisherman crosses the maritime borders. we have overcome many incidents on Indian fishermen caught arrested or even killed by Sri Lankan navy. However, it's an "unsubstantiated allegation" Here we cannot determine the coastal border, since the coastal area is too large than land area.

1.1.1 Disadvantages

- Country borders cannot be prestored.
- Unable to find the country borders while fishermen were in the sea.
- Only location of their ship or boat is sent via GSM modem at frequent intervals.

1.2 PROPOSED SYSTEM:

The proposed system of the project states that the major areas it's impossible to know the exact border without the help of the GPS. So we proposed a project with the help of GPS gets the coordinates from the NODEMCU microcontroller and wireless transmission of information is transferred from IOT tracking unit to the monitoring unit that store the coordinate of the exact location and if the anglers cross the border the microcontroller signals the ignition to set off, so that the anglers don't have to cross the maritime border as well as the life of the fishermen's is saved and the coordinates of the anglers is sent to the listed members or the naval officers as web page who can rescue the fishermen's on

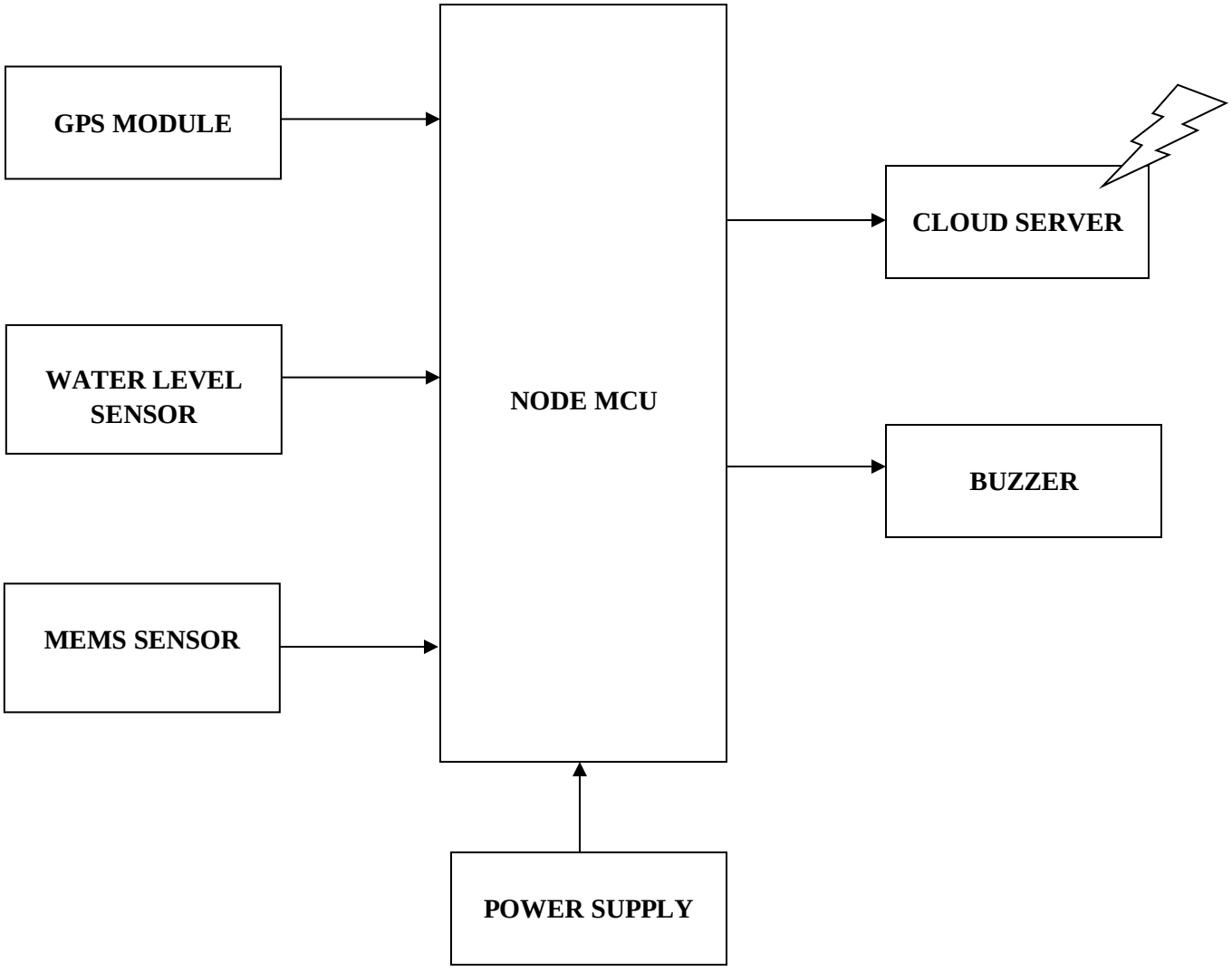
time. Additionally, accident detection is also included so that if their boat or ship has met with an accident it will be automatically informed in the IoT webpage. Here we include GPS modem, Water Level sensor as well as MEMS sensor.

1.2.1 Advantages

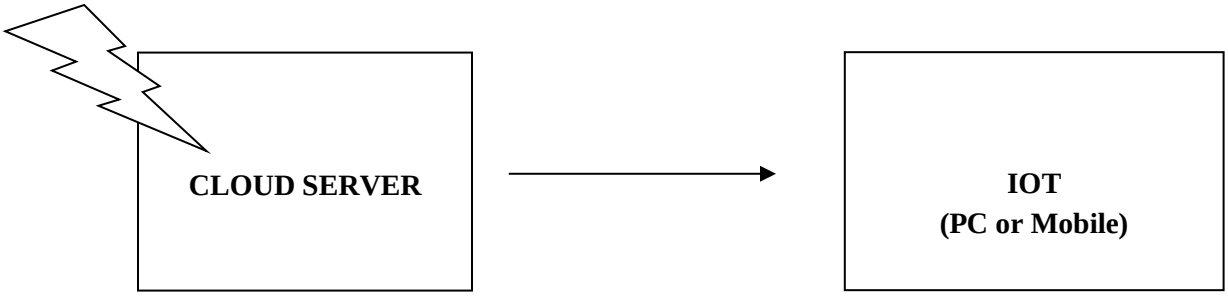
This system can alert the fisherman when he crosses the border. Since here also country borders are not preloaded, since it is an IoT system it can transfer the data when the system is connected to internet.

This system not only detects the border alert system it also detects the accident of their vessels.

1.2.2 BLOCK DIAGRAM:



RECIVER SIDE:



1.3 HARDWARE AND SOFTWARE SPECIFICATION:

1.3.1 HARDWARE REQUIRMENTS:

- NODE MCU
- GPS MODULE
- MEMS SENSOR
- WATER LEVEL SENSOR
- BUZZER
- REGULATOR
- POWER SUPPLY
- SOLDERING KIT
- CONNECTING WIRES

1.3.2 SOFTWARE SPECIFICATION:

- ARDUINO IDE
- EMBEDDED C

1.3.3 MODULES:

1. SENSOR INTERFACING
2. PREPARING POWER SUPPLY UNIT
3. MICRO-CONTROLLER PROGRAMMING
4. READING ANALOG DATA
5. TEST AND DEBUG
6. SUBMISSION

1.3.4 MODULE DESCRIPTION:

1.SENSOR INTERFACING

Sensor interfacing is a mix of amplification, filtering, and other signal conditioning as well as analog-to-digital conversion. The analog-to-digital converter (ADC) may be in your microcontroller, but you will still need to make the sensor compatible with the ADC input.

2.PREPARING POWER SUPPLY UNIT

A power supply unit (or PSU) converts mains AC to low-voltage regulated DC power for the internal components of a controller. A power supply is used to reduce the mains electricity at 240 volts AC down to something more useable, say 12 volts DC. There are two types of power supply, linear and switch mode. A linear power supply uses a transformer to reduce the voltage. The AC signal is rectified and regulated to produce a high DC voltage.

An AC adapter, AC/DC adapter, or AC/DC converter is a type of external power supply, often enclosed in a case similar to an AC plug. Adapters for battery-powered equipment may be described as chargers or rechargers (see also battery charger). AC adapters are used with electrical devices that require power but do not contain internal components to derive the required voltage and power from main power. The internal circuitry of an external power supply is very similar to the design that would be used for a built-in or internal supply.

3.MICRO-CONTROLLER PROGRAMMING

A microcontroller is a programmable IC, capable of multiple functions depending on how it’s programed. Many different kinds of microcontrollers exist that offer a wide range of functionality. The versatility of the microcontroller is what makes it

one of the most powerful tools in modern design. This guide will explain the basics of microcontrollers and how they are programmed.

4.READING ANALOG DATA

The microcontroller of the board has a circuit inside called an analog-to-digital converter or ADC that reads this changing voltage and converts it to a number between 0 and 1023. When the shaft is turned all the way in one direction, there are 0 volts going to the pin, and the input value is 0. When the shaft is turned all the way in the opposite direction, there are 5 volts going to the pin and the input value is 1023. In between, analog Read() returns a number between 0 and 1023 that is proportional to the amount of voltage being applied to the pin.

5.TEST AND DEBUG

Testing means verifying correct behavior. Testing can be done at all stages of module development: requirements analysis, interface design, algorithm design, implementation, and integration with other modules. In the following, attention will be directed at implementation testing. Implementation testing is not restricted to execution testing.

Debugging is a cyclic activity involving execution testing and code correction. The testing that is done during debugging has a different aim than final module testing. Final module testing aims to demonstrate correctness, whereas testing during debugging is primarily aimed at locating errors. This difference has a significant effect on the choice of testing strategies.

5.SUBMISSION

Submitting the prototype for the presentation to the faculty guide for review purpose

CHAPTER 2

LITERATURE REVIEW

2.1 IoT-BASED NAUTICAL TRACING SYSTEM

Author: V. Ulagamuthalvi

Description: Observation is an essential issue for perimeter command and the security of business workplaces. The ocean edge between the countries isn't really unmistakable, which is the guideline clarification behind this cross-periphery viciousness for fishers. The motto behind this research work is to give a simple to utilize and well-legitimate condition to avoid various disasters and to alert the fishermen on the periphery domains. An organized structure using microcontroller unit guarantees the fishermen by advising the border edge using Global Positioning System (GPS). GPS authority is used to find the present region of the calculating barge or vessel. Using GPS, the present extension and longitude regards can be traced and can be sent to the control unit. By then the control unit finds the present territory by differentiating the current degree and longitudinal characteristics with the predefined regard. From the eventual outcome of the examination, the system alert concerned fishers that they will accomplish the nautical periphery.

2.2 Smart low-consumption IoT framework for location tracking and its real application

Author: Hao Tang

Description: Location-based services are increasingly popular. Smart devices embedded with GPS receiver are widely used in vehicle tracking, law enforcement and person monitoring. To provide real-time data collecting and analyzing, a

backend server is necessary. A mobile app can work as a user client for accessing location data and remote control. In this paper, we describe the design and implementation of a system providing real-time positioning and tracking service. Our system consists of three parts: tracking device, backend server and mobile app. Our tracking device integrates GPS module, GSM/GPRS module and TCP/IP stack, capable of generating location data, establishing TCP connection and receiving SMS. Location data are transmitted over TCP connection from device to our backend server. The server is responsible for collecting and storing data. The server also provides an HTTP-based RESTful API for mobile app and web service. A mobile app is built for displaying data and controlling device remotely. Data accessing is via calling REST API and remote control is sent to device by SMS. Our device is compact in volume, accurate in positioning, and long in battery life. Our device has been integrated in a walking stick as a real-world product.

2.3 Intelligent security system based on location information

Author: He Weixin; Cong Linhu

Description: The current military management of important materials lacks real-time monitoring means. Once important materials are lost or stolen, they can only be analyzed and speculated through post-event investigations and evidence collection. People can’t immediately locate the real-time location of the item. Based on the above considerations, the NB-IoT communication module, Beidou positioning module, and buzzer are used to form a positioning device. When important materials are active outdoors, the NB-IoT SIM card on the device is activated, and the SIM card sends real-time location information of the materials to the cloud platform in real time to ensure that real-time trends are grasped, and the data will be sent to the computer terminal. The administrator operates the terminal

and can monitor the entire process without blind spots. In the process of data transmission, AES encryption is used to ensure data security. Installed on important materials, the management software will display the location, movement track, environmental status and other information of the materials in real time, which solves the needs of real-time monitoring, status monitoring and anti-theft warning of important materials.

CHAPTER 3
HARDWARE DESCRIPTION

3.1 HARDWARE

3.1.1NODE MCU ESP82266

ESP8266 is a single 2.4 GHz Wi-Fi-and-Bluetooth combo chip designed with the TSMC ultra-low-power 40 nm technology. It is designed to achieve the best power and RF performance, showing robustness, versatility and reliability in a wide variety of applications and power scenarios.

The ESP8266 series of chips includes ESP32-D0WD-V3, ESP32-D0WDQ6-V3, ESP32-D0WD, ESP32-D0WDQ6, ESP32-D2WD, ESP32-S0WD, and ESP32-U4WDH, among which, ESP32-D0WD-V3, ESP32-D0WDQ6-V3, and ESP32-U4WDH are based on ECO V3 wafer.

Featured Solutions:

- Ultra-Low-Power Solution

ESP32 is designed for mobile, wearable electronics, and Internet-of-Things (IoT) applications. It features all the state-of-the-art characteristics of low-power chips,

including fine-grained clock gating, multiple power modes, and dynamic power scaling. For instance, in a low-power IoT sensor hub application scenario, ESP32 is woken up periodically and only when a specified condition is detected. Low-duty cycle is used to minimize the amount of energy that the chip expends. The output of the power amplifier is also adjustable, thus contributing to an optimal trade-off between communication range, data rate and power consumption.

- Complete Integration Solution

ESP32 is a highly-integrated solution for Wi-Fi-and-Bluetooth IoT applications, with around 20 external components. ESP32 integrates an antenna switch, RF balun, power amplifier, low-noise receive amplifier, filters, and power management modules. As such, the entire solution occupies minimal Printed Circuit Board (PCB) area. ESP32 uses CMOS for single-chip fully-integrated radio and baseband, while also integrating advanced calibration circuitries that allow the solution to remove external circuit imperfections or adjust to changes in external conditions. As such, the mass production of ESP32 solutions does not require expensive and specialized Wi-Fi testing equipment.

Wi-Fi Key Features

- ✓ 802.11 b/g/n
- ✓ 802.11 n (2.4 GHz), up to 150 Mbps
- ✓ WMM
- ✓ TX/RX A-MPDU, RX A-MSDU
- ✓ Immediate Block ACK
- ✓ Defragmentation
- ✓ Automatic Beacon monitoring (hardware TSF)
- ✓ 4 × virtual Wi-Fi interfaces

- ✓ Simultaneous support for Infrastructure Station, SoftAP, and Promiscuous modes Note that when ESP32 is in Station mode, performing a scan, the SoftAP channel will be changed.
- ✓ Antenna diversity

BT Key Features

• Compliant with Bluetooth v4.2 BR/EDR and BLE specifications

• Class-1, class-2 and class-3 transmitter without external power amplifier

• Enhanced Power Control

• +12 dBm transmitting power

• NZIF receiver with –94 dBm BLE sensitivity

• Adaptive Frequency Hopping (AFH)

• Standard HCI based on SDIO/SPI/UART

• High-speed UART HCI, up to 4 Mbps

• Bluetooth 4.2 BR/EDR BLE dual mode controller

• Synchronous Connection-Oriented/Extended (SCO/eSCO)

• CVSD and SBC for audio codec

• Bluetooth Piconet and Scatternet

• Multi-connections in Classic BT and BLE

• Simultaneous advertising and scanning

CPU and Memory:

• Xtensa® single-/dual-core 32-bit LX6 microprocessor(s), up to 600 MIPS (200 MIPS for ESP32-S0WD/ESP32-U4WDH, 400 MIPS for ESP32-D2WD)

• 448 KB ROM

• 520 KB SRAM

• 16 KB SRAM in RTC

• QSPI supports multiple flash/SRAM chips

Clocks and Timers:

• Internal 8 MHz oscillator with calibration

• Internal RC oscillator with calibration

• External 2 MHz ~ 60 MHz crystal oscillator (40 MHz only for Wi-Fi/BT functionality)

• External 32 kHz crystal oscillator for RTC with calibration

• Two timer groups, including 2 × 64-bit timers and 1 × main watchdog in each group

• One RTC timer

• RTC watchdog

Advanced Peripheral Interfaces

• 34 × programmable GPIOs

• 12-bit SAR ADC up to 18 channels

• 2 × 8-bit DAC

• 10 × touch sensors

• 4 × SPI

• 2 × I²S

• 2 × I²C

• 3 × UART

• 1 host (SD/eMMC/SDIO)

• 1 slave (SDIO/SPI)

• Ethernet MAC interface with dedicated DMA and IEEE 1588 support

• Two-Wire Automotive Interface (TWAI®, compatible with ISO11898-1)

• IR (TX/RX)

• Motor PWM

• LED PWM up to 16 channels

• Hall sensor

Security

• Secure boot

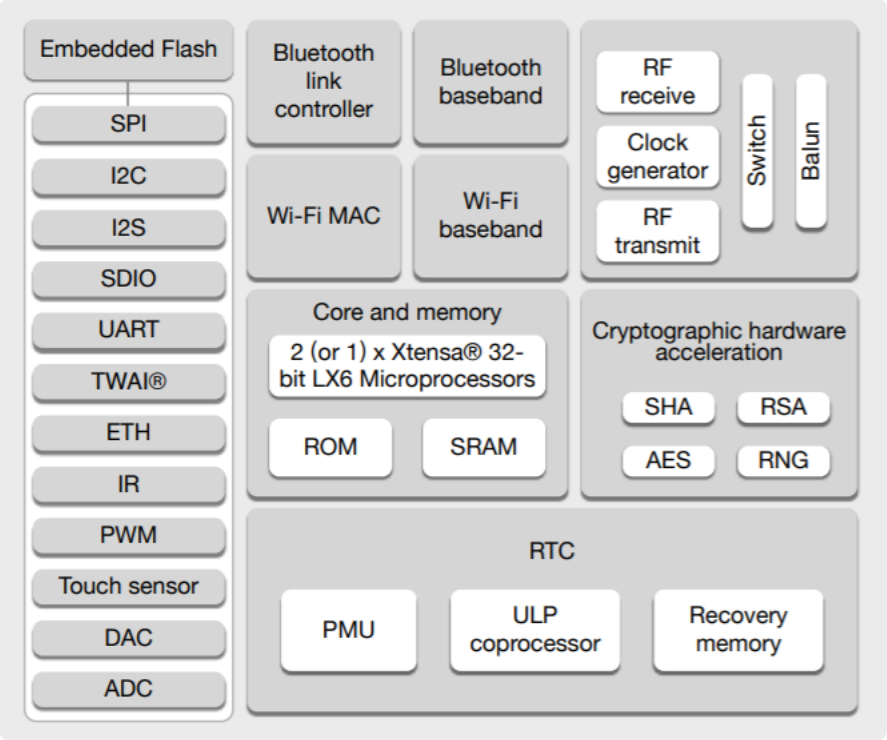
• Flash encryption

• 1024-bit OTP, up to 768-bit for customers

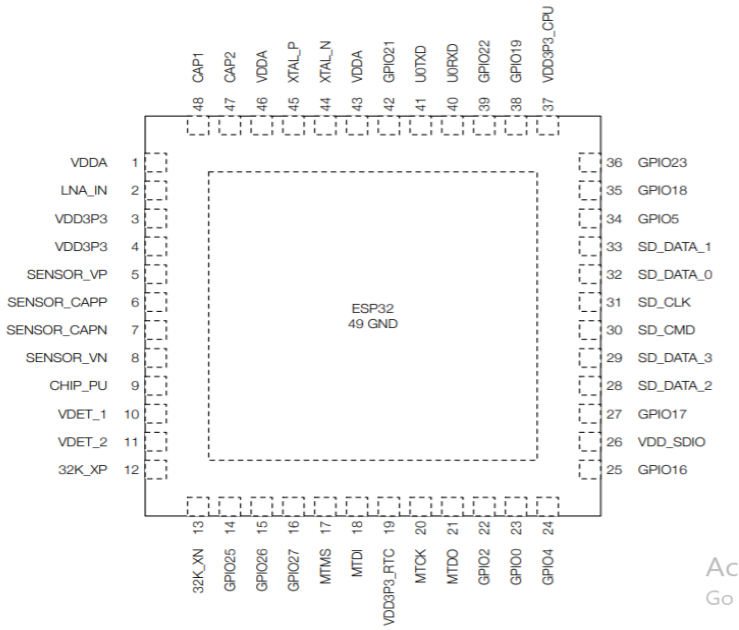
• Cryptographic hardware acceleration: – AES – Hash (SHA-2)

– RSA – ECC – Random Number Generator (RNG)

3.1.2 BLOCK DIAGRAM:



Pin Layout:



3.1.3 CPU and Memory:

CPU:

ESP32 contains one or two low-power Xtensa® 32-bit LX6 microprocessor(s) with the following features:

• 7-stage pipeline to support the clock frequency of up to 240 MHz (160 MHz for ESP32-S0WD, ESP32-D2WD, and ESP32-U4WDH)

• 16/24-bit Instruction Set provides high code-density

• Support for Floating Point Unit

• Support for DSP instructions, such as a 32-bit multiplier, a 32-bit divider, and a 40-bit MAC

• Support for 32 interrupt vectors from about 70 interrupt sources The single-/dual-CPU interfaces include:

• Xtensa RAM/ROM Interface for instructions and data

• Xtensa Local Memory Interface for fast peripheral register access

• External and internal interrupt sources

• JTAG for debugging

Internal Memory:

ESP32's internal memory includes:

• 448 KB of ROM for booting and core functions

• 520 KB of on-chip SRAM for data and instructions

• 8 KB of SRAM in RTC, which is called RTC FAST Memory and can be used for data storage; it is accessed by the main CPU during RTC Boot from the Deep-sleep mode.

• 8 KB of SRAM in RTC, which is called RTC SLOW Memory and can be accessed by the co-processor during the Deep-sleep mode.

• 1 Kbit of eFuse: 256 bits are used for the system (MAC address and chip configuration) and the remaining 768 bits are reserved for customer applications, including flash-encryption and chip-ID.

• Embedded flash

External Flash and SRAM:

ESP32 supports multiple external QSPI flash and SRAM chips. More details can be found in Chapter SPI in the ESP32 Technical Reference Manual. ESP32 also

supports hardware encryption/decryption based on AES to protect developers' programs and data in flash.

ESP32 can access the external QSPI flash and SRAM through high-speed caches.

• Up to 16 MB of external flash can be mapped into CPU instruction memory space and read-only memory space simultaneously.

– When external flash is mapped into CPU instruction memory space, up to 11 MB + 248 KB can be mapped at a time. Note that if more than 3 MB + 248 KB are mapped, cache performance will be reduced due to speculative reads by the CPU.

– When external flash is mapped into read-only data memory space, up to 4 MB can be mapped at a time. 8-bit, 16-bit and 32-bit reads are supported.

• External SRAM can be mapped into CPU data memory space. SRAM up to 8 MB is supported and up to 4 MB can be mapped at a time. 8-bit, 16-bit and 32-bit reads and writes are supported.

3.2 GPS MODULE

The Global Positioning System (GPS), originally Navstar GPS, is a space-based radio navigation system owned by the United States government and operated by the United States Air Force. It is a global navigation satellite system that provides geo location and time information to a GPS receiver anywhere on or near the Earth where there is an unobstructed line of sight to four or more GPS satellites.

The GPS system does not require the user to transmit any data, and it operates independently of any telephonic or internet reception, though these technologies can enhance the usefulness of the GPS positioning information. The GPS system provides critical positioning capabilities to military, civil, and commercial users

around the world. The United States government created the system, maintains it, and makes it freely accessible to anyone with a GPS receiver.

GPS MODULE

The Global Positioning System (GPS) is a global navigation satellite system that provides location and time information in all weather conditions. The GPS operates independently of any telephonic or internet reception, though these technologies can enhance the usefulness of the GPS positioning information. GPS satellites transmit signal information to earth. This signal information is received by the GPS receiver in order to measure the user's correct position.

The GPS concept is based on time and the known position of specialized satellites. GPS satellites continuously transmit their current time and position. A GPS receiver monitors multiple satellites and solves equations to determine the precise position of the receiver and its deviation from true time. At a minimum, four satellites must be in view of the receiver for it to compute four unknown quantities.

Each GPS satellite continually broadcasts a signal (carrier wave with modulation) that includes a pseudorandom code (sequence of ones and zeros) that is known to the receiver and a message that includes the time of transmission (TOT) of the code epoch and the satellite position at that time.

FEATURES

- Supply voltage: 12v DC
- Interface: UART RS232
- Optional T-TL uart also available
- Precision: 5 meters
- Automatic antenna switching function

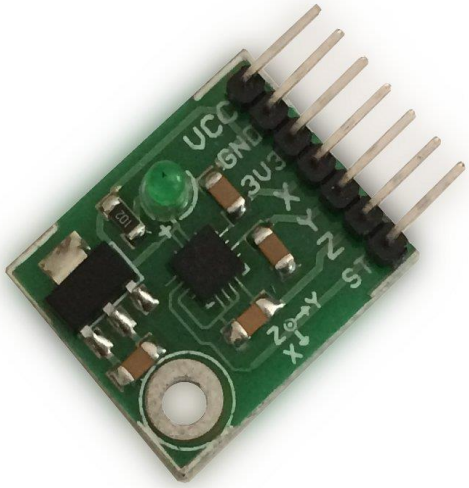
APPLICATIONS

- GPS trackers
- Automated vehicle
- Robotics
- Fleet tracking

3.3 MEMS SENSOR

Microelectromechanical system (MEMS, also written a micro-electro-mechanical, Microelectromechanical or microelectronic and microelectromechanical system and the related micro mechatronics) is the technology of microscopic devices, particularly those with moving parts.

The accelerometer is a low power, low profile capacitive micro machined Accelerometer featuring signal conditioning, a 1-pole low pass filter, temperature Compensation, self-test, 0g-Detect which detects linear freefall, and g-Select which Allows for the selection between 2 sensitivities Zero-g offset and sensitivity is Factory set and requires no external devices. This includes a Sleep Mode that makes it ideal for handheld battery powered elect.



. **ACCELEROMETER SENSOR**

You can use an accelerometer's ability to sense acceleration to measure a variety of things that are very useful to electronic and robotic projects and designs:

- Acceleration
- Tilt and tilt angle
- Incline
- Rotation
- Vibration
- Collision
- Gravity

Acceleration is a measure of how quickly speed changes. Just as a speedometer is a meter that measures speed, an accelerometer is a meter that measures acceleration. Accelerometers are useful for sensing vibrations in systems or for orientation applications. Accelerometers can measure acceleration on one, two, or three axis. 3-axis units are becoming more common as the cost of development for them

decreases. You can use an accelerometer's ability to sense acceleration to measure a variety of things that are very useful to electronic and robotic projects.

FEATURES

- Low Current Consumption: 400 Ma
- Sleep Mode: 3μA
- Low Voltage Operation: 2.2 V – 3.6 V
- High Sensitivity (800 mV/g @ 1.5g)
- Selectable Sensitivity (±1.5g, ±6g)
- Fast Turn on Time (0.5 ms Enable Response Time)
- Self-Test for Freefall Detect Diagnosis

APPLICATIONS:

- Self-balancing robots
- Tilt-mode game controllers
- Model airplane auto pilot
- Car alarm systems
- Crash detection/airbag deployment

3.4 WATER LEVEL SENSOR

Water Level Sensors. Level sensors are used to detect the level of substances that can flow. Such substances include liquids, slurries, granular material and powders. Level measurements can be done inside containers or it can be the level of a river or lake.

WATER LEVEL SENSOR

Level sensors detect the level of liquids and other fluids and powders that exhibit an upper free surface. Substances that flow become essentially horizontal in their containers (or other physical boundaries) because of gravity whereas most bulk solids pile at an angle of repose to a peak. There are many physical and application variables that affect the selection of the optimal level monitoring method for industrial and commercial processes. The selection criteria include the physical: phase (liquid, solid or slurry), temperature, pressure or vacuum, chemistry, dielectric constant of medium, density (specific gravity) of medium, agitation (action), acoustical or electrical noise, vibration, mechanical shock, tank or bin size and shape

Level sensors detect the level of substances that flow, including liquids, Slurries, granular materials, and powders. The substance to be measured can be inside a container or can be in its natural form. The level measurement can be either continuous or point values. Continuous level sensors measure level within a specified range and determine the exact amount of substance in a certain place. While point-level sensors only indicate whether the substance is above or below the sensing point generally the latter detect levels that are excessively high or low.

Selection of an appropriate type of sensor suiting to the application requirement is very important.

FEATURES

- Input voltage: 5v
- Output: Analog.
- Output voltage: 0-3v
- Level detecting range: 0 to .2m.
- Level is determined with the resistance.

APPLICATIONS

- Movable arm.
- Air ball.

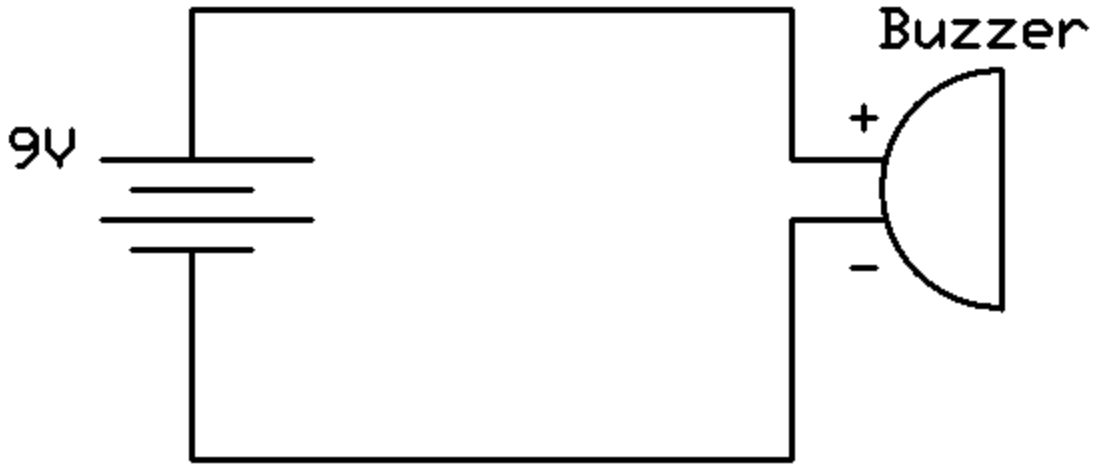
3.5 BUZZER

A buzzer or beeper is a signaling device, usually electronic, typically used in automobiles, household appliances such as a microwave oven, or game shows.

BUZZER

A buzzer or beeper is an audio signaling device, which may be mechanical, electromechanical, or piezoelectric. Typical uses of buzzers and beepers include alarm devices, timers and confirmation of user input such as a mouse click or key stroke.

Buzzer is an integrated structure of electronic transducers, DC power supply, widely used in computers, printers, copiers, alarms, electronic toys, automotive electronic equipment, telephones, timers and other electronic products for sound devices. Active buzzer 5V Rated power can be directly connected to a continuous sound, this section dedicated sensor expansion module and the board in combination, can complete a simple circuit design, to "plug and play."



CIRCUIT DIAGRAM

A buzzer or beeper is an audio signaling device, which may be mechanical, electromechanical, or piezoelectric. Typical uses of buzzers and beepers include alarm devices, timers, and confirmation of user input such as a mouse click or keystroke.

It generates consistent single tone sound just by applying D.C voltage. Using a suitably designed resonant system, this type can be used where large sound volumes are needed. At Future Electronics we stock many of the most common types categorized by Type, Sound Level, Frequency, Rated Voltage, Dimension and Packaging Type.

FEATURES

- Input supply: 5 VDC
- Current consumption: 9.0 mA max.
- Oscillating frequency: 3.0 ±0.5 KHz
- Sound Pressure Level: 85dB min

APPLICATIONS

- Confirmation of user input (ex: mouse click or keystroke)
- Electronic metronomes
- Sporting events
- Judging Panels
- Annunciator panels

3.6 REGULATOR

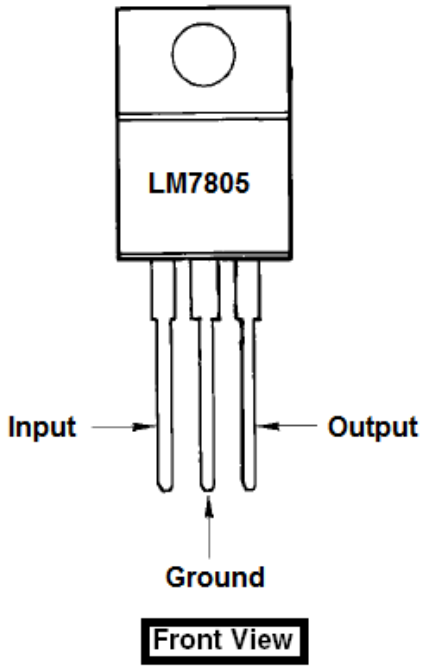
A voltage regulator is designed to automatically maintain a constant voltage level. A voltage regulator may be a simple "feed-forward" design or may include negative feedback control loops. It may use an electromechanical mechanism, or electronic components.

This series of fixed-voltage integrated-circuit voltage regulators is designed for a wide range of applications. These applications include on-card regulation for elimination of noise and distribution problems associated with single-point regulation. Each of these regulators can deliver up to 1.5 A of output current.

REGULATOR

The internal current-limiting and thermal-shutdown features of these regulators essentially make them immune to overload. In addition to use as fixed voltage regulators, these devices can be used with external components to obtain adjustable output voltages and currents, and also can be used as the power-pass element in precision regulators.

The LM78XX series of three terminal positive regulators are available in the TO-220 package and with several fixed output voltages, making them useful in a wide range of applications. Each type employs internal current limiting, thermal shut down and safe operating area protection, making it essentially indestructible.



PIN DIAGRAM

If adequate heat sinking is provided, they can deliver over 1A output current. Although designed primarily as fixed voltage regulators, these devices can be used with external components to obtain adjustable voltages and currents.

FEATURES

- Output Current up to 1A
- Output Voltages of 5, 6, 8, 9, 10, 12, 15, 18, 24V
- Thermal Overload Protection
- Short Circuit Protection
- Output Transistor Safe Operating Area Protection

3.7 TRANSFORMER

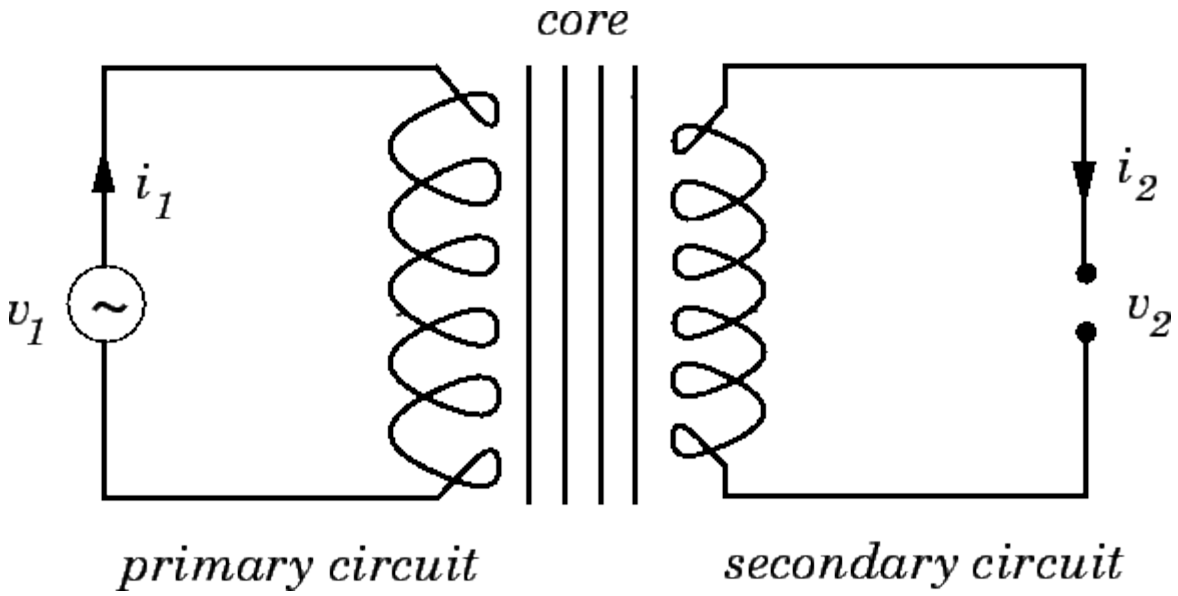
A Transformer is a device which transfers electric current from one circuit to another, usually by the principal of mutual induction. During this process, the frequency remains constant whereas the voltage can be increased or decreased according to the need.

This transfer of electricity occurs with the help of two coils. One of which is known as the Primary Coil, which is connected to a source of alternating current. The other is known as the Secondary Coil, and it is connected to an external circuit.

TRANSFORMER

It is a general purpose chassis mounting mains transformer. Transformer has 240V primary windings and center tapped secondary winding. The transformer has flying colored insulated connecting leads (Approx 100 mm long). The Transformer act as step down transformer reducing AC - 240V to AC - 12V. Power supplies for all kinds of project & circuit boards.

Step down 230 V AC to 12V with a maximum of 1Amp current. In AC circuits, AC voltage, current and waveform can be transformed with the help of Transformers. Transformer plays an important role in electronic equipment. AC and DC voltage in Power supply equipment are almost achieved by transformer's transformation and commutation.



CIRCUIT DIAGRAM

A transformer is an electrical device that transfers electrical energy between two or more circuits through electromagnetic induction. Electromagnetic induction produces an electromotive force within a conductor which is exposed to time

varying magnetic fields. Transformers are used to increase or decrease the alternating voltages in electric power applications.

It is a step-down transformer in which the secondary winding is more than primary winding. Due to the windings, it can able to step down the voltage. A Transformer changes electricity from high to low voltage or low to high voltage using two properties of electricity.

FEATURES

- Output current:1A
- Supply voltage: 220-230VAC
- Output voltage: 12VAC
- Soft Iron Core.
- 1Amp Current Drain.

APPLICATIONS

- DIY projects Requiring In-Application High current drain.
- On chassis AC/AC converter.
- Designing a battery Charger.
- Electronic applications.
- Step down applications (Power transmission).

CHAPTER 4

SOFTWARE DESCRIPTION

4.1 ARDUINO IDE

The Arduino Integrated Development Environment - or Arduino Software (IDE) - contains a text editor for writing code, a message area, a text console, a toolbar with buttons for common functions and a series of menus. It connects to the Arduino and Genuino hardware to upload programs and communicate with them.

Programs written using Arduino Software (IDE) are called **sketches**. These sketches are written in the text editor and are saved with the file extension .ino. The editor has features for cutting/pasting and for searching/replacing text. The message area gives feedback while saving and exporting and also displays errors. The console displays text output by the Arduino Software (IDE), including complete error messages and other information. The bottom righthand corner of the window displays the configured board and serial port. The toolbar buttons allow you to verify and upload programs, create, open, and save sketches, and open the serial monitor.

Before uploading your sketch, you need to select the correct items from the **Tools > Board** and **Tools > Port** menus. The boards are described below. On the Mac, the serial port is probably something like **/dev/tty.usbmodem241** (for an Uno or Mega2560 or Leonardo) or **/dev/tty.usbserial-1B1** (for a Duemilanove or earlier USB board), or **/dev/**tty.USA19QW1b1P1**.1** (for a serial board connected with a Keyspan USB-to-Serial adapter). On Windows, it's probably COM1 or COM2 (for a serial board) or COM4, COM5, COM7, or higher (for a USB board) - to find out, you look for USB serial device in the ports section of the Windows Device Manager. On Linux, it should be **/dev/ttyACMx** , **/dev/ttyUSBx** or similar. Once

you've selected the correct serial port and board, press the upload button in the toolbar or select the **Upload** item from the **Sketch** menu. Current Arduino boards will reset automatically and begin the upload. With older boards (pre-Diecimila) that lack auto-reset, you'll need to press the reset button on the board just before starting the upload. On most boards, you'll see the RX and TX LEDs blink as the sketch is uploaded. The Arduino Software (IDE) will display a message when the upload is complete, or show an error.

When you upload a sketch, you're using the Arduino **bootloader**, a small program that has been loaded on to the microcontroller on your board. It allows you to upload code without using any additional hardware. The bootloader is active for a few seconds when the board resets; then it starts whichever sketch was most recently uploaded to the microcontroller. The bootloader will blink the on-board (pin 13) LED when it starts (i.e. when the board resets).

4.2 PROGRAMMING LANGUAGE

Embedded C is a set of language extensions for the C programming language by the C Standards Committee to address commonality issues that exist between Cextensions for different embedded systems.

Embedded C is a set of language extensions for the C programming language by the C Standards Committee to address commonality issues that exist between C extensions for different embedded systems. Historically, embedded C programming requires nonstandard extensions to the C language in order to support exotic features such as fixed-point arithmetic, multiple distinct memory banks, and basic I/O operations

An embedded system is a computer system with a dedicated function within a larger mechanical or electrical system, often with real-time computing constraints. It is embedded as part of a complete device often including hardware and mechanical parts. Embedded systems control many devices in common use today. Ninety-eight percent of all microprocessors are manufactured as components of embedded systems.

Examples of properties of typical embedded computers when compared with general-purpose counterparts are low power consumption, small size, rugged operating ranges, and low per-unit cost. This comes at the price of limited processing resources, which make them significantly more difficult to program and to interact with. However, by building intelligence mechanisms on top of the hardware, taking advantage of possible existing sensors and the existence of a network of embedded units, one can both optimally manage available resources at the unit and network levels as well as provide augmented functions, well beyond those available. For example, intelligent techniques can be designed to manage power consumption of embedded systems.

Modern embedded systems are often based on microcontrollers (i.e. CPU's with integrated memory or peripheral interfaces), but ordinary microprocessors (using external chips for memory and peripheral interface circuits) are also common, especially in more-complex systems. In either case, the processor(s) used may be types ranging from general purpose to those specialized in certain class of computations, or even custom designed for the application at hand. A common standard class of dedicated processors is the digital signal processor (DSP).

Since the embedded system is dedicated to specific tasks, design engineers can optimize it to reduce the size and cost of the product and increase the reliability

and performance. Some embedded systems are mass-produced, benefiting from economies of scale.

Embedded systems range from portable devices such as digital watches and MP3 players, to large stationary installations like traffic lights, factory controllers, and largely complex systems like hybrid vehicles, MRI, and avionics. Complexity varies from low, with a single microcontroller chip, to very high with multiple units, peripherals and networks mounted inside a large chassis or enclosure.

CHAPTER 5

RESULTS

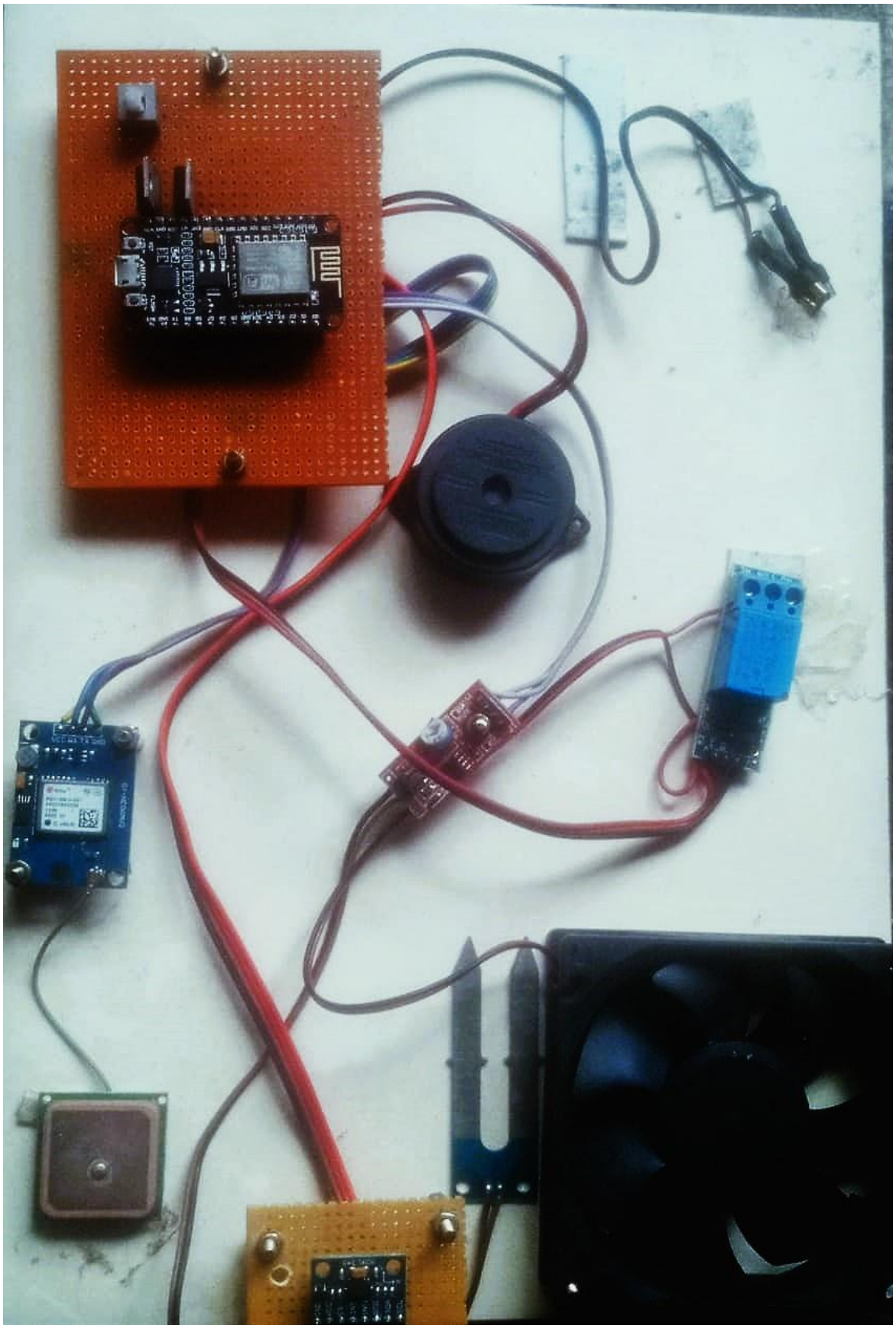
The objective of this project is to safe guard the lives of fisherman by using the technology GPS (Global Positioning System).

GPS is used to track the current location of the boat.

If the fisherman cross the border, the alarm sound will get generated.

The relay circuit will reverse the boat.

The Technology is to transfer the information between fisherman and IOT (Internet of Things) station.



CHAPTER 6

CONCLUSION

The alert system which we have developed will provide an effective solution for fishermen problem and prevent them from crossing other country border. This conclusion will save many fishermen lives from crossing the national border. Our project mainly focusses on smooth relationship between two countries. Death rate will be decreased by Sri Lankan navy and fishermen life time can be increased.

CHAPTER 7

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