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Defence Integrated Security System

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Abstract: - National Defence and security is of prime importance for any Government or nation. We used to hear the news of violation of seize fire across the border areas sometimes even in the least expected areas like smaller areas where our soldiers are less in number or are not that prepared for an attack. So to deal with such issues we can set up a special security system which would use sensors and would react instantaneously. This will not only enhance our security but also save the precious lives of our soldiers.

Key Words: — Sensors, Security, National Defense.

I. INTRODUCTION

National Defense means the protection of a country against foreign invasion or aggression. National Security is a concept that expects the Central Government of a unitary state to protect the whole country and its people against any national crisis by adopting political, economic, diplomatic, military other means. During the period of over 65 years of our country's existence since Independence, there has been invasions and aggression. This also means that in spite of our country's efforts to maintain peace in the region and with a population of peace loving nationals, we have been forced to devote a great deal of thought to the necessity of National Defense. We spend huge amounts on strengthening defenses, to protect ourselves from such aggressions. The strong Indian defense system will act as a deterrent to any wars in future. Potential causes of national insecurity include actions by other states (e.g. military or cyber-attack), violent non-state actors (e.g. terrorist attack), organized criminal groups such as narcotic cartels, and also the effects of natural disasters (e.g. flooding, earthquakes). Systemic drivers of insecurity, which may be transnational, include climate change, economic inequality and marginalization, political exclusion, and militarization. Originally conceived as protection against military attack, national security is now widely understood to include non-military dimensions, including the security from terrorism, crime, economic security, energy security, environmental security, food security, cyber security etc. Similarly, national security risks include, in addition to the actions of other nation states, action by violent non-state actors, narcotic cartels, and multinational corporations, and also the effects of natural disasters.

Although states differ in their approach, with some beginning to prioritise non-military action to tackle systemic drivers of insecurity, various forms of coercive power predominate, particularly military capabilities. The scope of these capabilities has developed. Traditionally, military capabilities were mainly land- or sea-based, and in smaller countries they still are. Elsewhere, the domains of potential warfare now include the air, space, cyberspace, and psychological operations. Military capabilities designed for these domains may be used for national security, or equally for offensive purposes, for example to conquer and annex territory and resources.

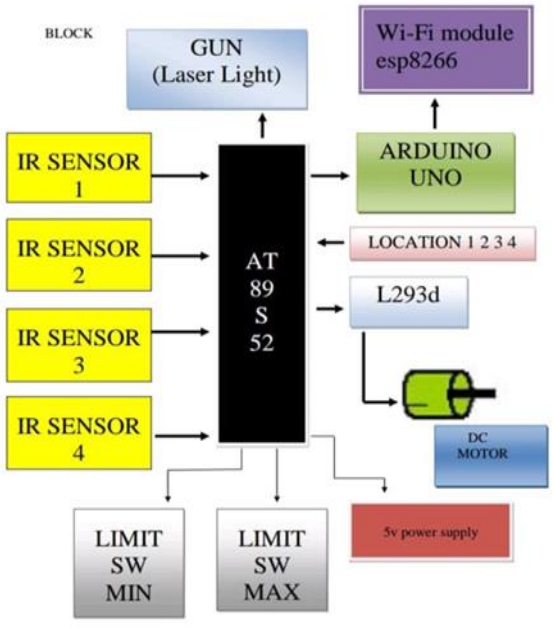

Fig 1. Block diagram

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II. Description Of Components Used In Proposed Model

The project has been divided our project into two modules: -

(a) Module 1- Laser Gun

(b) Module 2- Wi-fi Module

Both modules together form Defense Integrated Security System

Module 1-Laser Gun:

It consists of three Components-Ultrasonic Sensor, Microcontroller, DC Motor, Motor Driver.

Module 2- Wi-fi Module:

It comprises of components like GPS system, Wi-fi Module, Microcontroller, the microcontroller acts as an embedded computing system and control the activities of all the subsystems. It is interfaced with Emergency Switch, GPS, Receiver, GSM MODEM, and Electric shock circuitry. In case of emergency the trigger button is pressed. The system tracks the location information from the GPS and prepares a text SMS containing the present location information and send SMS through GSM modem to the police control room and distress message to the preprogrammed mobile number. Using the information supplied by this system, the location using GPS and can be traced through Google maps. Thus the girl will be safe and she feels protected.

A. Module 1-Laser Gun

In Fig 2.1 is the block diagram of flamethrower by which working of this module can easily be understood. Infrared Sensors detect and send the input to the microcontroller. The microcontroller takes the input and produces the output through Gun (Laser Light). The motor driver drives the DC Motor. It drives motor as and when directed by IR sensor. The Arduino UNO is connected to WiFi module which in turn is used in IOT system which tells us in which region maximum gunning has taken place.

B. Module 2- Wi-fi Module

The **ESP8266** is a low-cost Wi-Fi microchip with full TCP/IP stack and microcontroller capability produced by manufacturer Espress if 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 working of this module is explained though the block diagram in Fig 2.2.

Fig.2.2 Block Diagram of Wireless Safety System

III. Hardware Description

A. Main Blocks

The main blocks of this project are:

- Ultrasonic Sensor - HC-SR04
- Arduino UNO
- Gun (Laser Light)
- Motor Driver – L293D
- DC Motor
- 12V Power Supply
- Microcontroller – ATS952
- RADIO FREQUENCY IDENTIFICATION (RFID)
- WIFI Module – ESP8266
- Voltage Regulator – LM7805

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Ultrasonic Sensor (HC – SR04):

- As the name indicates, ultrasonic sensors measure distance by using ultrasonic waves.
- The sensor head emits an ultrasonic wave and receives the wave reflected back from the target. Ultrasonic Sensors measure the distance to the target by measuring the time between the emission and reception.
- An optical sensor has a transmitter and receiver, whereas an ultrasonic sensor uses a single ultrasonic element for both emission and reception. In a reflective model ultrasonic sensor, a single oscillator emits and receives ultrasonic waves alternately.
- This enables miniaturization of the sensor head.

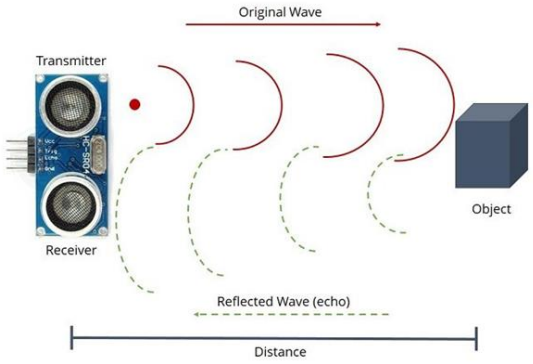

Fig 3.1. Ultrasonic Sensor

Arduino UNO:

Arduino Uno is a microcontroller board based on the ATmega328P. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz quartz crystal, a USB connection, a power jack, an ICSP header and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started. "Uno" means one in Italian and was chosen to mark the release of Arduino Software (IDE) 1.0. The Uno board and version 1.0 of Arduino Software (IDE) were the reference versions of Arduino, now evolved to newer releases. The Uno board is the first in a series of USB Arduino boards, and the reference model for the Arduino platform; for an extensive list of current, past or outdated boards see the Arduino index of boards.

Fig 3.2. Arduino UNO

The Arduino Uno has a number of facilities for communicating with a computer, another Arduino or other microcontrollers. The ATmega328 provides UART TTL (5v) serial communication, which is available on digital pins 0(Rx) and 1(Tx). In this project this microcontroller consisting data regarding the commodities available in the shop in the form of code which burned in the microcontroller. This controller will send the data in the form of 0s and1s to the MOSFET which is acting as a LED driver for the LED panel.

Gun (Laser Light):

Fig.3.3. Gun (Laser Light)

A laser is a device that emits light through a process of optical amplification based on the stimulated emission of electromagnetic radiation. The term "laser" originated as an acronym for "light amplification by stimulated emission of radiation". Gun acts as output.

Laser guns describe guns converted from their regular ammunition to using lasers to hit reflective targets.

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Motor Driver (L293D):

L293D is a dual H-bridge motor driver integrated circuit (IC). Motor drivers act as current amplifiers since they take a low-current control signal and provide a higher current signal. This higher current signal is used to drive the motors. L293D contains two inbuilt H-bridge driver circuits. In its common mode of operation, two DC motors can be driven simultaneously, both in forward and reverse direction. The motor operations of two motors can be controlled by input logic at pins 2 & 7 and 10 & 15. Input logic 00 or 11 will stop the corresponding motor. Logic 01 and 10 will rotate it in clockwise and anticlockwise directions, respectively. Enable pins 1 and 9 (corresponding to the two motors) must be high for motors to start operating. When an enable input is high, the associated driver gets enabled. As a result, the outputs become active and work in phase with their inputs. Similarly, when the enable input is low, that driver is disabled, and their outputs are off and in the high-impedance state.

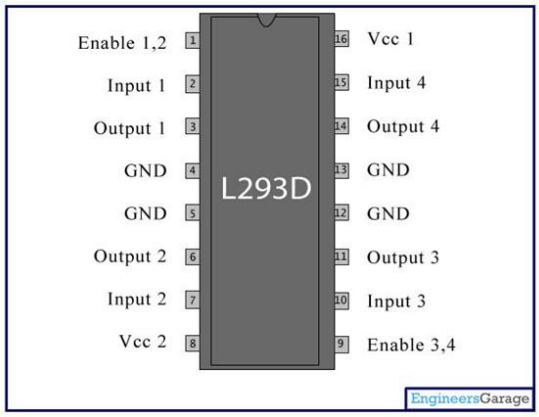

Fig.3.4. Motor Driver

DC Motor:

Fig.3.5 DC Motor

A DC motor is any of a class of rotary electrical machines that converts direct current electrical energy into mechanical energy. The most common types rely on the forces produced by magnetic fields. Nearly all types of DC motors have some internal mechanism, either electromechanical or electronic, to periodically change the direction of current flow in part of the motor. DC motors were the first form of motor widely used, as they could be powered from existing direct-current lighting power distribution systems. A DC motor's speed can be controlled over a wide range, using either a variable supply voltage or by changing the strength of current in its field windings. Small DC motors are used in tools, toys, and appliances. The **universal motor** can operate on direct current but is a lightweight **brushed** motor used for portable power tools and appliances.

Microcontroller (AT89S52):

The AT89S52 is a low-power, high-performance CMOS 8-bit microcontroller with 8Kbytes of in-system programmable Flash memory. The device is manufactured using Atmel's high-density nonvolatile memory technology and is compatible with the industry-standard 80C51 instruction set and pinout. The on-chip Flash allows the program memory to be reprogrammed in-system or by a conventional nonvolatile memory programmer.

Fig.3.6. AT89S52 Microcontroller

Radio Frequency Identification (RFID):

Radio-frequency identification (RFID) uses electromagnetic fields to automatically identify and track tags attached to objects. The tags contain electronically stored information. Passive tags collect energy from a nearby RFID reader's interrogating radio waves. Active tags have a local power source such as a battery and may operate at hundreds of meters from the RFID reader. Unlike a barcode, the tag need not be within the line of sight of the reader, so it may be

embedded in the tracked object. RFID is one method for Automatic Identification and Data Capture (AIDC). RFID tags are used in many industries, for example, an RFID tag attached to an automobile during production can be used to track its progress through the assembly line; RFID-tagged pharmaceuticals can be tracked through warehouses; and implanting RFID microchips in livestock and pets allows positive identification of animals.

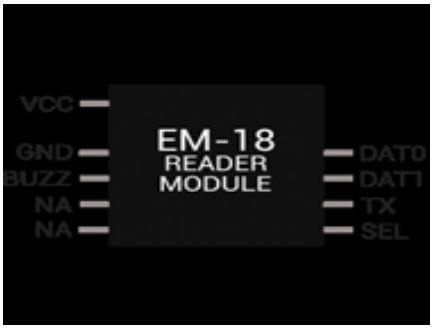

Fig.3.7. RFID

IV. FUTURE SCOPE

By using machine learning models on the captured videos/ images, we can distinguish between a human and an animal.

We can enhance this security system by using:

- Multiple cameras for surveillance to 1000m.
- Drones for surveillance of rough terrains.
- We can use to sense environment using GPS, stabilised digital compass, and laser range finders, which help the navigation and path planning algorithms in avoiding obstacles.

Advantages:

- SECURITY – It enhances our security in defence system.
- ALERT - It alerts on policy violations.
- INSTANT RESPONSE – Response (gunning) starts without any delay.
- TECNOLOGICALLY UPDATED – Regular updating of technology is essential for security purposes.
- CONTROL OVER BORDER AREA – We can have a check over the people crossing the border illegally.
- SAVE LIFE - It will help to save lives of our soldiers.

V. CONCLUSION

Security challenges and their management in border areas have always remained tense and complicated. More so in a country like India where a variety of geographical features can be found across borders like mountains, deserts, swampy marshes or even tropical evergreen jungles. Adding to all these is the hostile nature of our neighboring countries. Democracy as a sustainable feature could not be seen in many of these countries over the decades and a glimmer of hope is coming up only in recent years. All these have made border management quite complex and unique. There is cross-border smuggling of drugs, cattle, and fake currency notes other than the issues of terrorist infiltration and insurgency.

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