

ANTI-TERRORISM & RIOT (ATR) ROBOT –*THE TECHNOLOGICAL INTERVENTION TO DOMESTIC TERRORISM*

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ABSTRACT: According to a new study and report by the South Asia Terrorism Portal, the number of armed force fighters killed in India's Jammu and Kashmir area has increased by 106 percent in the last five years. In 2018, the country was subjected to 52 assaults, resulting in the deaths of 249 soldiers [1]. Terrorism is found not just on the country's outskirts and borders, but also within the country's interior [2]. The fresh incident of the Delhi riots in February 2020, in which 53 people were mercilessly killed, is possibly the most egregious act of domestic terrorism [3]. The Aug 2020 Bangalore riot, in which three people were killed and over 80 officers were critically injured by the equipped aggressors, unambiguously demonstrates the urgent necessity to utilize technology to prevent human encounters between assailants and victims without seriously harming them [4]. Police officers and the army are a country's most valuable assets; they preserve public order and peace. They are the front-line defenders, and their lives should be treated with extra care because they don't usually think about themselves because of their responsibility. Our proposed framework is an antiterrorism robotic framework that is sufficiently amazing to deal with crowd attack situations by using controlled electric shock and gentle stun. The system is first mathematically calculated to have the significant accuracy and precision. The mathematical modelling guarantees the accurate component and peripheral utilisation [5]. It also has wireless connectivity and lives surveillance systems that allow it to report live incidents in the form of a live video field with global coverage utilizing a night vision I.P camera. For the demo model, we use an Atmega 328 PPU microcontroller as the brain of the system, which works with Embedded C programming and HC-05 Bluetooth to operate the robot from a safe distance. Long-range Radio Frequency (RF) gadgets can be used as a range extension technique in a field model. Remote speakers are also used in the Anti-Terrorism & Riot (ATR) Robot to warn assailants to move away. To protect it from any attack by gunmen, the fundamental framework is designed and characterized in bulletproof and waterproof metallic coating.

IndexTerms—Atmega 328 PPU Microcontroller, Embedded C programming, HC-05 Bluetooth, Radio Frequency (RF) gadgets, Anti-Terrorism & Riot (ATR) Robot

JEL Codes: I18, I11, I15

1. INTRODUCTION

The multidimensional technological advancement can be broadly be seen all around us starting from basic household work to space aviation. Robotics is one of the major technology which has seen the maximum boost in recent decades. The works starting from the simple house cleaning with the help of cleaner robot has evolved to the robots on Mars to collect the samples [6]. The size of robots now is from nanobots who can work in the tiniest places till the mega robots who help during big construction works. Robotic innovation in the field of defence and anti-terrorism sectors can be of great use to save the lives of hundreds of soldiers and civilians. Robots are highly useful in radioactive areas where human intervention is next to impossible.



Figure 1.Army Robot [7]

There were several attempts to create a spy robot for different applications. It was mostly used for military applications but they were very big so anyone can detect them easily. It had lower battery life due to its heavy weight. It didn't have the facility to attack the enemy. They were highly vulnerable to physical assaults. The efficient communication and defence mechanisms were not used properly in existing systems. The major disadvantages of previous systems were Big Size Problem, Lower Battery Life, High Cost, Easy Detection, Not connected through internet. In our proposed system we have taken the necessary steps to overcome all previous issues.

2. FORMATTING THE TITLE, AUTHORS AND AFFILIATIONS

[1]. MertDemir explained in his paper about the antiterrorism robot based on electromagnetic weapons technology. The system integrates the electromagnetic weapons on the robot. The robot is equipped with automatic targeting of the subjects with electromagnetic weapons. The image processing and artificial intelligence-based system tracks the target in the field and accurately achieves the target. The overall works on increasing the target of the system and at the same time increasing the range of the electromagnetic weapon [8].

[2]. Jianghong Wei explained in detail a new type of antiterrorism robot with 8 wheel drive. This 8 wheel drive robot is a heavy-duty robot to work on all the planes and at the same time, it's very strong. The robotic system is remotely operated and is efficient enough to climb on the stairs. The different rotational speed is designed for the robot. The robotic system is equipped with scanning of the field disposal of the landmines and bombs and a projectile system is also provided to control several arms. The system is highly useful in terrorism control without losing human lives [9].

[3]. Bo You et al. explained in detail about a robot with inspiration from a police dog. The system combines the features of a robotic dog and an antiterrorism robot. The robotic dog receives the commands, transmits the information like photos/videos to control centres. The biological instinct dog is combined with the strength of the sensor of the dog to make it very accurate [10].

3. WORKING APPROACH

The robot has the vision entity, the camera-enabled with the capability to see in the dark which can communicate recordings of the conflict field to the base station to provide real-time backup in case of any attack or urgency. Military individuals have an enormous danger in their lives while entering an obscure area [11]. The robot will fill in as a proper machine for the guard area to decrease the deficiency of human existence and will likewise forestall criminal operations. It will help every one of the military individuals and military to know the state of the region before entering it.

Block Diagram and Explanation

We use Arduino as the brain of the system because of its ease of operation and C program feature [12]. We use the internet-based camera so at a time it can transmit the video footage all over the world. In our robot, we can also have the facility to produce a shock of 20000 volts to use in an emergency to give a shock to terrorists. This is our motivation to preserving human lives on both sides, and it has proven to be extremely beneficial to moderate the mob, as well as the illegal intimidation issue, to varying degrees. When done correctly, it can safeguard the survival of a large number of military soldiers and cops.

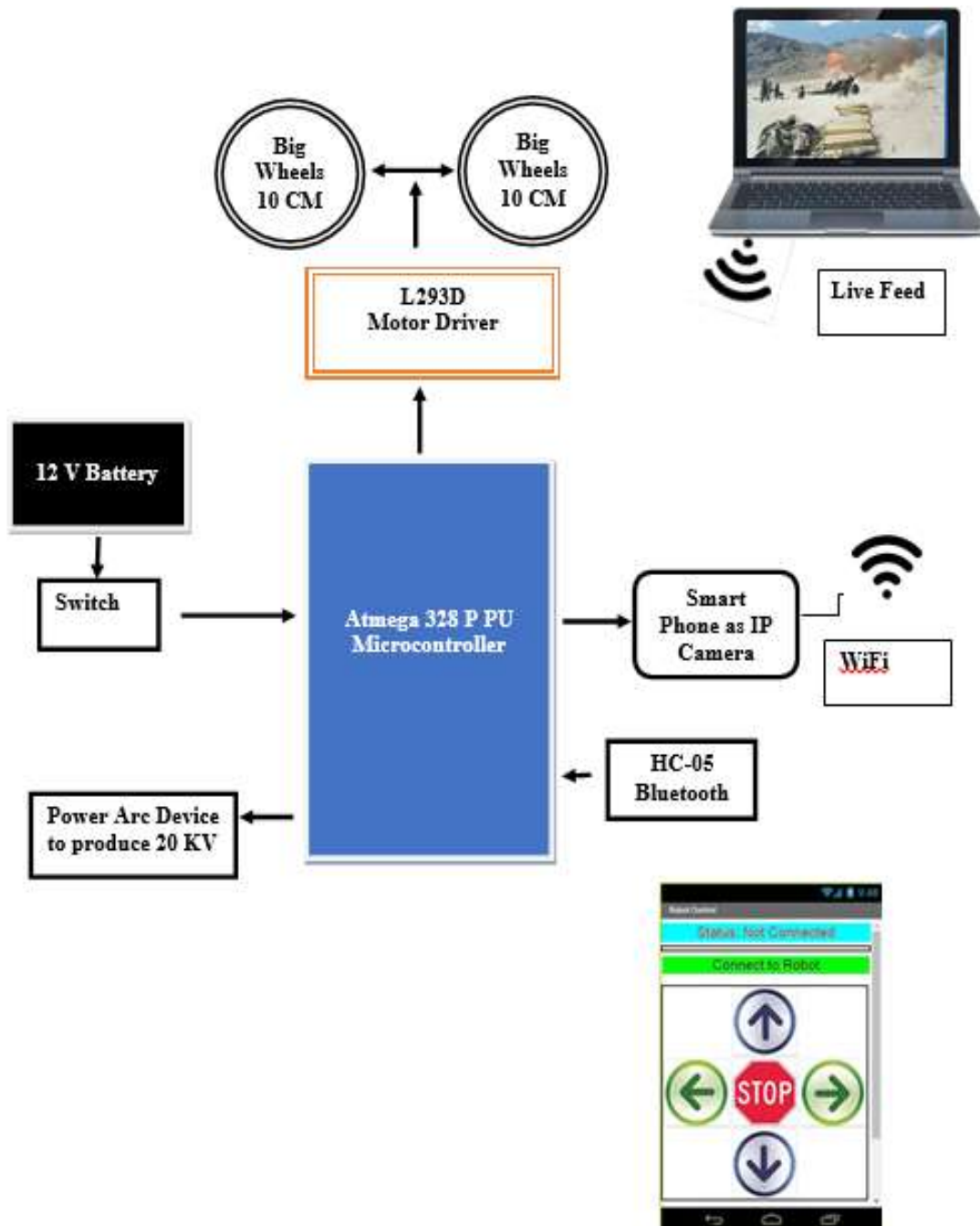


Figure 2.Block Diagram

The connectivity of the control centre is currently around 20-30 Metres due to the use of Bluetooth technology in the demo model is expandable up to worldwide coverage. With minor changes in connectivity devices, it can be extended from a few hundred meters using RF technology up to worldwide using DTMF and IoT technology. IP cameras used in the demo model already have worldwide data transmission coverage. The major advantages of the robot are in the applications of Army / Battle Field, Terrorist Activities, Fire, where humans can't enter, radioactive areas hazardous for human activities.

System Flow

The system flow provides the detailed process of the overall mechanism. The sequential order what the robot follows during the chain of commands is in detail provided in the below diagram. Initially, the robot waits for the Android app connected through the Bluetooth device to provide the command [13] .

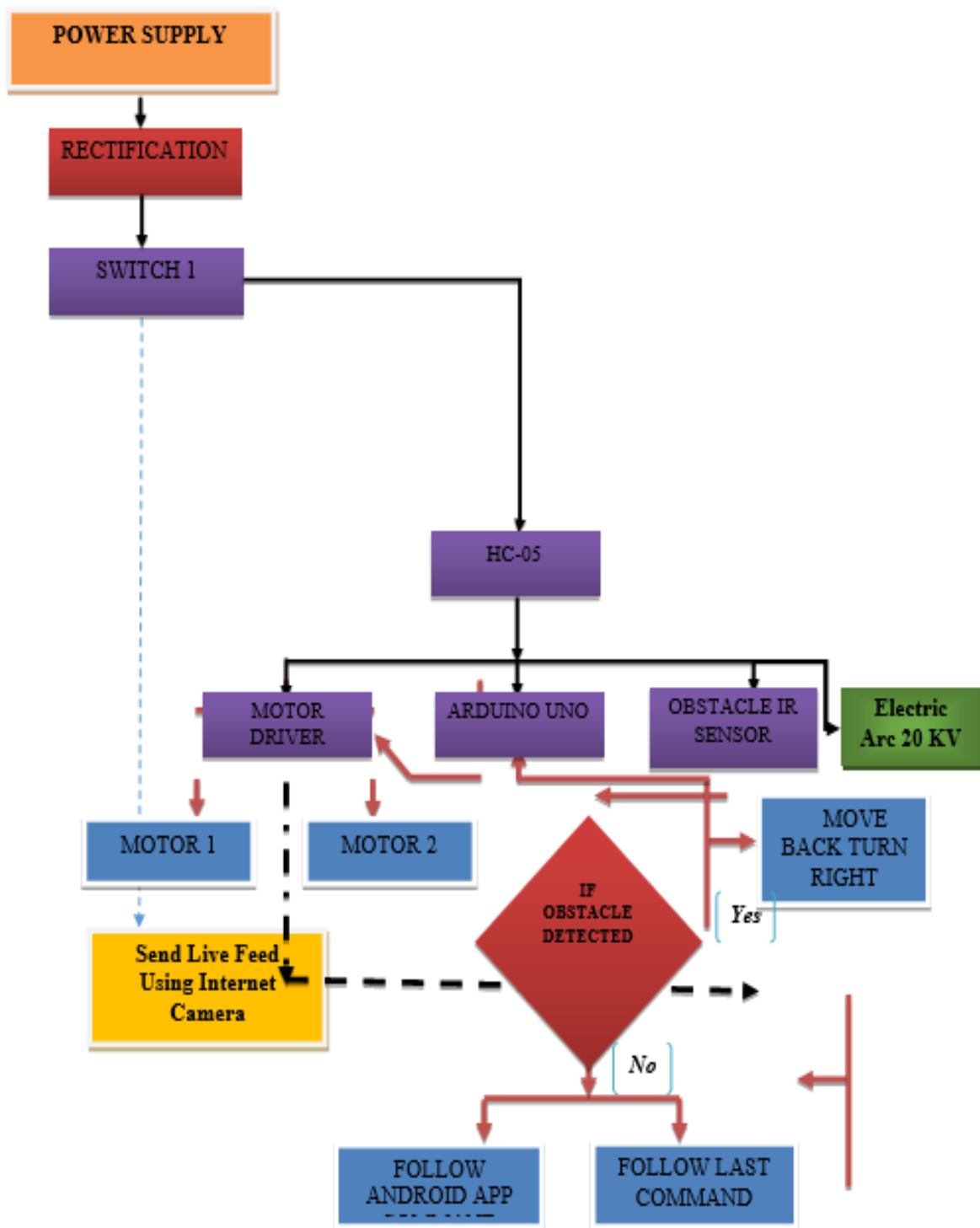


Figure 3. System Flow Diagram

Once after connection gets established between the robot and the mobile phone in which the robot control application is installed the manual command provided to the microcontroller is fed to the Motor driver IC L293D. The L293D IC is connected to the geared motors which are correspondingly connected to the wheels [14]. Ultimately the commands provided through the phone moves the robot. Once the command is provided robot follows the command till the second command is not provided.

Circuit Diagram

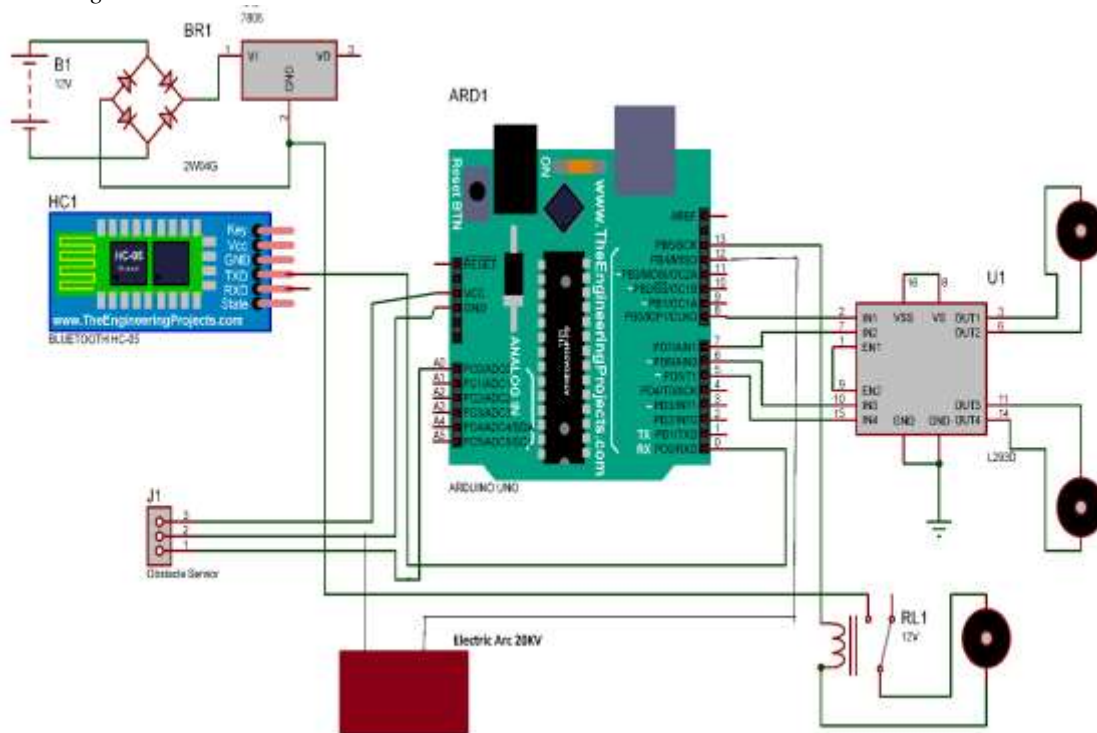


Figure 4.Circuit Diagram

The circuit diagram explains in detail the physical pin connections among multiple components in the Robot. The detailed connection is sufficient enough to recreate the original robotic fabrication. The power supply to the Bluetooth connection is well labelled and explained in the diagram.

4. CONCLUSION

The robotic system can help the defence and antiterrorism sector to much extent. Our project deals with the creation of a defence robot that can support the army and police without literally killing the criminals. There are many prototypes made having a robot that can click pictures but the idea of a robot that can give a shock to protect people seems to be quite interesting. This project has a wide scope in the future and can have several enhancements as well that can be done in the future. This project is a prototype of an anti-terrorism robot. This project aims to create a robotic vehicle for use in remote areas that are connected to an IP wireless camera for monitoring reasons. The robot can communicate audio-visual data in real-time, such as videos or images. On battlefields, the wireless robot could be beneficial for covert operations. And this is the first robot of its kind to be outfitted with a power arc device capable of delivering a 20 kv electric shock. Terrorists' locations can be exposed with the use of such a robot.

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