Project Synopsis on

IOT BASED MILITARY SURVEILLANCE & FIRE PROTECTION ROBO CAR

is submitted in partial fulfilment of the requirement of the degree

B.E. (Electronics and Telecommunication Engineering)

by

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CERTIFICATE

This is to certify that the project entitled "*IOT BASED MILITARY SURVEILLANCE & FIRE PROTECTION ROBO CAR*" is a bona fide work of the following students submitted to the University of Mumbai in partial fulfilment for the degree of 'Bachelor in Engineering' in 'Electronics and Telecommunication Engineering', Semester VII during the academic year 2021-22 as prescribed by University of Mumbai.

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ABSTRACT

In this project, we will learn how to make **IOT BASED MILITARY SURVEILLANCE & FIRE SAFETY ROBO**

CAR by using **ARDUINO**. The ROBOTIC CAR can be controlled wirelessly by SMARTPHONE via BLUETOOTH.

The smartphone has an android app through which the user can send commands directly to robot. The robo car can move

forward, backward, left & right direction as well as we can stop the robo car by using the android app. The android's

Bluetooth-controlled robo car is interfaced with a Bluetooth Module HC-05 or HC-06. We can give specific voice

Commands to the robo car through an android app installed on the phone at the receiving side. A Bluetooth transreceiver

Module receives the commands and forwards them to the Arduino and thus the robotic car is controlled.

The added feature in this project done by our group is that we are adding an IP based Neon Camera, Smoke Detector

& Jet Spray with a tank. The added feature in this project will give us some salient features like

1. While the motion of this surveillance vehicle, it captures the real-time footage of the surrounding areas (24x7)
   which can be significant to track the intruder movements and hence the corrective actions can be promptly taken
   by the relevant agencies.
2. The surveillance vehicle has in-built fire detection system which the vehicle captures while in motion and subsequently sprays the water which hydrant as prima facie corrective actions to extinguish the fire and also send the images for calling more assistance.

ACKNOWLEDGEMENT

We sincerely wish to thank our Project Guide **Prof. Amjad Shaikh** for his ever encouraging and inspiring guidance helped us to make our project a success. Our project guide makes us endure with his expert guidance, kind advice and timely motivation which helped us to determine about our project.

We would like to thank our project co-ordinator **Prof. Bhavna Thakur** for all the support we needed from her for our project.

We also express our deepest thanks to our H.O.D **Prof. Smita Lonkar** whose benevolent helps us making computer facilities to us for our project in our laboratory and making it true success. Without her kind and keen Co-Operation our project would have been stifled to standstill.

Lastly, we would like to thank our college principal for providing lab facilities and permitting to go on with our project. We would also like to thank our colleagues who helped us directly or indirectly during our project.

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1.1 Project Briefing

The project **IOT BASED MILITARY SURVEILLANCE AND FIRE PROTECTION ROBO CAR** also known as **UNMANNED GROUND VEHICLE (UGV)** is a car or is a vehicle which is going to be used for defence and fire protection purposes. This is a IOT based vehicle which going to be operated from an **APP** which is running through a **SMARTPHONE**. In that application there will be a remote which will help this robo car to move from one direction to other. This becomes possible because in robo car there is a Bluetooth connected and the name of the Bluetooth is HC-05. This Bluetooth will get connected to the smartphone and with the help of the app i.e. **BTROBOT** we can move the robo car from one direction top the other. Other than this there is a salient feature added in this projected and that is a **NEON CAMERA, SMOKE DETECTOR & A JET SPRAY**.

This salient feature helps a lot in this project. Firstly, the neon camera. As we all know that by using neon camera, we can get clear visuals even at night which helps our **MILITARY FORCES**. They can have a look from neon camera that if an intruder is trying to cross the border and corrective actions can be taken on the spot. Secondly, the smoke detector and the jet spray. Taking the advantage of the application of the smoke detector we have decided to connect a smoke detector along with the relay which will trigger the pump and pump will generate pressure in the tank and water will come out from jet spray wherever the smoke detector detects the smoke and due to which this car will we very useful to extinguish fire.
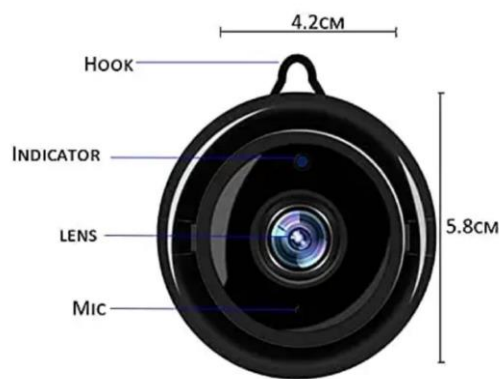

Fig-1.1 IP BASED NEON CAMERA

Fig-1.2 <u>SMOKE DETECTOR</u>

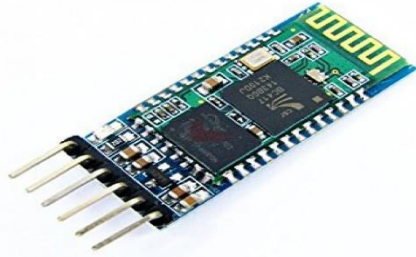**Fig-1.3 <u>JET SPRAY</u>**

Fig-1.4 <u>PUMP</u>

Fig-1.5 BLUETOOTH MODULE HC-05

Fig-1.6 ARDUINO UNO

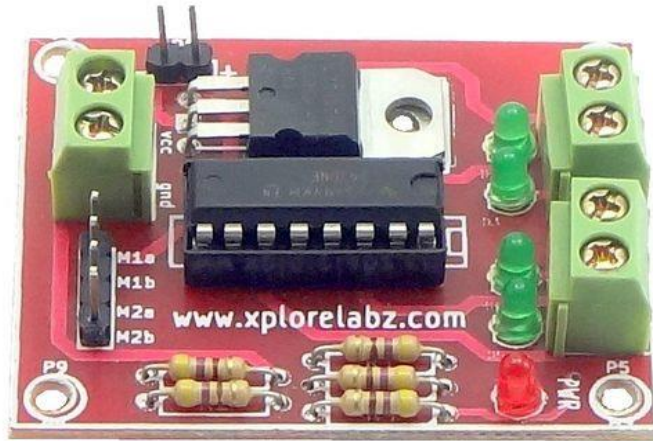**FIG-1.7 ARDUINO UNO CABLE**

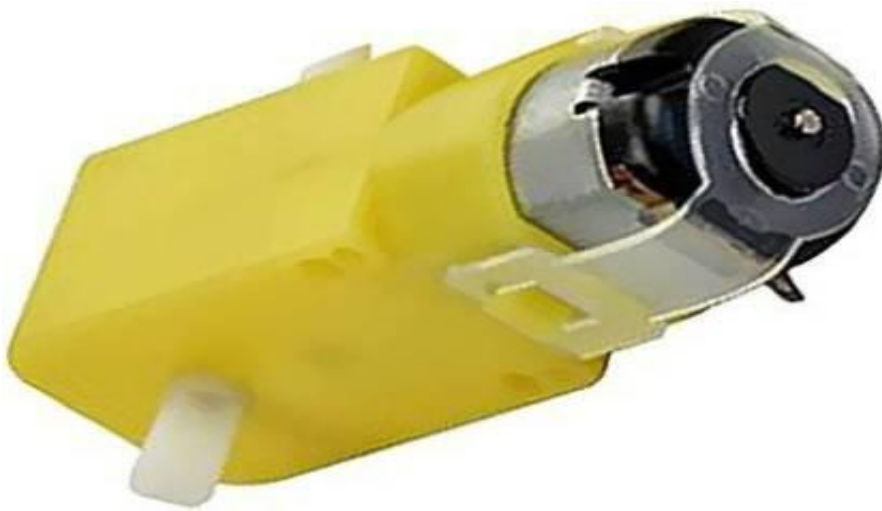**FIG-1.8 <u>L293D MOTOR DRIVER</u>**

FIG-1.9 <u>DC GEARED MOTOR</u>

1.2 <u>Technical Background</u>

Earlier the **IOT BASED MILLITARY SURVEILLANCE AND FIRE PROTECTION ROBO CAR** was named as **UNMANNED GROUND VEHICLE (UGV)**. It means the car is controlled without driver. But earlier the UGV used to run by the means of sensors, because of which car use to move unmanned but human does not have the control. The main intension was that the car should be unmanned but the car should be under the control of someone. So, from here the IOT comes into the picture. In 2011, Ernst Dickmanns (the pioneer of robo cars) invented IOT based robo cars. IOT based robo cars were very helpful. It was unmanned and also it can be controlled by someone from outside the car using smartphones.
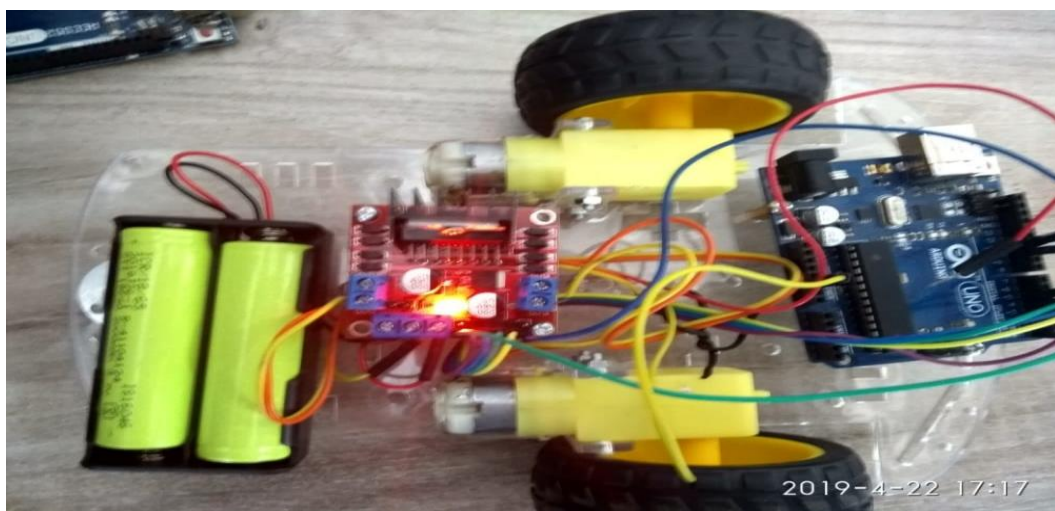

Fig-1.10 <u>IOT BASED ROBO CAR</u>

1.3 <u>Proposed Solutions & Benefits of Our Proposed Solutions</u>

In IOT BASED ROBO CAR we have proposed **2** major solution and they are
1. **Neon Camera**
2. **Smoke Detector Along with Relay & Jet Spray**

The benefit of these two major solutions are as follows

1. With the help of Neon Camera one can get clear pictures that what is happening in the night also. This advantage can be taken by the defence at borders to have a look on every movement at the borders, which results in if an intruder is spotted at the borders, corrective actions can be taken immediately by the defence people.
2. With the help of Smoke Detector & Jet Spray, we can easily extinguish the fire at a very short time span.

1.4   **OBJECTIVE OF THE PROJECT**

The objective of **IOT BASED MILLITARY SURVEILLANCE AND FIRE PROTECTION ROBO CAR** is to help the armed forces and defence to safeguard at the borders and an immediate solution to extinguish the fire at public as well as private sectors to prevent major loss of life and property.

CHAPTER 2: <u>LITERATURE SURVEY/REVIEW</u>

2.1   <u>LITERATURE SURVEY</u>

We have seen surveillance and fire protection robo car in this project. In this project there is a neon camera, smoke detector and a jet spray. With all this added advantage in this robo car, this robo car has become beneficial for our armed forces specially at borders. This helps the armed forces to keep an eye on every action happening at the border and to keep an eye if an intruder tries to cross the border, so that corrective actions would be taken on the spot. Another feature in this is, if fire catches in any public/private sector then this robo car will detect the smoke of the fire with the help of smoke detector and will trigger the pump with the help of relay connected in the smoke detector and pump will create pressure and jet spray will splash the water and we can extinguish the fire in a very short time span. Because of this additional feature in this robo car, we can limit the major loss of life and property. In short, this robo car is very helpful inside the country as well as at the borders of the country.

Earlier a work has been done on this robo car. Previously there was a simple unmanned ground vehicle, in which a car was running unmanned with the help of sensors because of which car as running unmanned but it was not in a control of someone. For defence purpose the main need was that the car should be unmanned but the car should be in control with someone. So, from there IOT came into picture. With the help of IOT, it became possible that the car would be unmanned but it should be controlled by someone by the means of smartphone. So various apps have been created and by the means of Bluetooth this robo car was controlled through smartphones. This was a great invention and solved many problems.

2.2   <u>SUMMARY OF METHODOLOGY</u>

In this project we are making a Robo Car which is a IOT based and can be controlled through a App namely BTROBOT. This app and robo car will be connected by the means of Bluetooth connected in the robo car and the app will act as a remote which can move car in forward, backward, leftward and rightward direction as well as a stop button which act as a break of the car. Now talking about the added feature in this car we have an additional neon camera also known as night vision camera gives real time footage. Another feature is a smoke detector & jet spray which helps to extinguish fire, if fire catches anywhere in a very short time span. This helps to restrict the major loss of life and property. Thus, the additional feature plays a major role and has many advantages.

2.3 <u>RESEARCH GAP</u>

 As we have seen the robo car has a added feature of neon camera, smoke detector and a jet spray but we could have added a voice command with the help of Artificial Intelligence. In this voice command we could give command to the robo car and the car will move as per the given technology. But the cost of this voice command technology would be very much high as compared to our project but it would a great added advantage to the car.

CHAPTER 3: <u>PROJECT DEVELOPMENT</u>

3.1   <u>METHODOLOGY</u>

Earlier there was an unmanned ground vehicle in which there were no man to control the car but the car would run with the help of sensors. But the main requirement or main need was that thought the car would be unmanned but the control of the car should be there with someone who will be standing outside the car. After this Internet of Things (IOT) came into picture. IOT brought a great help to solve this problem. With the help of IOT, it became possible to introduce such car which would run unmanned but it will be under control of someone who is standing outside the car. So, a robo car was introduced as shown in fig 1.4. In that robo car there was Arduino uno, Arduino uno cable, L293D motor driver & DC geared motors were the main components as shown in fig 1.6, fig 1.7, fig 1.8, fig 1.9 & fig 1.10.

This project enhances this robo car with added features. The first added feature in this robo car is a neon camera or a night vision camera as shown in the fig 1.1. With the help of neon camera one can see clear real-time footage even at the night. This will be very great help for the defence. They can keep an eye on the borders and if any false incidence happens like an intruder spot near the border corrective actions will be taken against those intruders. The second added feature in this robo car is the smoke detector and the jet spray as shown in the fig 1.2 and fig 1.3 respectively and a pump as shown in fig 1.4. If any public/private sector catches fire because of some reason. Then to extinguish fire this robo car will be very helpful. When the smoke detector detects the smoke of the fire, then the relay that is connected to the smoke detector will trigger the pump present in the tank and would create a pressure due to which water will come out of the jet spray. This will help to extinguish fire in a very short time span. Also, it will limit the major loss of life and property.
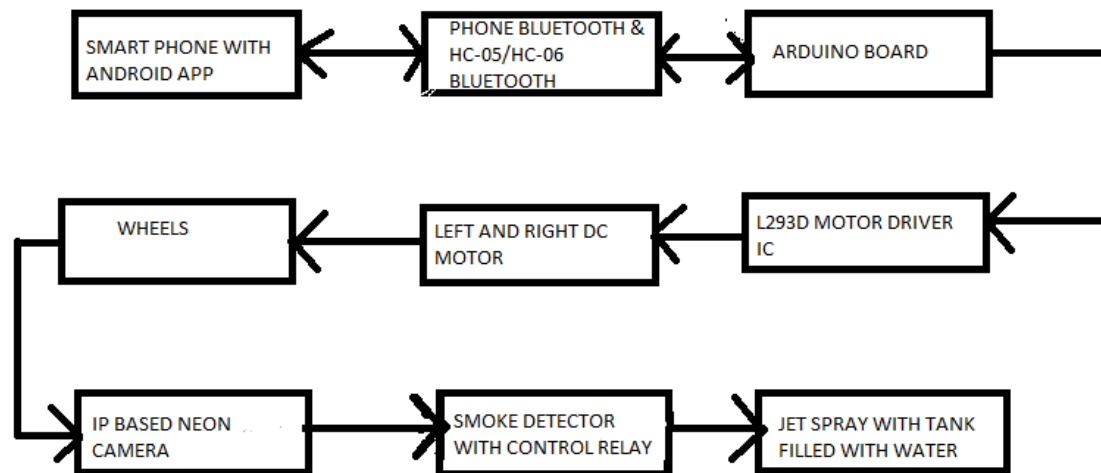
3.2 PROPOSED SYSTEM & BLOCK DIAGRAM

Fig-3.1 BLOCK DIAGRAM OF IOT BASED MILLITARY SURVEILLANCE AND FIRE PROTECTION ROBO CAR

The block diagram of IOT based military surveillance and fire protection robo car is shown in the fig 3.1. This block diagram shows each and every part which will be required to construct a robo car. The block diagram consists of a smartphone app. Along with that it has information of Bluetooth i.e. the phone Bluetooth and the Bluetooth which we will connect to robo car i.e. Bluetooth HC-05/HC-06 Another one is the Arduino board which is the heart of this project. Without Arduino board we cannot even think to run this project. Another important role is been played by the L293D motor driver IC. It receives the signal from the microprocessor and transmits it to the relative DC motors. The next role is played by the DC motors. These DC motors are helps in the rotation of the wheel for the movement of the robo car. Another block is for wheels. These wheels help in the movement of the robo car. The next block is of a neon camera. Neon camera is the first added feature in this robo car. It helps to see clear real-time footage wherever the robo car is moving. The other block shows the smoke detector with controlled relay. This smoke detector with detect the smoke and the relay will trigger the pump which will be present in the tank of the jet spray. The last block shows the jet spray. This jet spray splashes the water when the pump present in the tank creates pressure when the relay triggers it. Each and every part has been showed from fig 1.1 to fig 1.9 and the robo car with no added feature is shown in fig 1.10 also the smartphone app i.e. BTROBOT app is shown in the fig 3.2

We have seen almost every part of this project but the final and the most important which we will require as an apparatus for this project or we can say that we cannot run this project because of this is none other than BTROBOT app. This prototype or the image of the BTROBOT app is shown in the fig 3.2. As we can see in the fig 3.2 there are 5 keys in the app and they are forward, backward, rightward, leftward direction and a stop button which act as a break of the car i.e. to stop the car.

Fig-3.2 **BTROBOT APP**

3.3 **DESIGN**

Fig 1.10 shows that how a IOT BASED ROBO CAR looks like. To brief on the topic about the added feature which we will add in this project is the neon camera which is shown in fig 1.1. As per our group's thought we have decided to plant camera on the front side of the robo camera i.e. on the chassis of the robo car. The other feature is the smoke detector and we have decided to plant it with Arduino board and L293D motor driver. The pump will be placed in the tank of the jet spray and will be connected to the relay of smoke detector so that relay will trigger the pump if smoke detector detects the smoke. Finally, the jet spray. We have decided to plant is along with the smoke detector and Arduino etc. The placement of

tank is still not fix. It can be placed with the jet spray or we will make a hole in the chassis and try to fix the tank with the jet spray.

3.4   SOFTWARE USED

The software that we are going to use for programming is none other than **ARDUINO IDE.** With the help of this software, we will give commands to our robo car via Arduino.
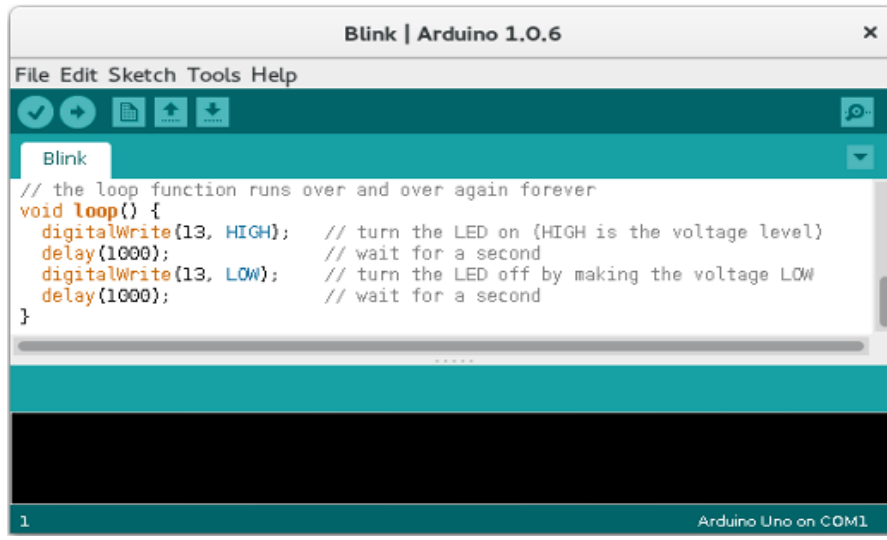

Fig-3.3 ICON OF ARDUINO IDE SOFTWARE

Fig 3.4 BLANK BODY OF ARDUINO IDE SOFTWARE
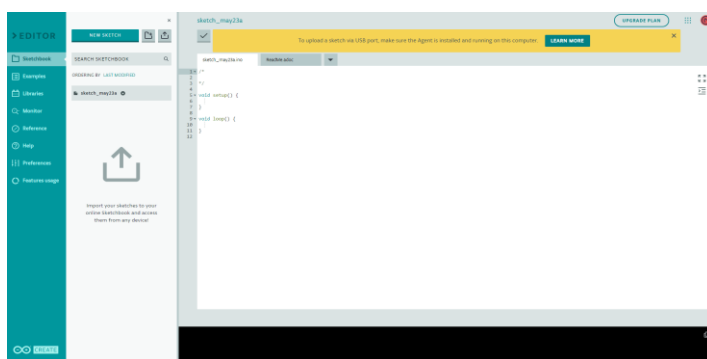
Fig-3.5 <u>MAIN BODY OF ARDUINO IDE SOFTWARE</u>

CHAPTER 4: <u>FUTURE WORK</u>

4.1 IMPLEMENTATION PLAN FOR NEXT SEMESTER

As per the discussion within our group member as well as our project mentor we have decided to finish our project synopsis and purchasing of our project components in this semester. After completing our semester-7 exam we will firstly complete our black book work within a month or 2. Along with that we will check whether all the components are in the working conditions or not to avoid panic situations in the last moment. After our black book completion till January end we will start making our project and try to complete it within a week or 2. Hence as per calculation it will take two and half months of our next semester to complete our black book and the making of our final year project model.

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[2]   Esra Yılmaz, Sibel T. Özyer* Department of Computer Engineering, Çankaya University, Turkey Copyright©2019 by authors, all rights reserved. Authors agree that this article remains permanently open access under the terms of the Creative Commons Attribution License 4.0 International License Universal Journal of Engineering Science 7(1): Published 1-7, 2019 DOI: 10.13189/ujes.2019.070101

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