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Fire Extinguisher Vehicle Using Android Application

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ABSTRACT: In recent years, there has been an excessive need for sophisticated equipment for extinguishing fire. The field of robotics is growing every day and not all devices can be taken care of by humans. They often depend on other's help to move from one place to another. Providing human labour for extinguishing fire at difficult places is the biggest problem all over the world. With the help of proposed device, user can move fire extinguishing vehicle on their own by just giving commands through Android Application over Bluetooth. If any obstacle is detected while moving it informs the user and stops. It detects fire and smoke through sensors, if detected it sends signal to the user and receives command to switch on the motor for dispersing water. A prototype is developed by incorporating all the features in a single module.

KEYWORDS: Arduino UNO, ultrasonic sensor, Bluetooth module, Android Application.

1. INTRODUCTION

Fire is one of the most frequently occurring and destructive disasters and it is extremely serious hazard to people life safety. It is an undesirable mishap which emits heat, smoke or flame and gets converted in the huge fire. Over the last few years, the demand of fire safety systems has taken a drastic increase due to the public awareness. The system will be able to locate the victim location and intimation to various stations to be included in the fire control the fire exposures. Fire extinguishers are vital equipment to stop the massive fires in emergency situations and minimizing the mishaps. By implementing the proposed system in a particular area, it is possible to spot the fire within small course of time, and extinguish it without risking human lives.

Objective of System can be to design the android operated vehicle with help of microcontroller, to develop it to be operated with help of command given through mobile phone, to equip the vehicle for fire extinguisher mechanism and to develop the fire extinguisher vehicle and save human lives.

II. RELATED WORK

M. Meena Kumari and S. Shimi, "Voice Operated Intelligent Fire Extinguisher Vehicle International Journal of Emerging Engineering Research and Technology, vol. 5, no. 8, pp. 14-16, 2017. This paper exhibits the exploration and usage of voice operated fire extinguisher vehicle. The vehicle is controlled through associated discourse input. The dialect input permits a client to collaborate with the robot which is recognizable to a large portion of the general population. The upsides of discourse actuated robots are sans hands and quick information input operations. The discourse acknowledgment framework is prepared in a manner that the robot is controlled in view of the guideline through the Speech Commands. The entire framework comprises of three subsystems, the speech recognition system, transmitter area furthermore, the collector segment (on vehicle). The outcomes demonstrate that proposed robot is equipped for controlling flame, evading obstructions what's more, comprehension the importance of speech orders.

Patel, M.K. and Pancholi, M.B.K., 2017. Survey on Implementation Methods of Fire Fighting Robot. International Research Journal of Engineering and Technology. Detecting the fire and extinguishing it is a dangerous job and that puts lives of fire fighters at risk. There are number of fire accidents in which fire fighter had to lose their lives in the line of duty each year throughout the world. Increase in the number fire accidents are due to expanding human population and growing industrialization. The physical limitations of humans to deal with these kinds of destructive fires make fire extinguishing a complicated task. The research and development in the

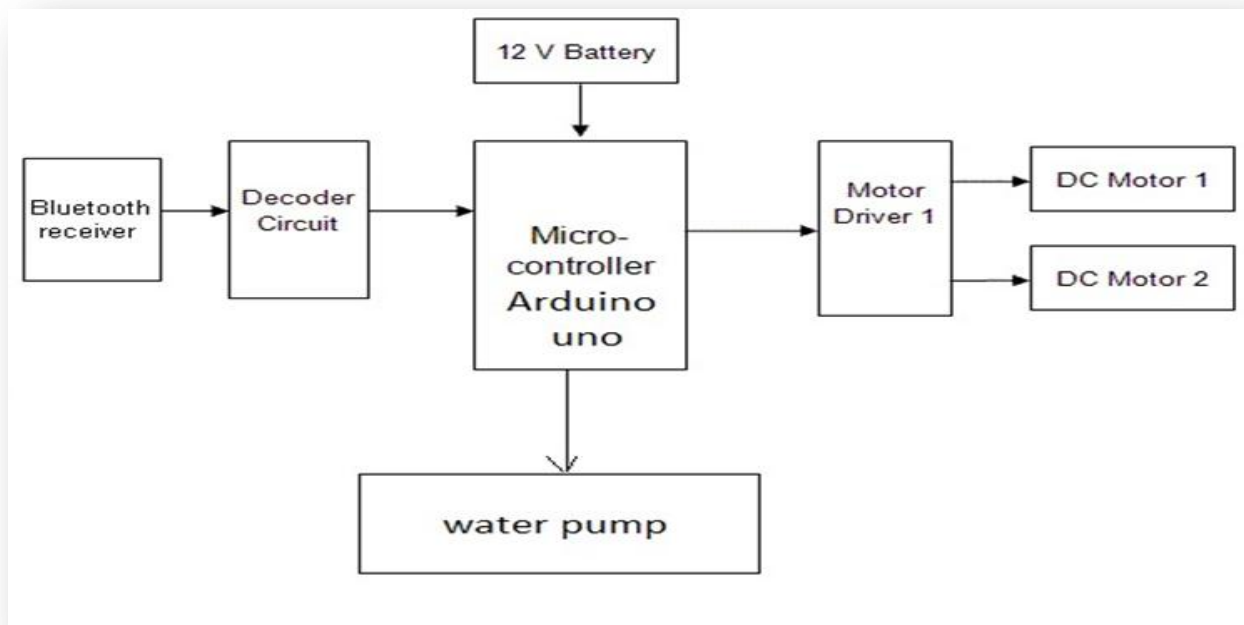
field of Artificial Intelligence has given rise to Robotics. Robots are implemented in various areas like Manufacturing, Industries etc. Hence, Robotics can be used to assist fire fighters to perform the task of firefighting and so reduces the risk of their lives. The use of firefighting robots can reduce the errors and the limitations that are faced by human fire fighters. This paper contains various methods for implementation of firefighting robots. Here we compare various design and construction of building a firefighting robot.

Kim, M.S. and Bae, M.J., 2017. A study on a fire extinguisher with sound focus. International Information Institute(Tokyo). Information, 20(6A), pp.4055-4062. There is a variety of fire extinguishers available on the market, including powder fluid-dispersers, gas-dispersers and water-dispersers. There has been little advancement in technology in fire extinguishers in the past 50 years. Inevitably, there is a need for developing a new kind of fire extinguisher that can be operated right on the spot at the beginning stage of fue without having any implementation issues in its use. The answer may be the sound fire extinguisher which has been on the track for several years. In this paper, we introduced an improved device, a sound extinguisher using sound focus in a speaker to produce more focused power of sound4 roughly 10 times stronger in its power than the device introduced by two graduate students in the U.S. This study explores ways to reduce weight of sound fire extinguisher so that it can be carried anywhere, based on new and special sound lens developed by Sori Sound Engineering Research Institute of Soongsil University.

K. Patel and B. K. Pancholi, "A novel fire extinguishing robotic vehicle controlled by android application," 2017 IEEE International Conference on Smart Technologies and Management for Computing, Communication, Controls, Energy and Materials (ICSTM), 2017, pp. 417-422. The project is designed to develop a fire fighting robotic vehicle controlled using android application for remote operation. The robotic vehicle is loaded with water tanker and a pump which is controlled over wireless communication to sprinkle water to extinguish fire. An AVR ATmega-32 microcontroller is used for the desired operation. Remote operation is achieved by any smart-phone/Tablet etc., with Android OS, upon a GUI (Graphical User Interface) based touch screen operation. The application is designed using Android studio in XML and functioning is defined in JAVA. The android device transmitter acts as a remote control that has the advantage of adequate range, while the receiver have Bluetooth device interfaced to the microcontroller to drive output devices to fulfill defined work.

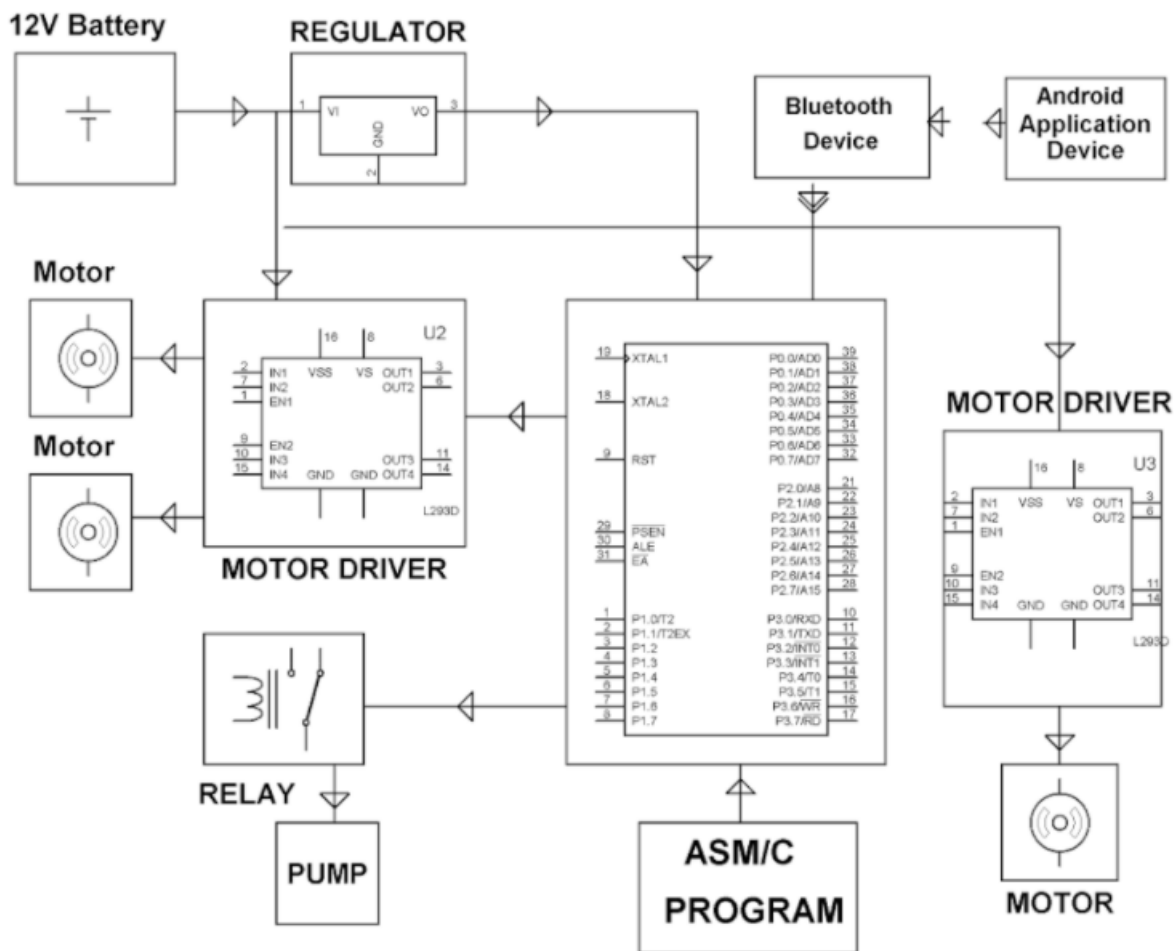
III.METHODOLOGY

The microcontroller or node mcu gives electricity supply. The microcontroller gives power to junction. It is from junction that power is distributed to all the components. The junction provides power to the relay (which acts as switch). The relay transfer power to the water motor. the junction also provides to the fire sensor and ultrasonic sensor. The Bluetooth is connected to microcontroller for transferring and receiving data. The motor driver is connected to two power suppliers.



The motor driver is connected to the DC motor which are connected to the wheels. we can move our vehicle to the location. The command we used through the Android application is sent to the Bluetooth known as input stream. The microcontroller give signal to motor drive to move in the direction. The ultrasonic sensor gives signals to user in case if any obstacle is detected which in the range of 50cm. when the fire and smoke sensor detect fire, it gives the messages to the microcontroller which send information to the Bluetooth and then is sent to the Android application. Now the user can give the command to start the motor and disperse the water.

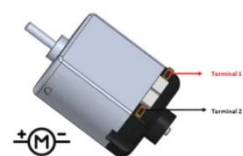
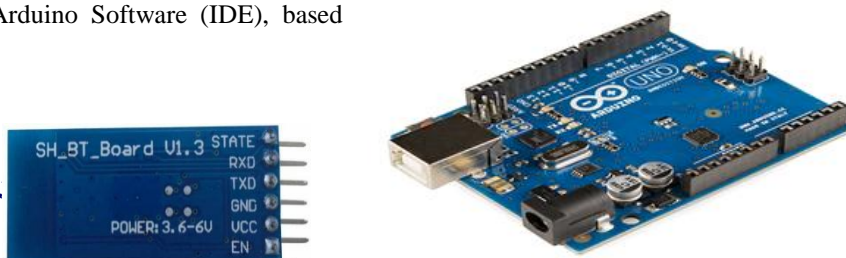
IV. CIRCUIT DIAGRAM



V. HARDWARE USED

A) Micro-controller: Arduino Uno

Arduino is an open-source electronics software. This makes platform-based software and also easy-to-use. Arduino take the data from the user and according to that it gets further operations such as read the inputs - light on a sensor, a finger on a button, and turn it into output by activating a motor or turning on an LED, We can design any circuit on board. By sending the information or instructions to the device, and then according to this it works. To do so we can use the Arduino programming language, and the Arduino Software (IDE), based on Processing free of cost.





B) DC motor

It is an electro-mechanical device that rotates when connected to a power source. DC motor is a rotatory electrical machine that converts electrical energy into mechanical energy. A normal DC motor has two terminals. Since these terminals must be connected through a coil. But they do not have any polarity. However, reversing the connection will only reverse the direction of the motor.

C) Android phone

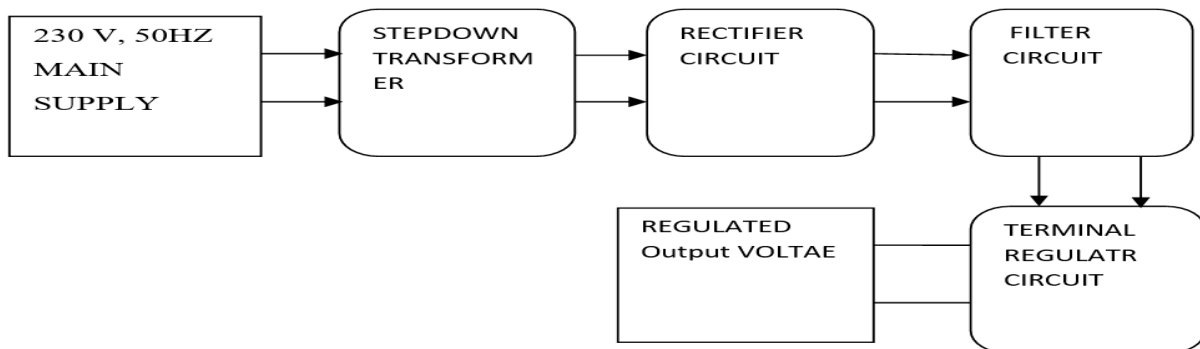
Remote operation is achieved by any smart-phone/Tablet etc., with Android OS, upon a GUI (Graphical User Interface) based touch screen operation. The android application device transmitter acts as a remote control that has the advantage of adequate range, while the receiver have Bluetooth device fed to the microcontroller to drive DC motors via motor driver IC for necessary work.

D) Bluetooth device (HC05)

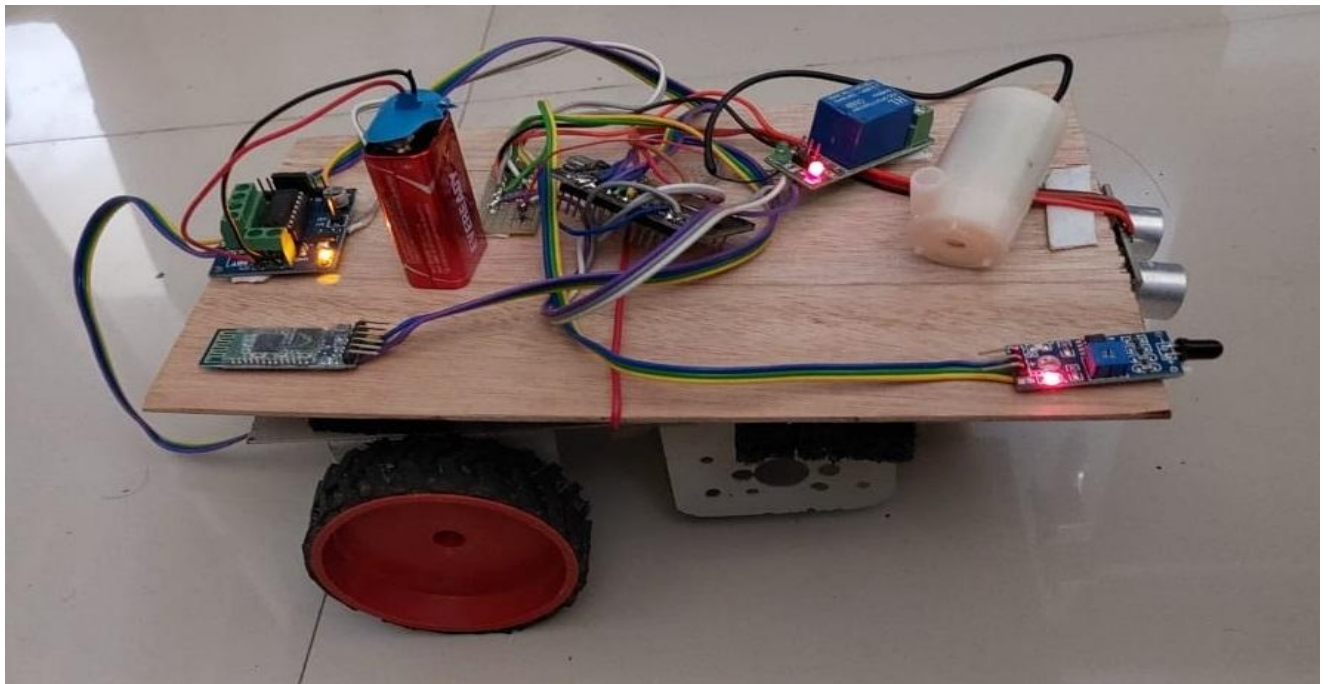
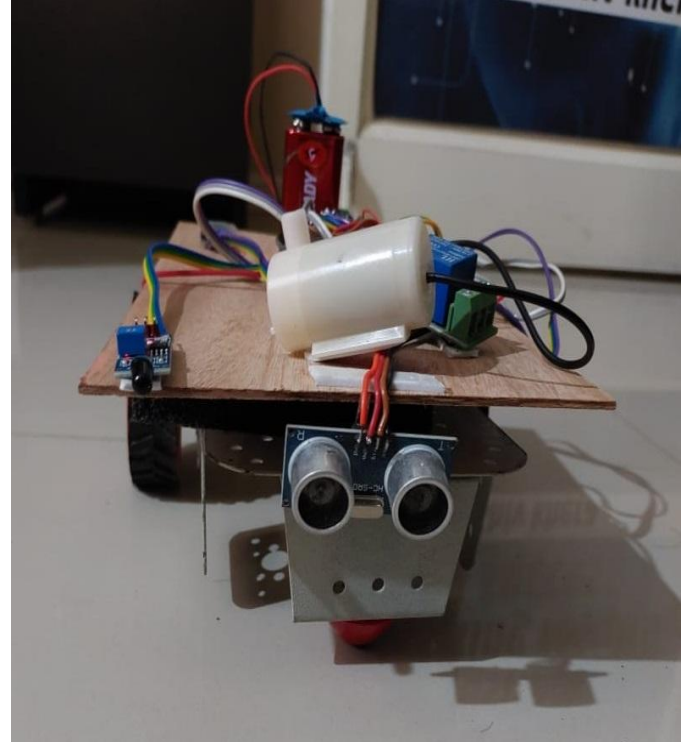
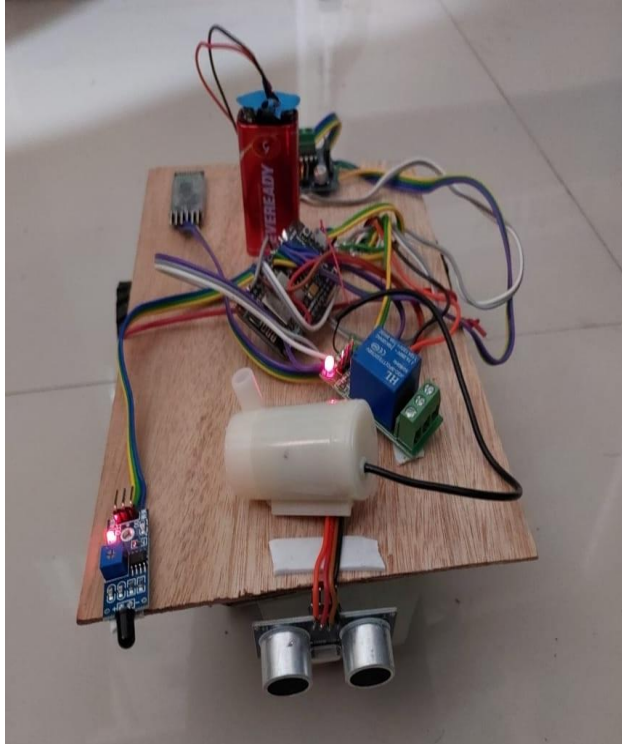
Used in wireless communication for a range of about 100m. Modulation used is GFSK and uses FHSS technology to send data serially. It uses a power supply of 3.3V to 5V. It is used in a master slave configuration. Bluetooth serial modules allow all serial enabled devices to communicate with each other using Bluetooth.

E) Power Supply

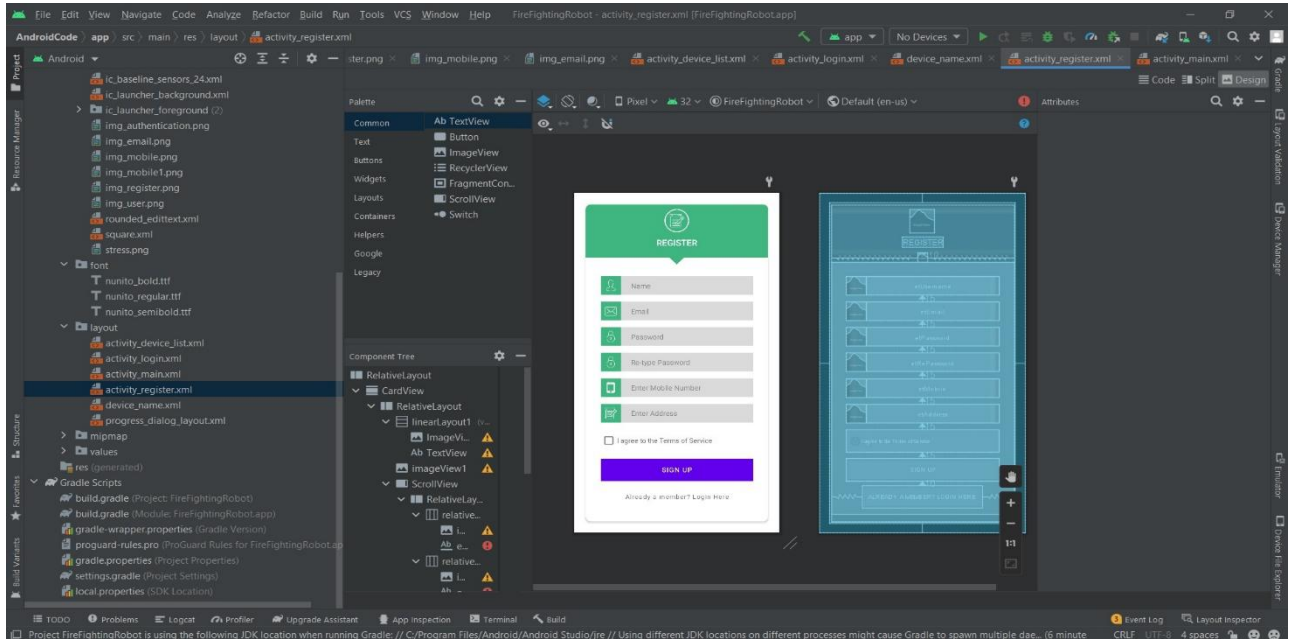
The power supply is the first and most important part of our project. For our project, we require a +5v regulated power supply with a maximum current rating of 500mA. The 1000µF capacitor serves as a “reservoir” which maintains a reasonable input voltage to the 7805 throughout the entire cycle of the AC line voltage. The 10µF and .01µF serve to keep the power supply voltage constant when load condition changes. However, at high frequencies, this capacitor is not very efficient therefore the .01µF is included to bypass high-frequency changes such as digital IC switching effects, to ground.



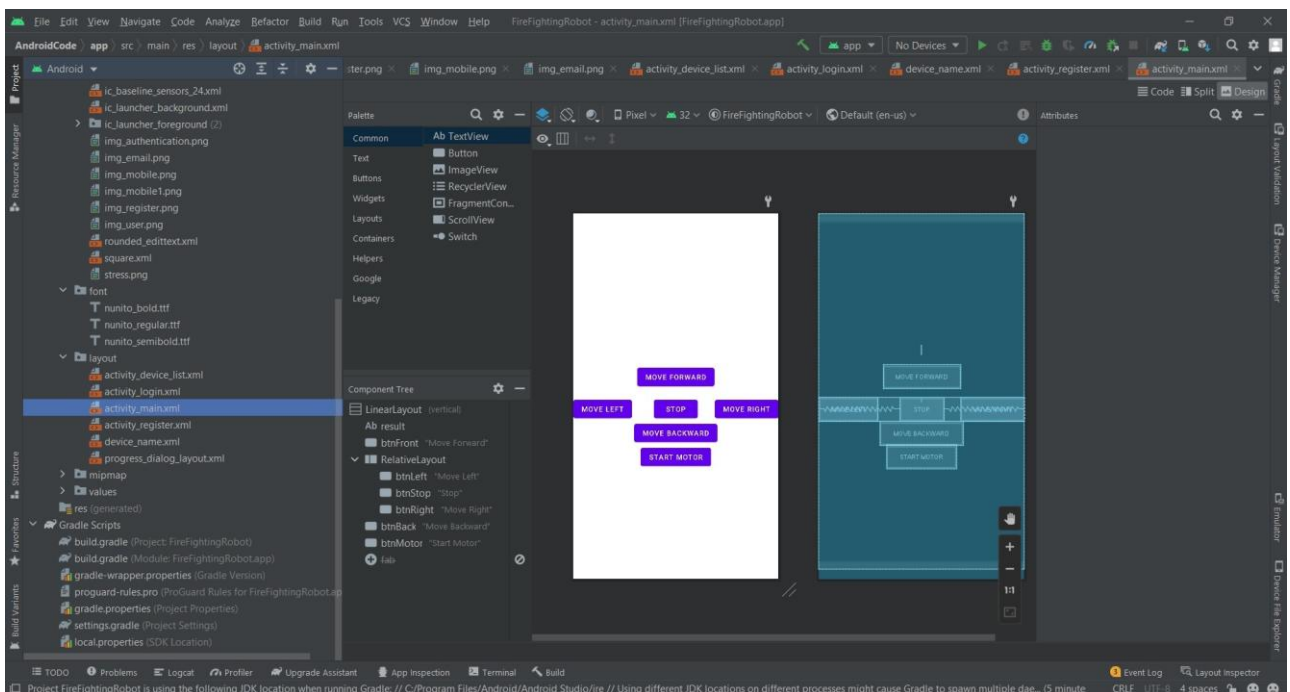
VI. EXPERIMENTAL SETUP



VII.RESULTS & ANALYSIS



ANDROID APPLICATION: REGISTRATION PAGE



ANDROID APPLICATION: BUTTONS PAGE

VIII.CONCLUSION



Traditionally, the primary purposes of a fire engine include transporting firefighters and water to an incident as well as carrying equipment for firefighting operations. The proposed system is android operated vehicle with fire extinguishing equipment of water pump. The vehicle is command operated through android phone thus helping to extinguish fire and save human lives.

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