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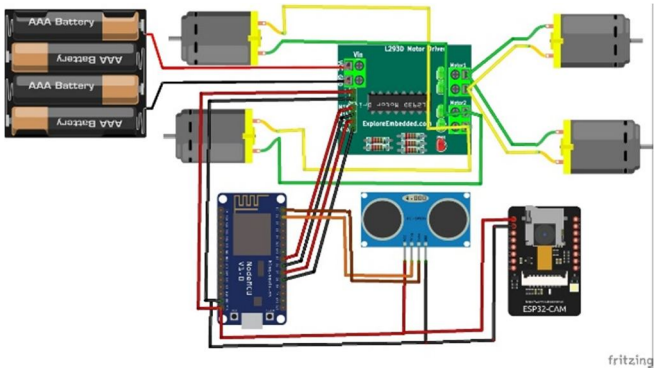
Pipeline Inspection Robot using IoT

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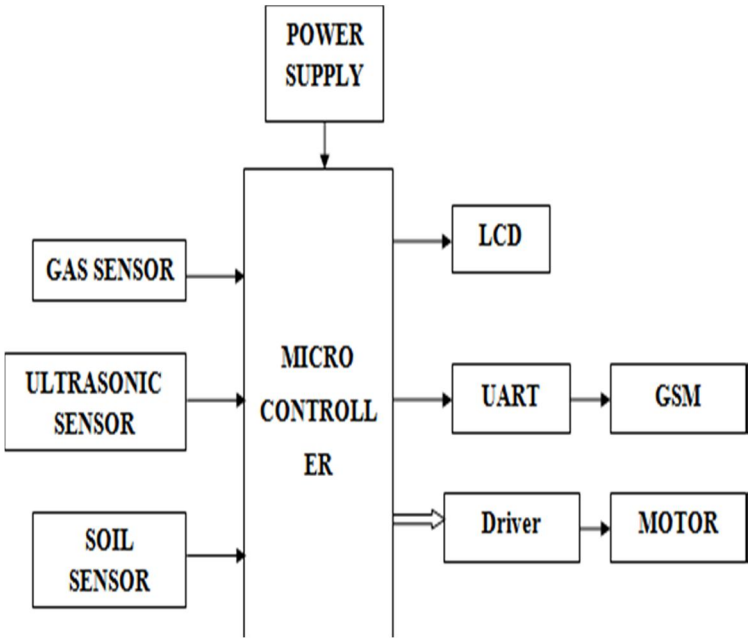
Abstract: pipeline inspection robot is a device which is inserted into pipe to check the damages, cracks, corrosion present in the pipe .there are many types of robot available in the market like screw robot, wheel type robot. it is used for inspecting up to 300mm diameter above the pipes. this type of robot used in oil and gas field industries. Aim of robot is to perform horizontal crawling.

I. INTRODUCTION

From the olden days to modern days (i,e. up to till now) pipeline is the important factor or source to transfer oil and gas from one location to another . It is inexpensive and cost effective compared to other sources. In this type metal pipes are commonly used. Where it is free from corrosive, low quality, pipe damages and other obstacles etc. In underground sea shore pipeline is difficult to perform so in this case inspection robot any other robot where used to detect inspection, leakages which is invented by humans. Pipeline inspection robot is great innovation for maintenance purpose. There are several type of robot are available like pig type, Wheel type, Wall press type set.



We are using wheel type of robot for this model which is same as that of mobile robot which is used to detect in ground surface. In this model it is comprised of parts like 12v batteries, wireless communication through GSM technologies, ES08266node MCV with arduino, ultrasonic sensor and ESP32 camera.

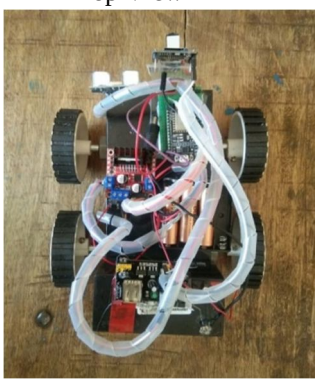


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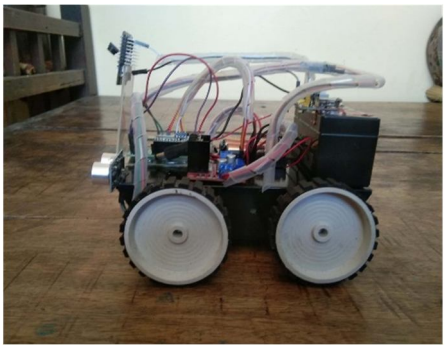
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Top View

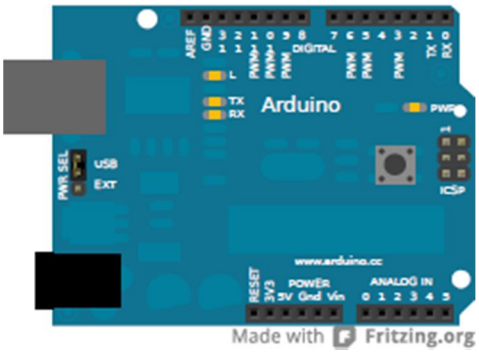


Side View



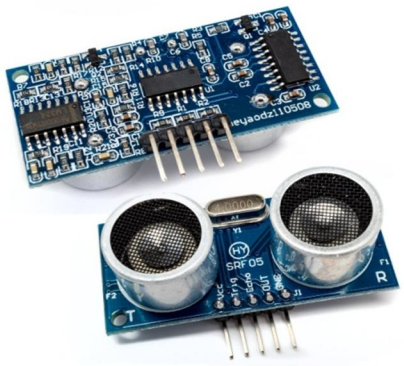
II. COMPONENTS

A. *Arduino*



It is a micro controller shaped small computer on a single integrated circuit which comprises of Processor core, Memory , Programmable input or output . It is an important part for us that microcontroller contain processor and memory and some input or output which is used to control. we will be using Arduino UNO Board . This UNO Board is a combination of micro controller which is easy to build . UNO is a microcontroller based it has 14 digital inputs or outputs, 6 analogue inputs ,16MHz quartz crystal ,USB Connection , A Power jack , ICSP header, Reset button .It is simply connected to computer with USB cable and powered to AC to DC adapter.

B. *Ultrasonic Sensor*



It is an instrument that measures distance of an object using ultra sonic sound waves, ultrasonic sensor uses transducer to send and receive ultrasonic pulses and relay back information about proximity .ultrasonic sensor works by sending out sound wave at a frequency above range of human hearing. Transducer act as microphone to receive and send ultrasonic sound. Ultrasonic sensor uses single transducer to send pulse and receive echo.

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C. ESP32 Camera

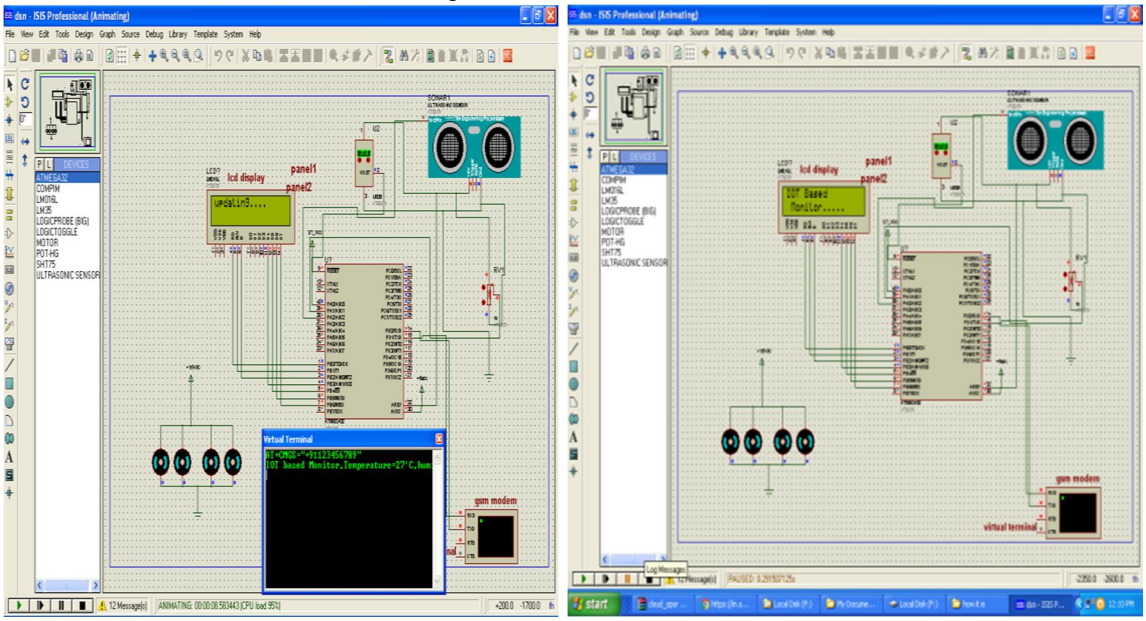


It is a hardware component with ESP32 chip, OV2640CAMERA, Micro SD card slot and several GPIOs to connect peripheral

D. NODE MCU ESP8266

It is an hardware component which is open source lua based firmware. ESP8266 has a2 buttons one is RST located on top left corner is reset button used to reset ESP8266 chip. Other is flash button left corner is download button used while upgrading firmware and there are four power pins in node MCU ESP8266 one is VIN pin and three 3.3v pins . VIN pins used to supply ESP8266 and peripherals to regulate 5v voltage source.

Simulation Output Simulation Result



III. CONCLUSION

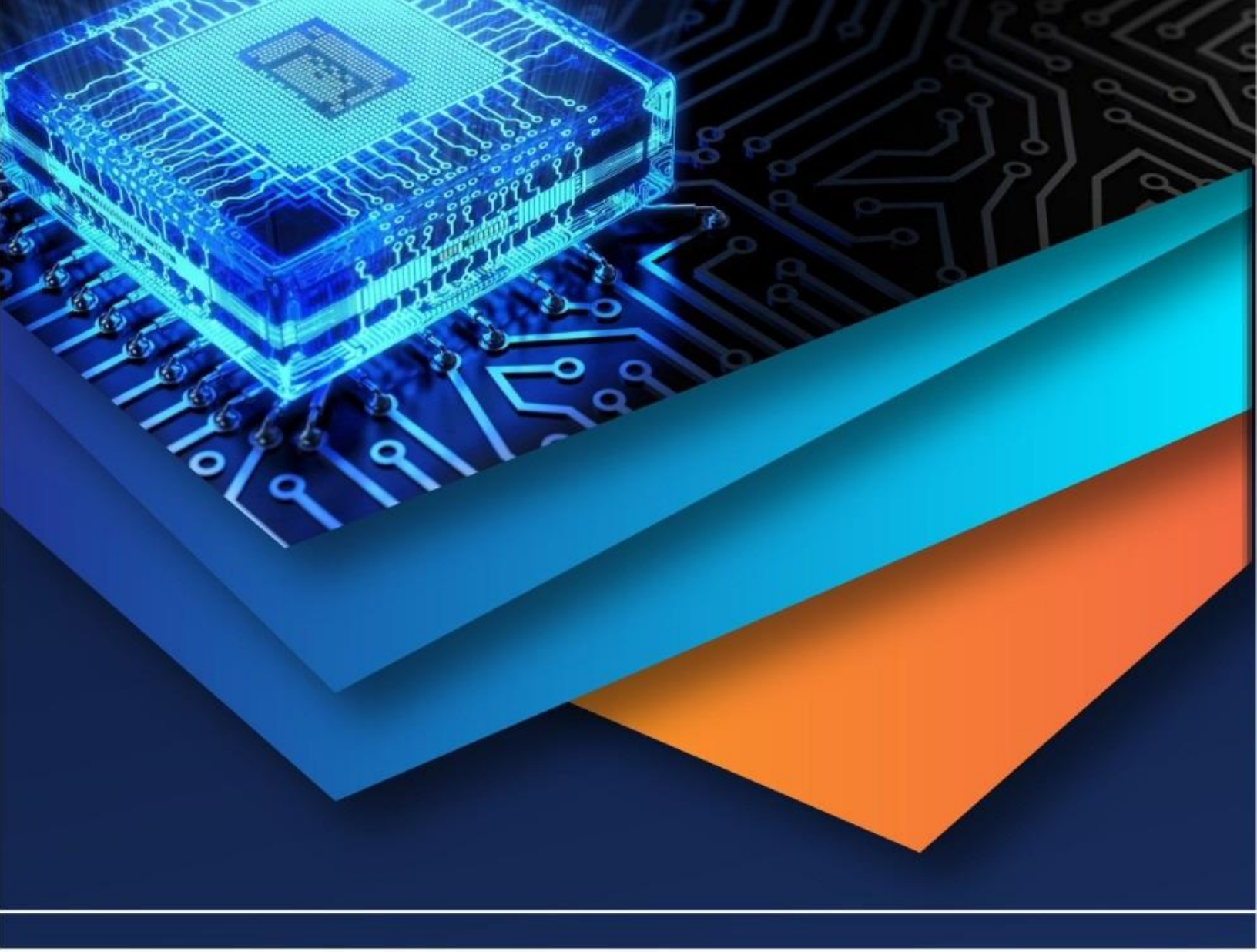
Robot play an important role in pipeline network and to repairs. There are different people design to specific task of constant diameter and may adopt various structures functions of variation of inspected pipe. We address design and development of pipe crawler for inspecting water pipes. As a future step, we are looking to address to increase in driving speed in order to improve pipe inspection efficiency. This type of inspection are different. A modular design was considered for easily adopted to new environment with small changes presence of obstacles within pipeline is difficult issue. It increases flexibility of mechanism. Robot is designed to able to traverse horizontal and vertical pipes.

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