

KROTO FINDER

Areeba Naseem, Ayush Kumar, Disha Verma, Mr. Manas Singhal, Dr. Kshitij Singhal

Department of Electronics & Communication Engineering,
Moradabad Institute of Technology ,Moradabad , U.P., India

Abstract:

Pipes are prime essential mode of transportation for fluids, which include different types of fuels and other industrial products which are used busily in industries and other manufacturing joints. Therefore, the health of these pipes is of maximum importance and need to be daily examined internally and in a safe and practical manner. Kroto Finder is device that is inserted into pipes for examining the obstruction or damage in the pipe. These robots are traditionally produced offshore, are extremely costly, and are often not sufficiently supported in the event. This had resulted in connected environmental services limited. A New Zealand employ of this apparatus, facing remarkable periods of down time as they wait for their robots to be the restored. Recently, they were notifying that several robots were no longer carried.

Keywords — Arduino UNO, Ultrasonic sensor, Wi-Fi module, Servo motors.

I. INTRODUCTION

Pipeline systems deteriorate progressively over time. Corrosion promotes progressively and long-term deterioration rises the probability of failure (fatigue cracking). Limiting regular examining activities to the "scrap" part of the pipelines only, results finally into a pipeline system with questionable integrity. The dependence level in integrity will fall below acceptance levels. Examine of presently uninspected sections of the pipeline system become necessary. This project will give information on the "robotic inspection technology".

Pipelines are demonstrated to be the securest way to transport and distribute Gases and Liquids. Regular inspection is essential to keep up that reputation. The larger part of the

pipelines system is approachable by In-Line Inspection. Tools but this approach is limited to the section in between the launching and receiving traps only.

Unfortunately, corrosion does not have this drawback. The industry looks for means of inspecting these in-approachable pressure holding piping systems, preferably, without interrupting the operations. It is a fact that enough reliable and exact examined results can only be obtained by direct pipe wall contact/access. If that is not useful from the outside, we have to go inside. Since modifying pipeline systems for In-Line Inspection is mainly not practical, KROTO FINDER pursues development of ROBOTIC inspection services for presently in-accessible pipeline systems.

Kroto Finder is a robot which is used to detect the cracks & damage into the pipe. In this robot, we have used Arduino uno which will be used for the controlling of the motor driver and the two servo-motor used for the camera. The motor driver is connected to the four wheels of the chassis which will move in the four directions (forward, backward, left, right). We have used ultrasonic sensor to A0 and A1 of the Arduino uno for measuring the distance if any obstacle present in front of the robot. We have used the camera Wi-Fi Module for live streaming of the video in the pipeline. For the rotation of the camera the 2 servo motors are connected to 6 and 7 pin on the Arduino uno. We have programmed the motors in such a way which are moving 90 degrees left and right and 90 degrees up and down according to the camera movement we want. We have used Blynk app to control our robot. Blynk app has all the controlling buttons for the movement of the robot as well as the camera. The robot is connected by the Blynk app through the Wi-Fi Module.

2. Materials required

1. ARDUINO UNO

Arduino.cc developed Arduino Uno which is a micro-controller board. It is an open-source electronics platform mostly located on AVR microcontroller Atmega328. The current version of Arduino Uno includes a USB interface, 6 analog input pins, 14 I/O digital ports that are used to connect with external electronic circuits. PWM output uses 6 pins out of 14I/O. It allows the designers to manage and feel the external electronic devices in the real world.



Fig 2.1: Arduino UNO

II. METHODS & MATERIALS

1. Block Diagram

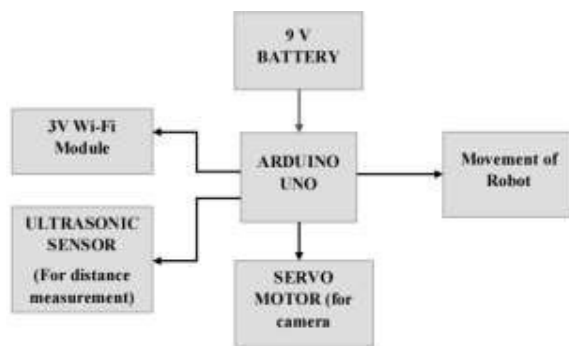


Fig 1: Block Diagram of Kroto Finder

2. Ultrasonic Sensor

An Ultrasonic sensor is an electronic device that estimates the distance of a target object by emitting ultrasonic sound waves, and converts the reflected sound into an electrical signal. It has 4 pin named as- VCC, Trigger, Echo and Ground respectively. This sensor is used to detect the distance of the object from the obstacle. Ultrasonic transmitter sends the ultrasonic wave in air and when it reflects back towards the sensor, the reflected back wave is observed by this module.

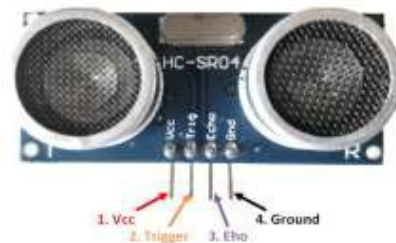


Fig 2.2: Ultrasonic Sensor

3, Single shaft bo motor (for wheels)

It is an another to our metal gear DC motors. It has an operating voltage of 3-12V and is suited for building small and medium robots. This motor set is cheap, small, easy to locate, and ideally matched for use in a mobile robot car. They are commonly used in our 2WD principles.



Fig 2.3: Single shaft bo motor

4. L298 2A Dual Motor Driver Module with PWM Control

L298N 2A Based Motor Driver is a high-powered motor driver best for driving DC Motors and Stepper Motors. It utilizes the popular L298 motor driver IC which includes onboard 5V regulator which it can provide to an external circuit. It can manage to 4 DC motors, or 2 DC motors with management of speed & direction. It is ultimate for robotics and mechatronics projects and best for controlling motors from microcontrollers, switches, relays, etc.

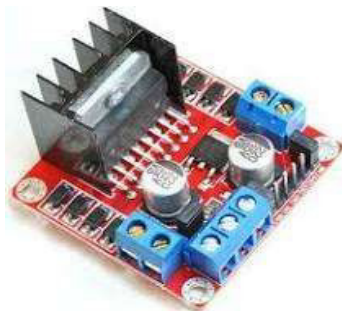


Fig 2.4: L298 2A Dual Motor Driver Module with PWM Control

5. Esp-32cam Wi-fi Module

The ESP32 CAM Wi-Fi Module Bluetooth with OV2640 Camera Module 2MP For Face Recognition has a very competitive small-size camera module that can operate independently as a minimum system with a track of only 40 x 27 mm; a slumber current of up to 6mA and is widely used in several IoT applications.



Fig 2.5: Esp-32cam Wi-fi Module

6. ESP-01 ESP8266 Serial Wi-fi Wireless Transceiver Module

The ESP-01 ESP8266 Serial Wi-fi Wireless Transceiver Module is an independent SOC with merged TCP/IP protocol stack that can give any microcontroller approach to your Wi-Fi network. The ESP8266 is able to hold an application or unloading all Wi-Fi networking purpose from another application processor.

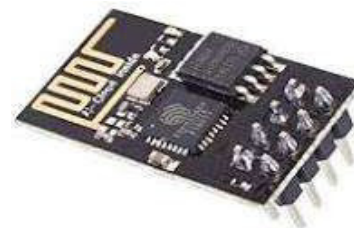


Fig 2.6: ESP-01 ESP8266 Serial Wi-fi Wireless Transceiver Module

7. Micro servo motor 9g

The Micro Servo 9G is delicate, superior and lightning-fast. The servo is depicted to work with nearly all the radio control systems. It brings you to another horizon of flight with excellent performance. The SG90 mini servo with attachment is best for R/C helicopter, plane, car, boat and truck use. A servo motor can normally only turn 90° in either direction for a whole of 180° movement.



Fig 2.7: Micro servo motor 9g

III. RESULTS AND DISCUSSION

a) Schematic Diagram

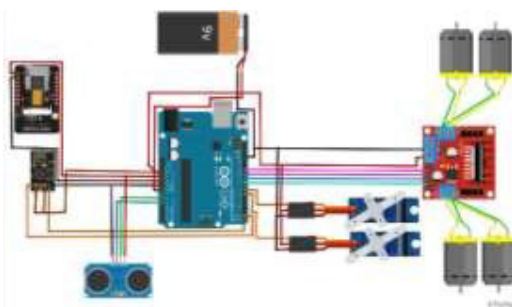


Fig 3: Schematic Diagram of Kroto Finder

b) Working

Kroto Finder is a robot which is used to detect the cracks & damage into the pipe. In this robot, we

have used Arduino uno which will be used for the controlling of the motor driver and the two servo-motor used for the camera. The motor driver is connected to the four wheels of the chassis which will move in the four directions (forward, backward, left, right). We have used ultrasonic sensor to A0 and A1 of the Arduino uno for measuring the distance if any obstacle present in front of the robot. We have used the camera Wi-Fi Module for live streaming of the video in the pipeline. For the rotation of the camera the 2 servo motors are connected to 6 and 7 pin on the Arduino uno. We have programmed the motors in such a way which are moving 90 degrees left and right and 90 degrees up and down according to the camera movement we want. We have used Blynk app to control our robot. Blynk app has all the controlling buttons for the movement of the robot as well as the camera. The robot is connected by the Blynk app through the Wi-Fi Module.

IV. CONCLUSION

Robots play foremost role in inside pipe-network conservation and their repairing. Some of them were drawn to realize specific tasks for pipes with continuous diameters, and other may change the structure function of the alternation of the examined pipe. This Project helps to detect the quality of pipe being damaged.

V. FUTURE SCOPE

The technology is proceeding quickly in whole all the fields, not in a tiny but in every second. With this fast development in technology, huge growth has been noticed in the global automation industry. The utilization of automation techniques is in constant growth and it is expected for the probable

future. The robotic process automation is one of the revolutions in the automation industry, and it is predicted to rise in taller potential in terms of usage and staff execution in the approaching year. Robotic Process Automation, especially focuss on the process of automation of those industries which are mainly business aligned and are operated by humans.

REFERENCES

- [1] M. N. Mohammed, Vidya Shini Nadarajah, Nor Fazlina Mohd Lazim (2018), "Design and development of Pipeline inspection Robot for Crack and Corrosion Detection", Proceedings of IEEE Conference on Systems, Process and Control (ICSPC 2018), Melaka, Malaysia, December 2018, (pp. 29-32).
- [2] Linija Shylin, Sudha M, Prasoona O, Rhituporna Sarkar, Tejashree M S (2017), "Development of Android Based Remote Acquisition – Kroto finder", IJERECE 2017, Vol. 4, Issue 5, (pp. 148-153)
- [3] V. Mallikarjuna, K. Rajesh, C. Chandra Sekhara (2017), "Design and Development of Kroto finder", Department of ME, Joginapally BR Engineering College, Hyderabad, Indi
- [4] Thanuja I K, Sheeba Kumari M, Vineeth Reddy M (2016), "Kroto finder- detection of damages in oil/gas pipes", IJAER 2016, Vol. 12, Issue VI, (pp. 19-30)
- [5] Shahid Latif, Syed Adil Javed, Zil e Huma, Izzat Fatima, Arsalan Ejaz, Umair Naeem (2019), "Design and development of a wireless controlled human aide robot", Proceedings of IEEE International Symposium on Recent Advances in Electrical Engineering (RAEE 2019), Vol. 4,2019