

# REMOTE CONTROLLED METAL DETECTING ROBOT WITH IMAGE TRANSMISSION

B. Sai Kiran<sup>1</sup>, P.Vijay Kanth<sup>2</sup>, B. Naresh Kumar<sup>3</sup> Student<sup>1</sup>, Student<sup>2</sup>, Assistant Professor<sup>3</sup>  
ECE Department, BVRIT, Narsapur, Telangana, India<sup>1,2</sup>

*Abstract* : Metal detectors are fascination machines The project is designed to develop a robotic vehicle that can sense metals ahead of it on its path similar to sensing land mines. It consists of a proximity sensor that detects the metals ahead of it and image in front of the surrounding is sent to the mail. An Beagle Bone Black of microcontroller is used for the desired operation.

A proximity sensor is mounted on the robot body and its operation is carried out automatically on sensing any metal underneath. As soon as the robot senses this metal it sends the mail. This is to alert the operator of a possible metal (eg: land mine) ahead on its path.

**Keywords:** BeagleBone Black, proximity sensor.

## I. INTRODUCTION

A metal detector is a device which responds to metal that may not be readily apparent. The simplest form of a metal detector is the proximity sensor which detects the metal when it is close to some target and it sends the control signal.

The first industrial metal detectors were developed in the 1960s and were used extensively for mining and other industrial applications. Uses include de-mining (the detection of land mines), the detection of weapons such as knives and guns, especially in airport security, geophysical prospecting, archaeology and treasure hunting. Metal detectors are also used in the construction industry to detect steel reinforcing bars in concrete and pipes and wires buried in walls and floors.

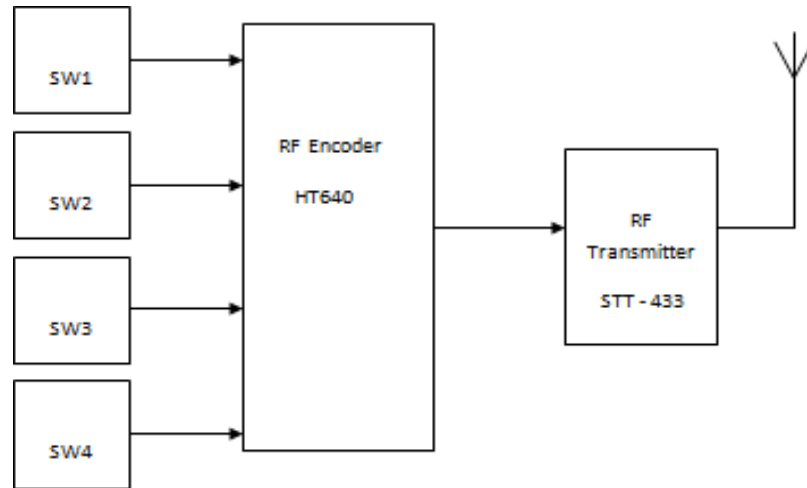
This robot is controlled by a RF remote. This can be moved forward and reverse direction using geared motors of 100RPM. Also this robot can take sharp turnings towards left and right directions. This project uses BeagleBone Black as its controller. A high sensitive proximity sensor and a usb camera is fixed to this robot.

When the robot is moving on a surface, proximity sensor detects the metal when the metal is detected the usb camera captures the image and Simultaneously the images around the robot will be transmitted to the mail.

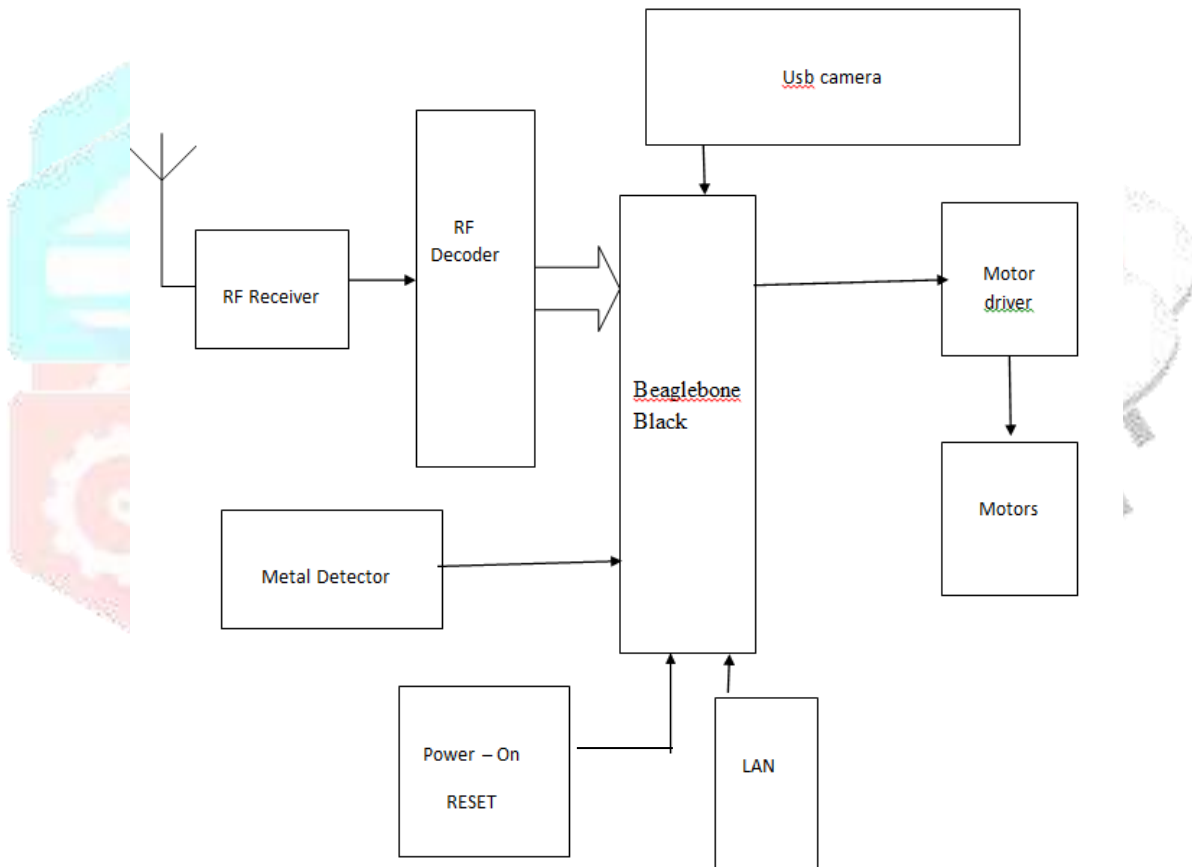
## II .LITERATURE SURVEY

Metal detectors are fascination machines. Many of the people who use them are just as enthusiastic about extolling the virtues of their favorite metal detector as they are about setting off in search of buried treasure. This is the primary means by which we determine how well we are doing our jobs, and what sort of things we need to do better. Sometimes though, communication is difficult. The most commonly used metal detection technology is very low frequency (VLF), also known as induction balance. In this type of metal detector, there are two rings: an outer coil called the transmitter coil and an inner coil called the receiver coil. The transmitter coil has an electric current running through it, which creates an electromagnetic field. This magnetic pulse interacts with any conductive object it passes over, causing that object to create a weaker magnetic field of its own; it is this magnetic pulse from the object that the receiver coil senses. The receiver coil is shielded from the transmitter coil's magnetic field, but can pick up magnetic pulses sent by other objects. The receiver coil amplifies these frequencies and sends them to the control box for analysis.

### III. PROPOSED SYSTEM



Transmitter(remot)



Receiver(robot)

This project works with the proximity sensor as its metal detector. When the metal is detected it send the output to the mail. The signal getting from RF transmitter through RF receiver is also sent to the BeagleBone Black. The BeagleBone Black directly cannot drive the motors.so BeagleBone Black sends the output to the L293 motor driver. This motor driver runs the motors. There are two DC motors. The motors will drive the robot.

It consists of a proximity sensor and a camera whenever the metal is detected the camera captures the surrounding area and sends it to the mail. The robot works with the RF technology and the project uses RF transmitter and receiver at 433MHz. Whenever the robot finds any metal in its path it stops there and the proximity sensor sends the control unit and sends the surrounding images the mail.

Further the project can be enhanced by live streaming so that the movements of the robot can controlled remotely by watching it on a screen.

#### IV. HARDWARE

Hardware used in this project is

- 1 BeagleBone Black
- 2 Motor driver
- 3 Two 100 RPM motors
- 4 Proximity sensor
- 5 Camera
- 6 RF Transmitter and Receiver
- 7 Encoder and Decoder

#### V. SOFTWARE

As the Microcontroller is used from the family of Texas Instruments, it requires a coding platform to control the peripherals. In this project for the BeagleBone Black we uses the Python.

Python is a general-purpose interpreted, interactive, object-oriented and high-level programming language. It was created by Guido van Rossum during 1985-1990. Like pearl, python source code is also available under the GNU General Public License(GPL). This tutorial gives enough understanding on python programming language.

#### V.CONCLUSION

This project presents a metal detecting robot using BeagleBone Black in embedded system domain.

The mine sensor worked at a constant speed without any problem despite its extension, meeting the specification required for the mine detection sensor. It contributed to the improvement of detection rate, while enhancing the operability as evidenced by completion of all the detection work as scheduled. The tests demonstrated that the robot would not pose any performance problem for installation of the mine detection sensor. On the other hand, however, the tests also clearly indicated areas where improvement, modification, specification change and additional features to the robot are required to serve better for the intended purpose. Valuable data and hints were obtained in connection with such issues as control method with the mine detection robot tilted, merits and drawbacks of mounting the sensor, cost, handling the cable between the robot and support vehicle, maintainability, serviceability and easiness of adjustments. These issues became identified as a result of our engineers conducting both the domestic tests and the overseas tests by themselves, and in this respect the findings were all the more practical.

#### VI.Future work

This project can be further enhanced by using live streaming.

This project can further be used wireless by using wifi modules in the robot.

This project can also be extended by using Bluetooth modules

**Result:**



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