MINI PROJECT

(2019-2020)

ON

Four Leg Walker

Mid Term Report

Institute of Engineering & Technology
GLA UNIVERSITY, MATHURA

Supervised By:-
Mr. Amir Khan
(Technical Trainer)
Department of Computer Engineering & Applications

Team Members:-
Rachit Chaudhary
(171500248)
Yashika Goyal
(171500399)
Apoorvi Goyal
(171500060)

Title of the project

"Four Leg Walker"

Problem Statement:

The goal is to make a four leg iot based walker which helps in mining as metal detector and ease the human workload .Features like camera module ,night vision can also be added to make it more efficient.
As the world is shifting towards machines and robots ,this project is also an attempt to reduce the work stress,and to prevent human resources from any mishappening in the mining industry.

Reason for selecting the topic:

When college time gets over and Day Scholars look for their buses and they, instead of having time well enough to eat the food item, decide not to order the food item looking into the fact that it will take some time for the order to get prepare and the buses will start to depart in that piece of time. So, they give priority to the bus keeping in mind the waiting time for the order.

Objective:

The objective of this project is to develop the four leg walker using a minimum number of servomotors. The minimum number of servo motors allows the walking robot to minimize the power consumption while constructing a program that can produce coordination of multi-degree of freedom for the movement of the walker.
The main objective is to reduce the human workload and to keep humans out of harm's way.

Future Scope:

As the world is shifting towards robotics and machine learning, the project can play its part in its own way. The project is a step towards developing India's mission by keeping human resources out of harm's way and to ease the work ,mainly in the mining industry. The data collected by the sensor over a given mining area can be used to analyse or to detect certain items in the bounded constraints.Technology like Artificial Intelligence and machine learning can also be used in future to make this project more effective and reliable.

Summary

The project mainly aims to scan a particular area and find any metal and after finding that the model generates a sound to tell us a metal is detected. The project will reduce the manual work of the miners and help in detecting in the smallest area, the model can reach.Moreover, it will make the process of mining reliable as miners don't have to go and search the whole day for detecting the metals and also help in saving the resources such as the utilisation of humans who can be used in other tasks. The project will also further extend its limits as a stable structure can be formed and also features like collecting the metals with the help of the walker and reducing the task of miners can also be added.

Hardware and Software to be used:

ARDUINO UNO: Arduino is an open-source electronics prototyping platform/environment .We can program an arduino using arduino ide.

Servo Motor-A servo motor is an electrical device which can push or rotate an object with great precision. If you want to rotate an object at some specific angles or distance, then you use a servo motor.

Camera or vision sensor: The camera module OV7670 can be interfaced with Arduino UNO.

Inductive Proximity sensor: An inductive proximity sensor can detect metal targets approaching the sensor,without physical contact with the target.

Power Supply circuit and metal/plastic body frame,etc

Testing Technologies:

Functional Testing is a kind of black box testing that is performed to confirm that the functionality of an application or system is behaving as expected.

Performance Testing,Perf Testing is a type of testing performed to check how application or software performs under workload in terms of responsiveness and stability.

Applications:

1. This project can be used in the mining industries to detect the metal.
2. Variation in the model can be introduced according to the need of surrounding and work.

Scope for extension into a major project:

1. A certain app can be made for this model which will allow us to access the bot from a distance also .

2. We can make our bot self balancing by using PID algorithms and hardware like MPU6050 as a gyroscope or accelerometer.

3. Various Machine Learning Algorithms can be applied on the data collected by the BOT, in order to analyze the pattern so obtained which will surely help in predicting the metal position.Moreover, metal detection would become easy by keeping an eye on the pattern from the large data.

Progress Details:

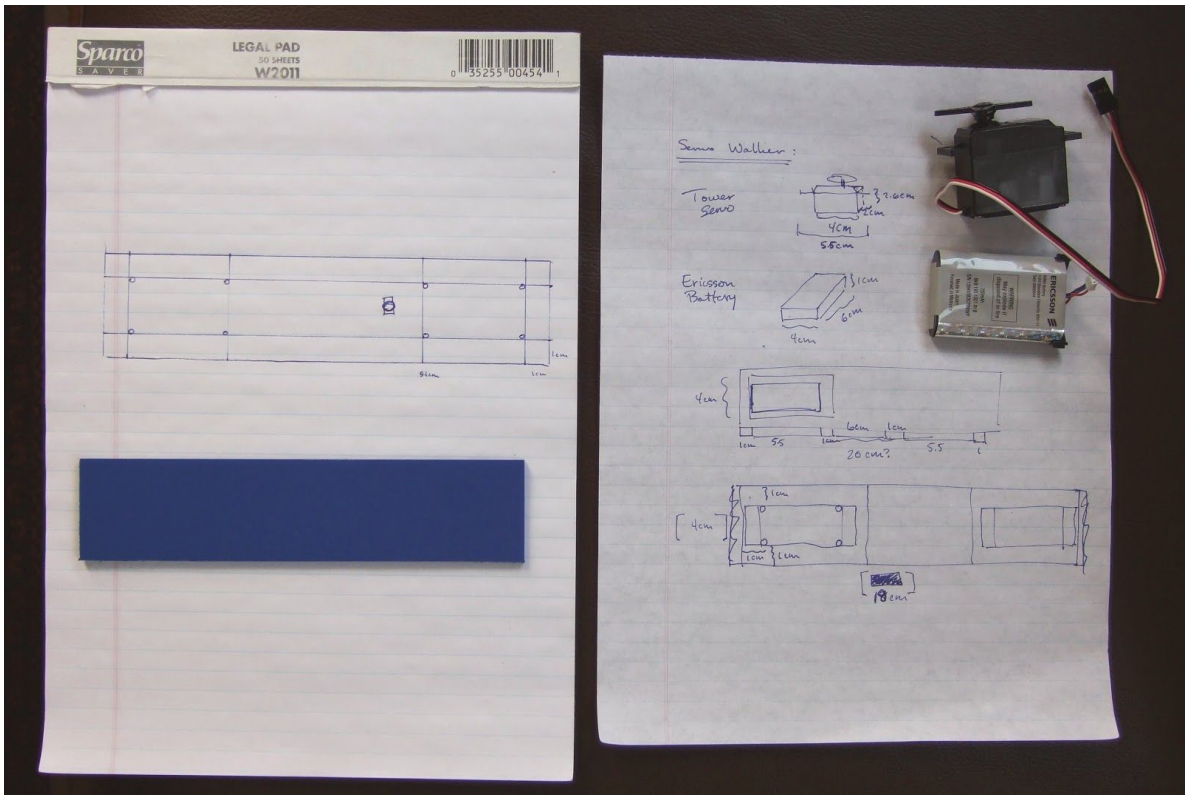

Fig 1 : pictorial view of our procedure.

Here you see us measuring out the parts , making a sketch for the frame , and then grabbing a ruler to make a paper template.Then we drilled holes on the corners of the motor cutouts,then scored along the edge of a ruler from hole with a knife, after cutting out the holes we test-fit the motors just to how it worked.

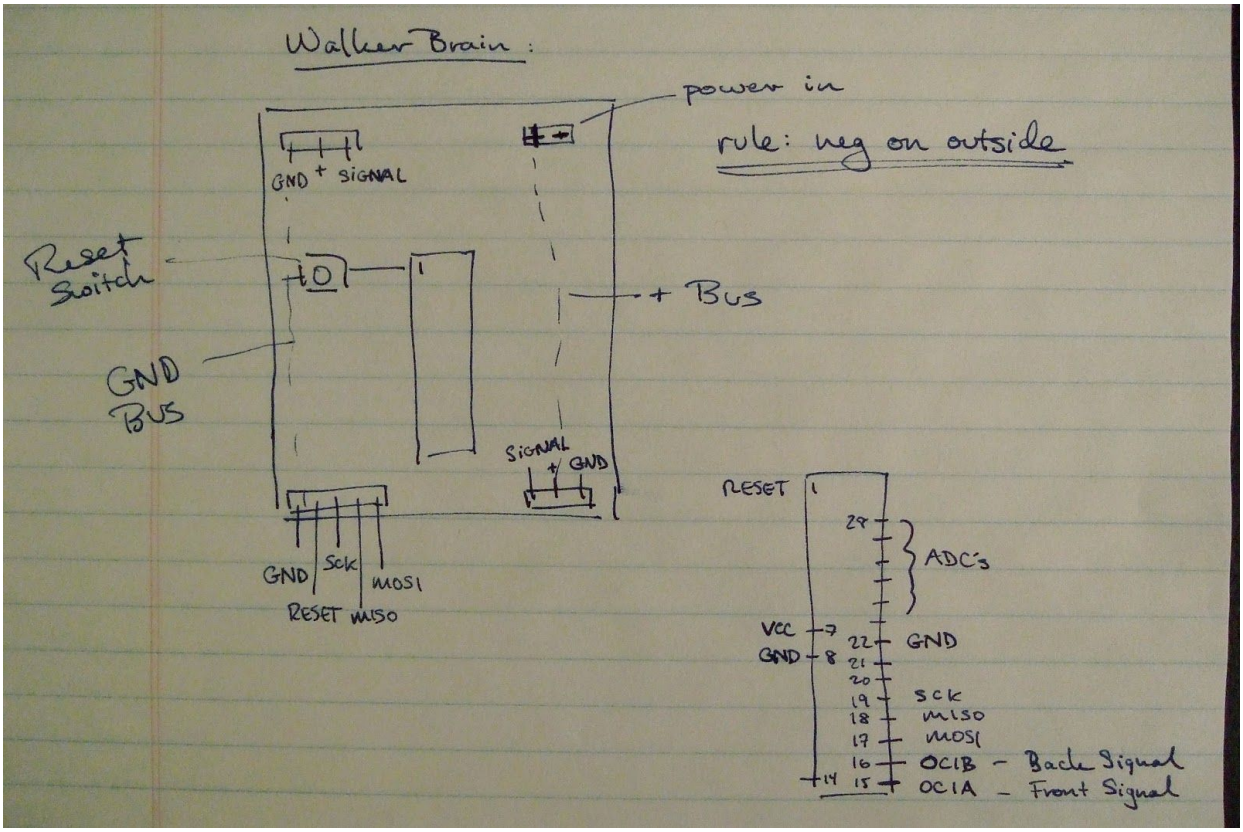

Fig 2 : diagrammatic view of brain board

Once all the sockets and headers were glued on,we soldered them up,after attaching all the motors ,we made a brain board which is the brain of our walker,then we programmed the chip in order to make our bot walk properly.

CODE:

```
void loop() {
//STARTING POSITION
```

```
Set_Leg_Position_0Cartes(‘A’, 50,10,down);
Set_Leg_Position_0Cartes(‘B’, 50, -10,down);
Set_Leg_Position_0Cartes(‘C’, -50,50,down);
Set_Leg_Position_0Cartes(‘D’, -50, -50,down);
//STEP 1
Step_in_Y(‘B’, -10,110);
//SHIFT1
Move_in_Y(‘A’, 10,-50);
Move_in_Y(‘B’, 110,50);
Move_in_Y(‘C’, 50,-10);
Move_in_Y(‘D’, -50,-110);
//STEP 2
Step_in_Y(‘D’, -110,10);
//STEP 3
Step_in_Y(‘C’, -10,110);
//SHIFT1
Move_in_Y(‘A’, -50,-110);
Move_in_Y(‘B’, 50,-10);
Move_in_Y(‘C’, 110,50);
Move_in_Y(‘D’, 10,-50);
//STEP 4
Step_in_Y(‘A’, -110,10);
```

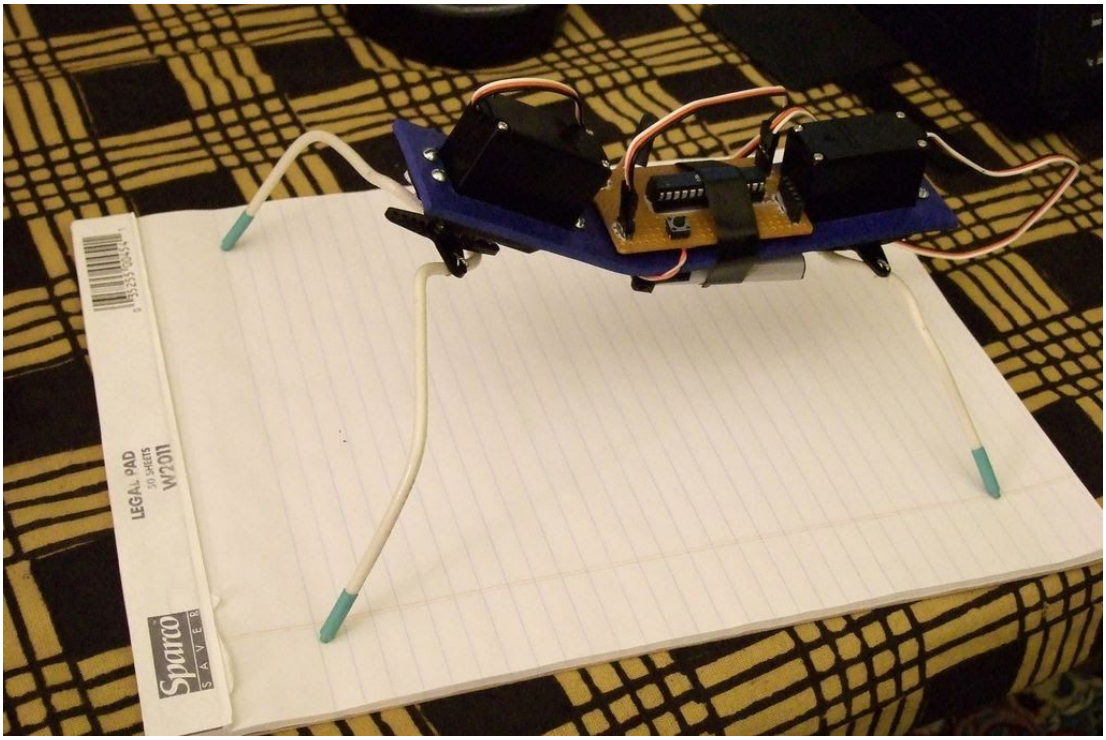

Fig 3 : pictorial view of our project

There are minor errors in our code and general wiring and hardware issues which make our walker inefficient and incomplete.Till now half the work is done ,soon we will be able to see our baby(walker) walking.

Contribution:

Hardware part is managed by Apoorvi Goyal.

Software part is done by Rachit Chaudhary and Yashika Goyal.

References:

1. www.coursera.org
2. https://circuitdigest.com/internet-of-things-iot-projects
3. https://www.instructables.com/id/A-Servo-based-4-legged-Walker/
4. https://www.zapmeta.co.in/