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# Bluetooth Based Land Survobot Using Arduino

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**ABSTRACT:** Surveying Of Land Has Been An Important Process In Human Development From Recorded Time Of Human Civilization It Is Being Implemented In A Certain Area Measurements Area Subdivisions Field Perimeter Calculations Maps Formation Etc Different Technologies Are Evolving Regularly To Make This Process Much Ease And Comfortable They Include Horizontal Taping Edm (Electronic Distance Measurement) Land Surveying Robots Combined With Different Type Of Sensors Etc In This Paper A Survobot Has Been Developed To Measure The Land Perimeter Which Will Be Noted To Make Further Analysis Of Specifications Of Land It Makes Use Of Arduino Nano Microcontroller For Controlling Bluetooth Module For Communicating With The User And System A Motor Driver For Regulating Input And Output Voltage Levels Of Dc Motors And An Bluetooth Application For Displaying The Measurements Whenever This Survobot Is Made To Travel Along A Plot It Displays The Land Covered At The End Of The Journey To The User.

**KEYWORDS:** Microcontroller, Motor Drivers,Dc Motor, Bluetooth Module, Bluetooth Application.

## I.INTRODUCTION

Surveying Of Land Refers To The Analysis Of All Respective Measurements Of Particular Plot. It Includes Perimeter, Area, Subdivision Of Land, Boundary Measurement Etc. Many Technologies Have Evolved To Make This Land Surveying More Efficient. Firstly, Horizontal Taping System Was Used To Measure The Distance Which Is Further Used To Make All The Land Measurements But This Needs Lot Of Human Effort And Time Loss.

Later, The Edm (Electronic Distance Measurement) Was Developed In 1943 To Measure The Velocity Of Light But Was Modified To Get The Distance Of The Land. It Reduced The Limitations Of Previous Systems. Edm Is Of Three Types. Microwave Instrument, Infrared Equipment And Light Wave Equipment. It Contains Two Devices Called As Theodolites. One Is Electromagnetic Distance Measurement Equipment And Other Is Reflector. Electromagnetic Waves Are Used To Measure The Distance. It's Range Is Up To 100 Km. But It Is Much Overhead To Carry The Whole System To The Required Plot. It Requires Much Human Effort And It Is Costlier To Accommodate. Hence, A Surveying Robot Evolved By The Engineers. It Can Be Developed With Many Technologies Associated With It. Nowadays, Surveying Applications Are Available Over The Internet Which Makes Use Of Gps System But These Are Not Much Accurate Compared With The Survobot. The Drone Technology Can Also Be Used To Measure The Distance Of An Area But It Needs More Technical Expertise To Operate The System. It Is Also Expensive To Accommodate For The General Purpose Usage. Hence, This All Limitations Will Be Eradicated With The Efficient Usage Of Land Surveying Robots.

In This Paper The Detailed Explanation Of Survobot Is Explained Which Works On The Principle Of Timer Concept. It Uses Arduino Microcontroller For Controlling Input And Output Peripherals, Two Dc Motors For Driving The Robot Forward, A Motor Driver For Making Input And Output Voltage Levels Of Dc Motors Compatible, Anbluetooth Application To Display The Measured Values To The User. This Robot Communicates With The User In Bluetooth Communication. So, A Bluetooth Module Is Introduced For This Purpose. This Robot Can Travel With The Speed 0.62 M/Sec With The Battery Lifetime Of 27.5 Hours. However, It Can Be Changed According To The Battery Used And Diameter Of The Dc Motors.



The Methodology Starts With The Communication Of User And The Robot System. For This A Bluetooth Application Will Be Installed In The User Mobile And Will Be Starting To Input Commands For The Robot To Travel Along A Particular Direction. After The Robot Travels Along The Path And Reaching The Destination, The Measurement Of The Land Displayed On The Bluetooth Application Will Be Noted In Pc And Can Be Used For Further Analysis Of Other Parameters Like Area, Boundary Ship, Map Formation, Land Subdivision Etc. The Lifetime Of The Robot Depends On The Battery Used But It Can Be Replaced Again With The New As Per The Requirements. An Ultrasonic Sensor Can Be Used To Get Alerted With The Upcoming Obstacles To Get Sensed But As This Robot Is Operated Manually There Is No Need To Get Alerted With The Obstacles And Hence Ultrasonic Sensor Is Removed Optionally. Advantages Of Survey Robots Include

- 1)Enhanced Accuracy-These Robots Provide Much Accurate Results Within Less Range Requirements.
- 2)Less Overhead- The Survey Robot Is Less Weight And Size. So, It Is Easy Portable In Nature.
- 3)Inexpensive- The Whole System Is Economical To Build.

## II.LITERATURE SURVEY

Akshay M.Sajjanar, Kushal Kalyan P M, Mamta S Kannur[1], Design And Implementation Of A Land Surveying Robot Published In International Journal Engineering Research In Electronics And Communication Engineering(Ijerece). This Paper Explains The Design Of A Surveying Robot Which Ultimately Measures The Area, Perimeter And Subdivision Of Plots If Required. This Paper Also Make Use Of Bluetooth Communication And Atmega Microcontroller. Instead Of This Controller Other Controllers Like Arduino Nano Can Also Be Used That Provides Best Programmable Interface.

K.Chidambaram, S.Anil Kumar, T.Mohan Kumar[2], Design Analysis Of Land Surveying Robot Using Arduino Uno Is Published In International Research Journal Of Engineering And Technology (Irjet).This Paper Also Designs A Land Surveying Robot Which Works On Bluetooth Communication And Displays Results In Lcd Display. Here Making Use Of Ultrasonic Sensor May Results In Extra Power Consumption And Extra Overhead.

Shiksha. G.K, Vidyashree Patil, Keerti. R.K,Vaishnavi.S.K[3], An Autonomous Land Surveying Vehicle Using Microcontroller 328 Published In Journal Of Emerging Technologies And Innovative Research(Jetir). Here, A Land Surveying Robotic Vehicle Has Been Designed Which Travels Along A Path And Gives The Distance By The Wheel Rotation Using Ir Sensor.

Dr.P.S.Raghavendran,M.Gayatri,T.Aravind[4], Automation Land Subdivision Using Robot. This Paper Explains The Design Of Land Surveying Robot Which Specifically Uses Zigbee Technology Instead Of Bluetooth And Other Types Of Communication. Zigbee Communication Has Its Own Advantages And Limitations Compared To Others. It Has Less Data Transfer Speed Compared To Bluetooth And More Expensive For Affording A Simple Project.

Feroz Morab, Thazeen, Seema Morab, Mohammed Najmus Saqhib[5], Land Survey Robot Is Published In International Journal Of Advanced Research In Engineering And Technology(Ijaret). This Paper Also Follows The Features Of Zigbee Technology. It Has Less Data Transfer Speed Compared To Bluetooth And More Expensive For Affording A Simple Project.

## III.PROPOSED SYSTEM

The Main Objective Of This Project Is To Develop A Land Surveying Robot. It Assists In Analysing The Main Parameters Of A Particular Plot. It Contains A Bluetooth Module For Communication, Dc Motors For Driving The Robot, And A Motor Driver For Acting As An Interface Between Dc Motors And Control Circuits. Bluetooth Application For Controlling The Robot Movements And Displaying The Results And An Arduino Nano For Controlling All The System. The Process Begins With Initiating Communication With The Robot To Travel Forward. For This, An Application Will Be Installed On The Mobile Phone, And Commands Are Trans Versed To The System. The Robot Is Driven Along With A Plot As Per The Requirements Of The User And Is Terminated At The End Of The Journey. It Makes Use Of The Time Concept For Measuring The Distance. After All The Process Is Done, The Robot Produces The Distance Results On The Bluetooth Application. These Results Are Further Analysed To Calculate The Perimeter Or All The Remaining Required Parameters.

Block Diagram Of Bluetooth Based Land Survobot Using Arduino:

The Block Diagram Of This Proposed System Consists Of

- Bluetooth Application
- Bluetooth Module
- Arduino Nano



- Motor Driver
- Dc Motor
- Battery

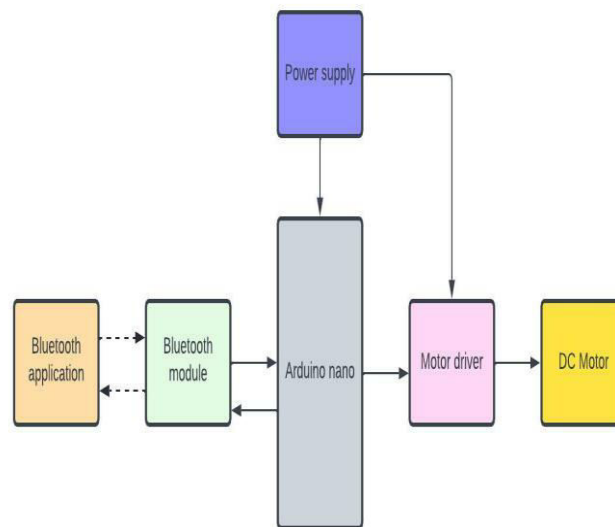


Fig 1: Block Diagram Of Bluetooth Based Land Survobot Using Arduino

The Block Diagram Consists Of The Components Used In The Project. It Contains A Battery To Supply Power To Every Component In The System. Every System Gets Driven By The Power Consumed By The Battery. It Contains Arduino Nano A Microcontroller For Processing And Maintaining The Input And Output Peripherals. It Processes The Commands From The User And Controls The Elements Connected To It. Here, The Whole Process Starts With The Bluetooth Application. On The User Side, A Bluetooth Application Is Installed And Commands Are Given As Inputs Which In Turn Are Received By The Bluetooth Module And Send The Information Or Commands Received From The User To The Arduino Nano Microcontroller. Now, The Motor Driver Is Connected Directly To The Arduino Nano And Controls The Dc Motors. At Last, The Processed Information Is Displayed In The Bluetooth Application Connected To The System. Each Component Is Connected Using The Jumper Wires. This Contains Male To Female And Male To Male And Female To Female Types Of Jumper Wires.

Flowchart Of Bluetooth Based Land Survobot Using Arduino:

This Flowchart Describes The Working Of Our Developed Land Surveying Robot. Initially, The Required Materials And Equipment Are Taken Then The Design Layout Of The Chassis Is Made To Eradicate The Accuracy Of The Measurement By The Robot. Hence Required Program Is Created By Using Arduino Nano Software And Then The Created Code Is Then Transmitted To The Arduino Nano Board. The Motor Driver Is Connected To The Arduino Followed By The Respective Pins Given In The Program For Arduino Nano. As Per The Program, The 100 Rpm Motors Are Connected On Either Side Of The Chassis. Then The Bluetooth Module Is Connected With The Arduino To Receive The Signals For The Movement Of The Robot From The Mobile Similarly The Rollerball Is Inserted At The Front Of The Chassis.

The Value Measured By The Robot Will Be Displayed On The Given Bluetooth Application Connected Along With The Arduino Nano Board. For Controlling The Robot We Will Be Generating The App To Control The Movement Of The Robot's Directions Such As Forward, Backward, Left, Right, Etc., And Also The Land Mapping Diagram Is Received Through The Bluetooth Module To The Laptop.

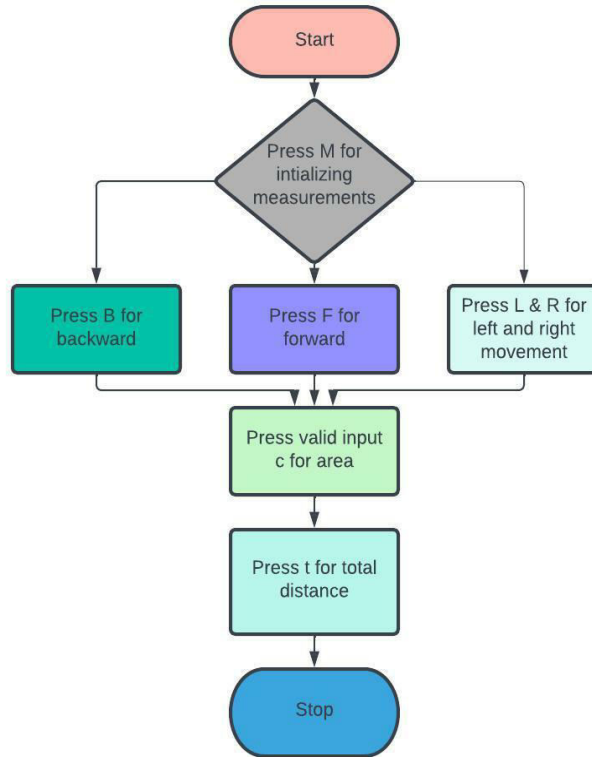


Fig 2: Flowchart Of bluetooth Based Land Survobot Using Arduino

After The Required Information Is Collected By The Robot, Our Required Parameters Like Perimeter, Area, Etc Can Be Calculated And Can Be Analysed For Further Steps Respectively. Finally, The Methodology Of Our Robot Is Explained Above Clearly.

#### IV. RESULT

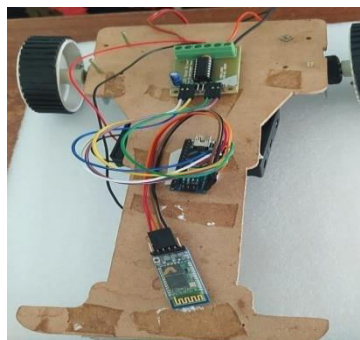


Fig 3: Prototype Of The Design

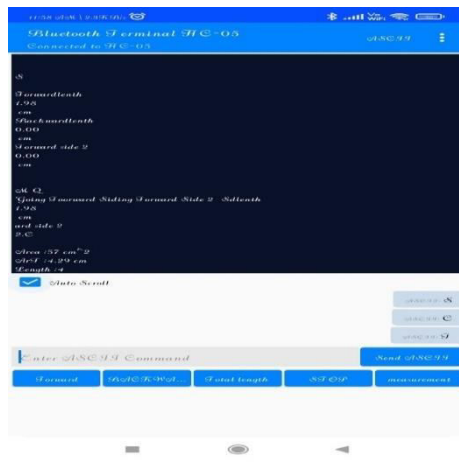


Fig 5: Output Result In Bluetooth Application

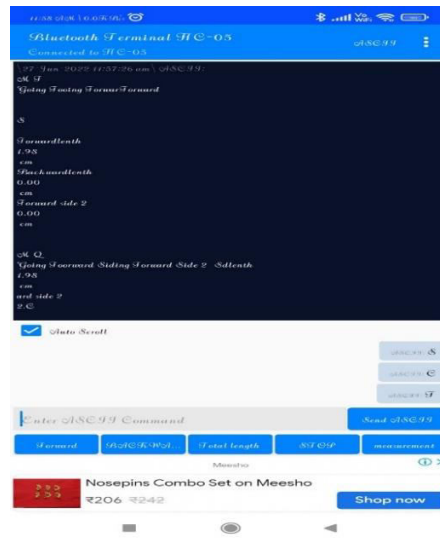


Fig 6:Output Result In Bluetooth Application

## V. CONCLUSION

The Land Survey Has Always Been A Typical Task In The Early Days For The Technicians In Early Days. Initially Horizontal Tapes Have Been Used For Measuring Distance As Time Passed On, Edm Electronic Distance Measurement Instrument Has Come Into The Picture. It Is Overhead To Use And Transport From One Place To Another. Keeping All These Into Observation We Decided To Build A Land Surveying Robot Which Has Many Advantages As Compared To Earlier Equipment. It Is Built Using An Arduino Uno Microcontroller, Motor Drivers For Controlling Voltage Fluctuations Of Motors, And Anbluetooth Application To Display The Result To The User. It Is Communicated Through Bluetooth Communication. For This, A Bluetooth Application Will Be Installed On The Mobile And Will Be Given Instructions Of Directions To Travel By Robot. Hence A Bluetooth Module Is Been Taken As A Component For This Communication Purpose. At Last, All The Connections Are Made. Finally, When The Robot Is Initiated To Travel Along With A Certain Plot As Communicated By The User, It Travels And Gives The Information To The Bluetooth Application. This Information Can Be Used For Any Purpose As Per The Requirements.

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