Voice Controlled Tripod With Sensors Using Arduino

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Abstract:

The purpose of robotics in commercial & residential has come to be quite essential for executing challenging work in a more conveniently simple way. The report presents the design & development of a Voice Controlled Tripod with Sensors based on Arduino Nano. The control system of the tripod movement will be employed by the voice and the tripod will rotate to the direction where the sound has been produced. The goal of Voice Controlled Tripod is to listen and act on the commands received from the user. Here, the system will require training from the user (for the accent) after which the device will start understanding the commands issued. This is done by adding commands to the controller through a code. The system is designed based on the microcontroller which is connected to a smart Android phone through a Bluetooth module for receiving voice commands. The voice command is converted to text by an app on the Android phone and sends necessary data to the microcontroller for controlling tripod movement. This project is mainly designed to help people with disabilities and also for monitoring, where the tripod will sense the voice and do all the required actions commanded by the users.

Index Terms – Voice Controlled, Arduino Nano, Bluetooth module, Microcontroller.

I. INTRODUCTION

Overview:

The stand will be founded on the microcontroller Arduino Nano due to its adaptable highlights alongside various benefits which depend on Atmega328P and an open-source stage with the advantage of actual processing. Bluetooth utilizes radio waves with protected and less power-consuming gadgets to interface and trade information between gadgets with next to no sort of actual contact like wires and links. A. Development control of the mount utilizing voice order. The development of the proposed mount will be constrained by the voice order of the client. The client will utilize an android worked cell phone to provide voice orders. The order can be gotten utilizing an application that will change over the voice order into text. The telephone will be associated with the microcontroller utilizing a Bluetooth module. After the discussion

of the voice order into message the application will send vital information to the microcontroller [1] utilizing Bluetooth from the telephone As indicated by the order, the mount will push ahead, in reverse, left, right, up, and down.

A mount is a convenient three-legged casing or stand, utilized as a stage for supporting the weight and keeping up with the security of some other item that likewise holds a camera. Picture takers and movie producers utilize a stand when they maintain that the camera should be kept totally still, with no trace of shaking that their hands could cause. This additionally helps individuals, particularly old-matured or debilitated individuals and children at home with computerized voice-based route and observation. It can without much of a stretch perceive voice orders and play out the developments without any problem. The mount will be founded on the microcontroller Arduino Nano in view of its adaptable elements alongside various benefits which depend on Atmega328P and an open-source stage with the advantage of actual processing. The framework will use Bluetooth innovation and a Standard correspondence interface known as SPI interface [2]. Bluetooth utilizes radio waves with protected, less power-consuming gadgets to interface and trade information between gadgets without utilizing any sort of actual contact like wires and links. SPI connection point is a simultaneous sequential data process used by microcontrollers for cooperating alongside at least one fringe gadgets quickly through restricted ranges.

Objectives:

This undertaking means to plan a stand for aiding individuals, particularly old-matured or debilitated individuals, and children at home with computerized voice-based route and reconnaissance. It can without much of a stretch perceive voice orders and play out the developments without any problem. Voice acknowledgment ordinarily upholds actual people by assisting them to control their gadgets with voice orders. This will likewise empower observing in childcare or handicapped individuals. For our venture, we need to make it easy to use and do the best procedure to control this voice-controlled stand [3].

II. RELATED WORK

[1] Voice Controlled Robotic Vehicle, International Research Journal of Engineering and Technology (IRJET)

The paper is intended to control a mechanical vehicle by voice orders for far off activity. An ARM series microcontroller is involved along with an Android Application for the ideal activity. The Android Application is associated with the Bluetooth module (HC-05) present on the Robot by means of Bluetooth. The orders are shipped off the robot utilizing press fastens or voice orders present on the Android application. At the less than desirable end, two dc servo engines are communicated to the microcontroller where they are utilized for the development of the vehicle. The RF transmitter of the Bluetooth can take either switch press or voice orders which are changed over completely to encoded advanced information for the benefit of sufficient reach (up to 100 meters) from the robot. The recipient disentangles the information prior to taking care of it to another microcontroller to drive DC engines through engine driver IC for fundamental work. This innovation enjoys an upper hand over a long correspondence range when contrasted

with RF innovation. Further, the venture can be created utilizing IoT innovation where a client have some control over the robot from any edge of the world.

In the proposed research paper, they control the developments of the vehicle utilizing voice orders from the client. These orders will be given through the Android Application on the client's telephone which is associated with the robot utilizing a Bluetooth Module. The orders gave will then be handed-off over a RF channel and will be gotten by the Module. The objective of Voice Controlled Automated Vehicle (VCRV) is to tune in and follow up on the orders got from the client. Here, the framework will require preparing from the client (for the highlight) after which the gadget will begin understanding the orders gave. This is finished by adding orders to the regulator through a code.

[2] Omer Saad Alkhafaf1, 2, Mousa K. Wali1 and Ali H. Al-Timemy3, improved Prosthetic Hand Control with Synchronous Use of Voice Recognition and Inertial Measurements

This paper is distributed inthe 2022 IEEE Worldwide Meeting on Disseminated Registering and Electrical Circuits and Hardware (ICDCECE). IoT-helped mechanical technology applications are an obvious truth of our impending future. IoT-based Hexapod is one such application that can be utilized for different purposes from clinics to the tactical which has serious potential gains for the current and people in the future. This work intends to plan a hexapod for aiding individuals, particularly old-matured or wiped out individuals at home with computerization, voice-based route, and observation. Sensors are utilized to recognize impediments and the hexapod can pick an alternate way. Electronic gadgets in each room are controlled through voice orders. The robot is additionally intended to help the client via conveying objects like drugs, documents, and so forth, to different regions in the locally established on the provided orders. The house is checked and the video will be live-transferred for the client to screen their home from anyplace whenever.

[3] Voice Controlled Robot using Arduino and Voice Recognition App (microcontrollerslab.com),Voice Controlled Robot using Arduino and Voice Recognition App (microcontrollerslab.com)

In this Arduino project, we will figure out how to fabricate a voice-controlled robot utilizing Arduino and an Android application. In thisembedded frameworks project, we plan to make a Voice Control Mount that we have some control over utilizing explicit voice orders through a versatile application called AMR_Voice. The application tunes in and sends the guidance to the Arduino board utilizing Bluetooth and afterward Arduino plays out the predetermined activity. We will program our board so that the portable application will be equipped for distinguishing five orders which are "Stop",

"Forward", "Back", "Left", "Right", "Open" and "Close".

[4] Design and Implementation of a Voice Controlled Robot with Human Interaction Ability Humayun Rashid, Iftekhar Uddin Ahmed, Sayed Bin Osman, Qader Newaz, Md. Rasheduzzaman and S M Taslim Rez

The reason for mechanical technology in business and private goal has come to be very fundamental for executing testing work into all the more helpfully straightforward way. There are a ton of investigates dealing with to upgrade the association among people and robot. The paper presents the exploration of the planning and improvement of a voice controlled talking robot utilizing cell phone in light of Arduino Nano microcontroller. The control arrangement of the robot development will be utilized by the voice and the robot will reaction the telling people by creating hints of human voice with each verbal guidance. The proposed framework will be planned in view of microcontroller which is associated with brilliant android telephone through Bluetooth module for getting voice order. The voice order is changed over completely to message by an application of the android telephone and sends essential information to the microcontroller for controlling robot development. Subsequent to getting the information the robot reactions as indicated by the order by performing appropriate development to the legitimate heading as per the voice order. A SD card module alongside a SD card which will comprise some pre-recorded human voice as sound document will be involved by the robot for the improvement of the robot's talking framework. Subsequent to getting each order the robot will act as indicated by the guidance and will actually want to talk various sentences.

The robot will be founded on microcontroller Arduino Nano on account of its adaptable elements alongside various benefits which depends on Atmega328P and an open source stage with the advantage of actual registering. The framework will use Bluetooth innovation and Standard correspondence interface known as SPI interface. Bluetooth utilizes radio waves with protected, less power consuming gadget to associate and trade information between gadgets without utilizing of any sort of actual contact like wires and link. SPI connection point is a coordinated sequential data process used by microcontrollers for communicating alongside at least one fringe gadgets quickly through restricted ranges. There are two fundamental applications that robot will actually want to perform which are talked about beneath.

III. .PROBLEM STATEMENT

a) People need to rely upon switches and ordinary actual strategies for communication. For instance, IoT gadgets permit an outwardly hindered client to change the settings without expecting to program a regulator.

b) People experiencing loss of motion or the people who are totally confined to bed deal with an issue carrying out roles like moving their cell phones/gadgets.

c) In most cases, individuals with incapacities require consistent checking which can frequently be testing and requesting for them.

d) Parents deal with a ton of issues while observing their children when they are working or at outside.

e) Looking towards the continuous issues, the client needs to change the cameras without anyone else while catching recordings or accomplishing some work like cooking, it's tedious due to no sans hands tasks.

IV. IMPLEMENTATION

Block Diagram

- This Tripod will have four sensors connected in four quadrants, a LM393 Sound Detection Sensor Module to sense voice, and a 5V battery to power the setup.

- The pin A0, A1, A2, A3 and A4 connected to sound sensors 1, sound sensors 2, sound sensors 3, and sound sensors 4. Each of the sensors are connected to 5V dc and other pin is grounded.

- In Arduino Nano, pin VCC is connected to 5V dc and other is GND.

- Pin D2 and D3 is connected to L298 Motor Driver. If D2 is positive and D3 is negative then the rotation will be on clockwise, if D2 is negative and D3 positive then the rotation will be on anti-clockwise.

- L298 Motor Driver is then connected to Bo Motor.

- Pin D10 and D11 is connected to switch array.

- RX(receives) of Arduino Nano is connected to TX(transmits) of HC-05 Bluetooth and viseversa.
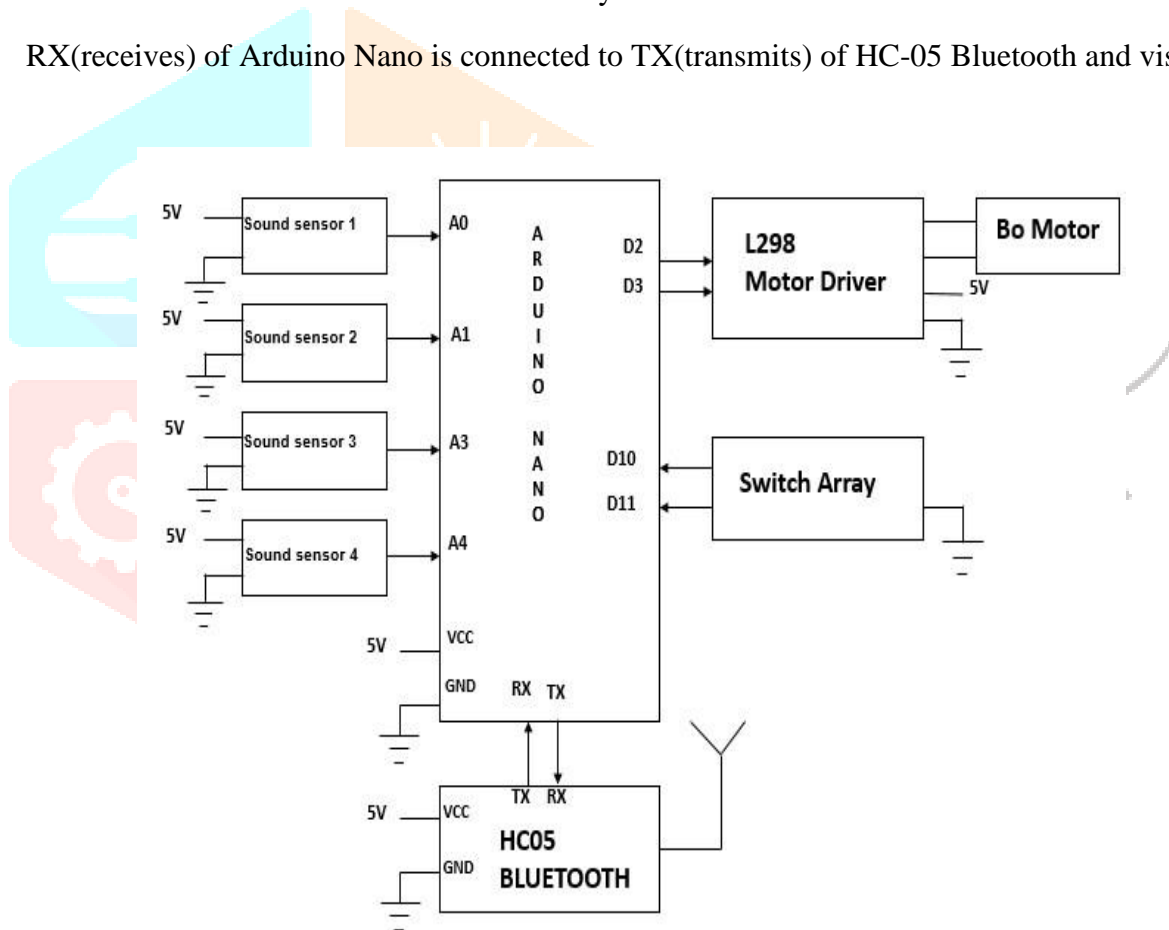
Fig1 Block diagram of the proposed model

Flowcharts
Flowchart for Automatic mode

In Automatic mode, the sensors will sense the sounds and rotate to its directions. Here the user should initialize the sensors at beginning. After initializing the sensors, the sensors will sense the user's voice and rotate the device. The Fig2 shows the flowchart of the automatic mode.
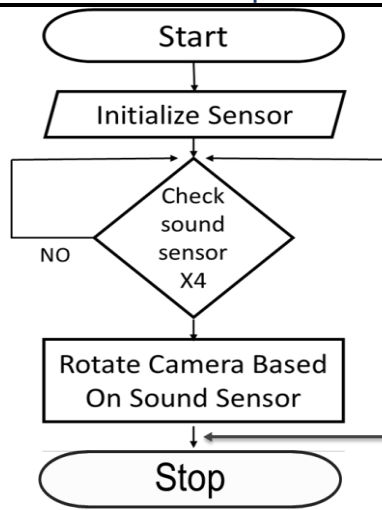
Fig 2 Flowchart of Automatic mode

Flowchart for Manual mode

In manual mode, the rotation of the tripod will be controlled by the commands of the users via android application. So to use the tripod with the manual mode, the user should start the user voice application and then connect it to the tripod via Bluetooth. After connecting it to the Bluetooth the user can command any instructions like "Left", "Right" and "Stop". According to the voice commands detected by the tripod will perform the movements. If the voice failed to detect, the user can check on to the Bluetooth connections and do the further operations in the tripod. The fig 3 shows the flowchart of the manual mode.
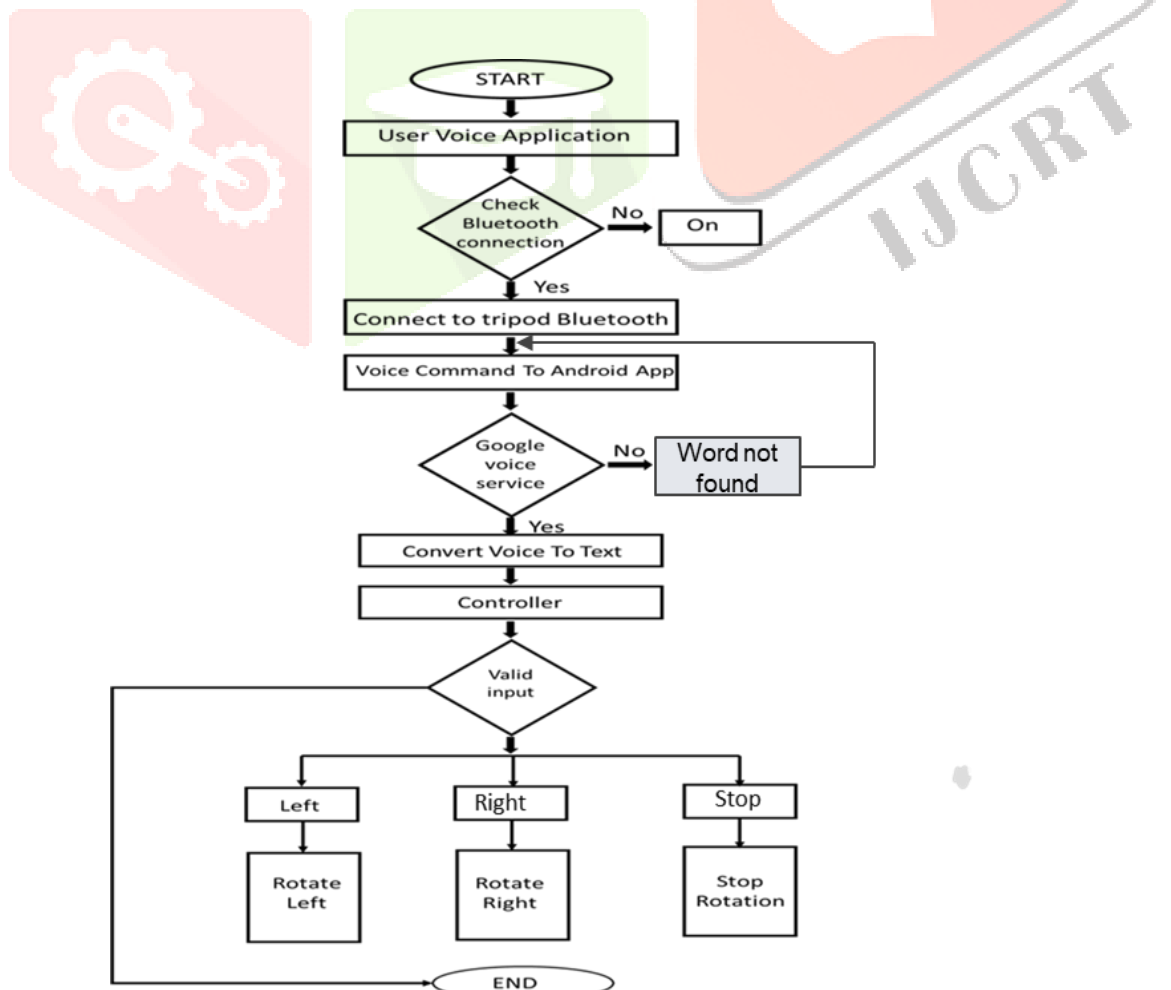
Fig 3 Flowchart for Manual mode

Communication between Arduino Nano and PC via Bluetooth

The steps below explain the communication between Arduino Nano and smartphone through Bluetooth,

<u>Step 1:</u>

Turn on Arduino Nano which with completed installation of sample hardware and source code.

<u>Step 2:</u>

Go to [smartphone] -> open [Bluetooth Places]

<u>Step 3</u>:

Key in default passwords: 1234 on [Passkey] to connect HC-05 Bluetooth Module.

<u>Step 4</u>:

After turn on Bluetooth device on smartphone, Go to the android application [Arduino Voice] -> Tap on to Connect button from the left upper corner.
<u>Step 5</u>:

From Connect -> Select the HC-05 Bluetooth Module on the display and double click the Serial Port Icon to connect.
<u>Step 6</u>:

Now you may send your voice commands to want to Arduino Nano by,

1. Press the voice button and then,

   2.   The voice will be detected from the user and perform the required actions.

V. RESULT AND DISCUSSION

Source Code in Arduino IDE

Fig4 Source Code in Arduino IDE

Proposed Tripod Model

Fig5 Proposed Tripod Model

Android Application for Voice Control

Fig 6 Interface of the application

Fig 7 Connecting the Bluetooth module to Arduino

Fig8 List of Arduino language

VI. CONCLUSION

We can presume that a voice-controlled stand can be a future market for some modern and homegrown purposes connected with computerizing everyday undertakings. The created robot can move toward any path as indicated by the voice order got from the client by Android telephone and Bluetooth. Voice orders have ready to control the robot to push ahead, in reverse, left, and right. It can without much of a stretch perceive and detect the voice orders. The framework will be planned in light of Arduino Nano which is associated with a cell phone through a Bluetooth module for getting voice orders, the voice order is shipped off an application of the cell phone and sends vital information to the Arduino for controlling the developments. Further improvement in the undertaking can be utilized for home security where the orders can be given to the stand without risk by keeping it at any spot that we need.

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