Smart Wheelchair with Gesture and Voice Control

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ABSTRACT

Being disabled brings approximately a sense of isolation from the out of doors worldwide and a experience of dependability as we need to rely upon others help for just transferring from one location to exclusive and plenty of other fundamental needs. Wheelchair has solved this problem to an quantity as it's gives private mobility for the aged and disabled. But it's far very hard for the disabled humans to use the manual power of the wheelchair independently. As a choice to this trouble, we have were given put forward a energy wheelchair which can be managed with a clean android tool using IOT technology. We have used the technology initially used to control robots to manipulate a energy wheelchair the usage of an android device both with the useful resource of touch joysticks or by way of using voice commands or by using gesture.

Keywords—Android application, wheelchair, physically challenged, Arduino UNO, Internet of things, sensors, voice commands

I. INTRODUCTION

Physical incapacity is increasing due to getting older, accidents and diverse diseases like paralysis. For this reason, the use of wheelchair is growing. Some of the folks who use the wheelchair can't operate the wheelchair with their palms.[8] [3]So, they want the assist of others to transport the wheelchair from one place to the alternative. The android controlled wheelchair can conquer those troubles generally through the idea of imposing the wheelchair the usage of android utility, now an afternoon's android cellular telephones are generally used. [2]The wheelchair might be operatedwith the voice commands and gesture as inputs, which offers the instructions as person directs. [3] This wheelchair has received greater unbiased existencebecause the

Arduino helps to covert the voice commands into outputs and the wheelchair can flow freely. Along with this an ultrasonic sensor is used to come across the boundaries. [9] By the proposed method, the wheelchair will be working at the inputs along with voice, gesture and touch through an android smartphone that movements the wheelchair in keeping with the commands provided. It. Allows the bodily disabled and aged human beings to move the wheelchair independently with none outside support. [8]

II. LITERATURE SURVEY

In the past few years, many projects are developedrelated to the wheelchair. The existing wheelchair forthe disabled and aged people are

designed in such away that they can't move independently without anexternal support. The developed projects are based onthejoystick,voice,handgestureandbrainwavesensing .Intherecentyears,thebatterypoweredwheelchairsalso havebeeninvented,whichhadgained popularity because it's more helpful for thephysicallydisabledandtheagedpeople.

[1] Thomas Roofer, Christian Mandel "Controlling anautomatedwheelchairviajoystick,/Headjoystick supportedbysmartdrivingassistance",herethesmar tdrivingassistancesupportstheuserofthewheelchai r incomplexnavigationalsituations.

[2] MohammedAsger,MirzaBadra,KhanIrshad,Shaik hAftab"Automated Innovative Wheelchair" .

[3] KyungMogLeestudyontheelectronicwheelchair controlled with a smart phone, here theauthor uses the android smart phone to control thewheelchairwithvoicecommands.

[4] Sachin S. Patil, Kiran N. Patil, Sanjay P. Patil"Gesture based wheelchairs for physically disabled"focusesonthehandmovementsorthehand gesturetocontrolthewheelchair.

[5] HollyA.Yanco,"Wellesley:ARoboticwheelchairsy stem:Indoornavigationanduserinterface" focuses on the development and evaluationof a robotic intelligent wheelchairsystem based ontheobstacledetection.

[6] KoheiArai,RonnyMardiyanto,"Eyesbasedelectric wheelchair control system" here the idea is tocreateaneyemonitoredsystemwhichhelpsthemo vementsofwheelchairdependingontheeyemovem ents.

III. SCOPE

The present wheelchairs have a few obstacles of their features and flexibility. The android smart telephones are come to be the part of our everyday life, because of that it is able to be effectively used as the medium to move the wheelchair independently. The wheelchair is managed the usage of the voice instructions, gesture, and contact via the android telephone. Using this person can control the wheelchair independently with none outside aid. The motivation behind this smart wheelchair using android platform is to build an automatic wheelchair for the disabled and aged people to transport from one area to any other without seeking the help from any outside person.

IV. PROPOSEDSYSTEM

The reason of this paper is to put in force a clever wheelchair which moves independently as according to the users enter. The gadget is evolved with the voice, cellphone gesture and contact as inputs thru the android smart telephone. The wheelchair is fully independent and the consumer does now not need any outside support to move the wheelchair. The wheelchair is applied with incorporating the technologies of Arduino and motors. The Arduino is connected with the vehicles for the motion of wheelchair. Bluetooth module is

incorporated in the wheel chair architecture and the android cellphone might be connected to the Bluetooth.

Theinputsusedare:

3.1 VOICE

When voice is selected as an input, the user can givethedirectionsasvoicecommandsformovingthewhe elchairtothedesiredlocations.Thevoiceistakenfrom the android smart phone and is giventothe Bluetooth module to control the operations of DCmotor.

Commonwordsanditsoperations:

VOICECOMMANDS	OPERATIONS
STOP	Stopsmoving
FORWARD	Movesforward
LEFT	Movesleft
RIGHT	Moves right
BACK	Movesbackward

3.2 PHONEGESTURE

On selection of gesture as enter, the person will ought to make the instructions for the android tool. Here the telephone's sensors and accelerometers may be used to manipulate the moves that the user offers.

3.3 TOUCH

If the enter is taken as contact, the direction keys are the front, returned, left, proper which decides the moves of the wheelchair. These inputs given via those keys will control the motion of the wheelchair to the favored locations.

3.4 OBJECTDETECTION

To make sure the safety of the disabled humans, additionally the item detection sensors are used to detect the boundaries. This wheelchair prevents the customers from accidents by imparting the item detection section. If any barriers are detected it affords the instructions for the user's protection.

V. IMPLEMENTATION

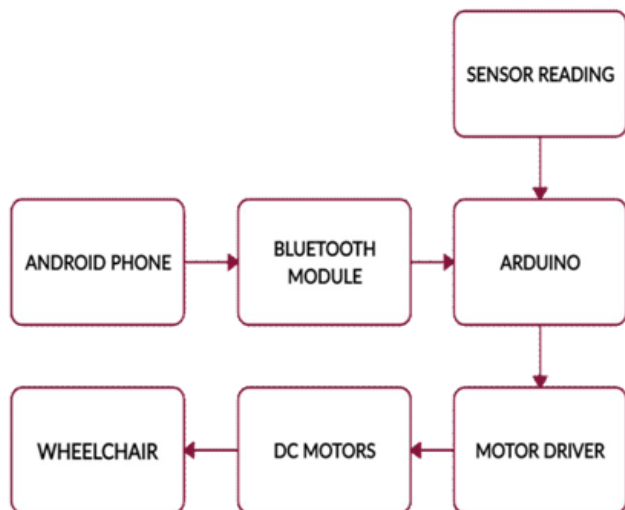Hereweneedboththesoftwareandhardwarerequirementsinorderfortheimplementation.

Figure1: WheelchairBlockdiagram

4.1 SOFTWAREREQUREMENTS

AndroidApplication

Androidsoftwareisusedtocontrolthewheelchair.

Codinglanguage

AcodinglanguagesuchascorpythonisrequiredtoprogramtheArduino.

ArduinoSoftware(IDE)

ItisusedtocreateanduploadthecodetotheArduino.

4.2 HARDWARE REQUREMENTSArduinoUNO

ItisaMicrocontrollerboardwhichhereisusedtocontrolthewheelchair.

DCMotor

Two DC motors are used here for themovementofthewheelchair.

Bluetoothmodule

HC-05Bluetoothmoduleisusedhereforwheelchair and android mobile interface.

Battery

A suitable battery is used to power thewheelchair.

Androidphone

An android phone with the wheelchairapplication is needed to control thewheelchair.

Sensor

HC-SR04ultrasonicsensorisusedforobjectdetection.

Wheelchairchassis

A wheelchair chassis is needed to mountthesecomponents.

4.3 INTERFACEDESIGN

The figure given shows the system interface for theproposed application. The system is created for theandroidmobilephonewouldcontainthethreeprimary inputs that are voice, gesture and touch. [3]For the wheelchair processing, each of these modulestransmit the data through the medium. These data aretransmittedthroughtheBluetoothmoduleforthetransmission and receiving. The android applicationcan be written using the c language. As per the usersdemandthedcmotoriscoupledwithArduino.[3]
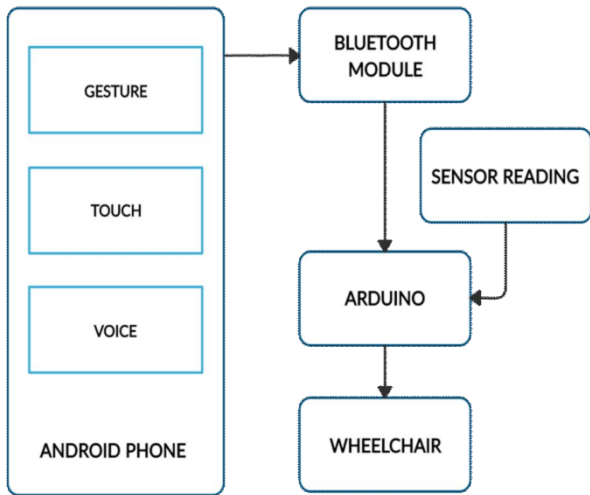
**Figure 2: Wheelchair-Arduino Interface diagram**

VI. ADVANTAGES

User friendly: the method employed for the working of wheelchair is user friendly since it can be used in any of the three ways convenient for the user.

Reduce man power: the manual work is reduced to its minimum since touch, voice; gestures are there to control the wheelchair.

Less wiring because of Bluetooth: wiring could increase complexity because the aged and disabled would find it difficult to handle.

Automated operation: all the three methods employed could bring the whole device to a fully automated one.

VII. RESULT AND ANALYSIS
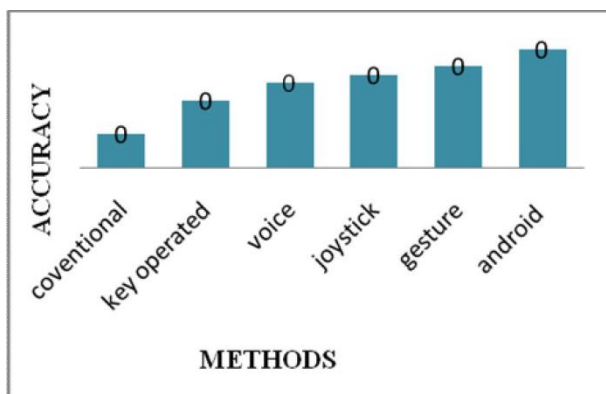
Here Android refers to our android controlled wheelchair whose efficiency and accuracy are greater than that of the all other specified papers. The specified model helps in bringing up a user-friendly technology for handling the user's needs in movement because any of the preferred ways of movement can be chosen according to the users convenience whereas all other meters of comparison here uses only a single technology and is not up to the fullest consent of the user.

VIII. FUTURE SCOPE

The next section development that may be incorporated to this project is the addition of brain wave manage which can be an ice breaker for the wheelchair enterprise. The brainwave-controlled wheelchair is connecting the brain to the pc for getting structure and statistics of the brain wherein the mind of motion might be taken as enter signals and faster motion will be possible. Electroencephalography is used for the connection between the pc and mind. This form of wheelchair is used for the paralyzed and handicap humans. The EEG alerts help the motion of the wheelchair to move freely. The device can store the video and the wheelchair can independently recognize the numerous styles. The brain wave sensing may want to do a good deal more with the elderly and the disabled as they can be greater simply operated via themselves.

IX. CONCLUSION

The clever wheelchair consist of voice, gesture, contact and object detection that we intend to find a cost effective layout to build a wheelchair for bodily disabled people, who can independently flow the wheelchair for their displacement. [3] The current gadget wishes the help of different humans to move the wheelchair from one place to every other. Our proposed device objectives to clear up the above issue. This task offers the users to control the wheelchair mechanically the use of an android smartphone due to the fact the consumer interface of an android smart phone is straightforward. This is an IOT primarily based wheelchair which is controlled the use of an

android smart smartphone taking inputs as phone gesture, voice, and touch.[3] Also it affords item detection that gives ease of navigation without colliding with objects in its path, so it assures the safety of the wheelchair customers. We are trying to expand a system that may make the disabled human beings one independent and provide an intense ease in their life. Project includes the hardware designing and software program expertise.

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