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Automated Voice Based Home Navigation System for the Elderly and the Physically Challenged

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ABSTRACT: The voice controlled wheel robot framework needs to make utilization of the most recent mechanical segments accessible. In this paper, we show the outline and execution of a voice based wheel seat framework where correspondence advances and Internet have been utilized. Every one of these methods is effectively converged in a voice controlled wheel seat framework. With this, the completely planned voice controlled framework can be composed where it can move from any piece of the house or office. The primary piece of this strategy is the Voice Recognition Software which is an android software package and also has the remote access utility. The wheel chair that is to be controlled is associated with the circuit. The embedded hardware is then associated with your portable through Bluetooth correspondence. Here, the Voice Recognition software is running on the mobile with android operating framework and the framework must be prepared first. The voice recognition software should be used only with one person at a time.

KEYWORDS: Voice recognition, Bluetooth, android

I. INTRODUCTIONS

A. Background

In previous system the whole system was made by using the microcontroller with the matlab software .But in our system we use the Arduino controller which is interface with the android application. In day to day life the android phone will be use by everyone hence with help of this android this system work more efficient than the previous system.The previous system is little bit complicated to understand the user .but in our system such condition not happend with user.

B. Motivation

Today's world comprises of a large variety of people. Some of them depend on others for their living. But in today's fast world, everyone is busy and there are less people to care for the increasing number of elderly and the physically challenged people. Also these people find it tough to even navigate inside the home without external aids. The elderly people find automated wheelchairs as an easy way for locomotion. Having known about these facts, our aim was to bring an automated navigation system which can be used by both – the elderly and the physically challenged people in a user-friendly manner using voices for operation.

II. OBJECTIVES

- The main objective is to designsystem which provides solution for the physically handicapped (challenged) people those who can't move by themselves, using speech commands.
- To build voice operated system for physically disabled persons
- To design hardware for voice recognition and corresponding action

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III. LITERATURE SURVEY

Yoshinori Kunotl et al. [1] “Interactive Gesture Interface for Intelligent Wheelchairs” proposed a motion based interface for our smart wheelchair. It can see even unregistered motions through collaboration with the client. The interaction is realized by the iteration of the guess-action-observation cycle. Exploratory outcomes affirm the helpfulness of our approach.
Yoshifumi Murakamit et al. [2] “Collision Avoidance by Observing Pedestrians’ Faces for Intelligent Wheelchairs” proposed an intelligent wheelchair which can keep away from pedestrians appropriately by watching their face heading. Test comes about demonstrate that our approach can fulfil open to going for both passer-by what's more, wheelchair client. In the present framework, we think of one as pedestrian at a time as the avoidance target. In any case, there are cases in this present reality that various pedestrians move around the wheelchair. We are at present dealing with this issue and also enhancing every part.
Ren C et al. [3] “Adaptive Intelligent Assistance Control of Electrical Wheelchairs by Grey-Fuzzy Decision-Making Algorithm” The Gray-Fuzzy Decision-Making (GFD) calculation introduced in this paper is joined with the model free proportion directing control idea to perform shrewd collaborator control of the sensor based electrical wheelchairs "Luoson#l " and "Louson#3". Through the joining of an electronic compass and the dead retribution, the controller can watch the wheelchair movement yields. The GFD can then discover the temporal optimal parameters to approximate the Observed framework elements demonstrate. The test comes about have shown the GFD as a reliable adaptive controller applied on the two wheelchairs, which are like universally useful electrical wheelchairs by which numerous potential instability and slippage may bring about mishaps.

S. Fioretti et al. [4] “A Navigation System for Increasing the Autonomy and the Security of Powered Wheelchairs” This paper shows how the proper design of a navigation system can increase the autonomy and the security of commercial powered wheelchairs. The design was based on the analysis of the user’s needs by interviewing people with different disabilities and by the analysis of the relevant literature. This preliminary design phase demonstrated the demand for increasing autonomy of the users with motor disabilities both at home and in their working environment, and a positive attitude (mainly in young persons) toward the use of high-tech devices. The intervention of the user to complete a complex task demanded from a high-tech device (for example, a navigation task in a dead-lock situation) is not considered a severe limitation of the system. Facing some difficulties in a job is regarded as a challenge but interaction with the system should be kept to a minimum so as not to stress the user too much. The above considerations led to the development of the described Navigation module and to its integration on a commercial powered wheelchair in order to increase the autonomy and the security levels of users. The robotic system was designed taking into account usability, acceptability, efficiency and cost criteria.

Pei Jia et al. [5] “Head gesture recognition for hands-free control of an intelligent wheelchair” This paper depicts the design and execution of a novel hands-free control system for IWs. The created framework gives upgraded portability to the elderly and disabled people who have very restricted limb movements or severe handicaps. A robust HGI is designed forvision-based head gesture recognition of the RoboChair user. The perceived motions are utilized to produce movement control charges so that the RoboChair can be controlled according to the client's expectation. To maintain a strategic distance from superfluous developments brought about by the client glancing around arbitrarily, our HGI is concentrated on the focal position of the wheelchair to recognize helpful head signals.

IV. SYSTEM ARCHITECTURE

When the voice is detected, the wheelchair can be controlled to move in that direction by giving commands to the wheelchair. These commands are transferred to the wheelchair using electrical signals which are used the drive the left or right motor of the wheelchair. There are basically two motors connected to the left and right wheels of the wheelchair. The electrical signals are transferred to these motors using some hardware ports, called the communication ports.Four wheels are used in the wheelchair for proper balancing.

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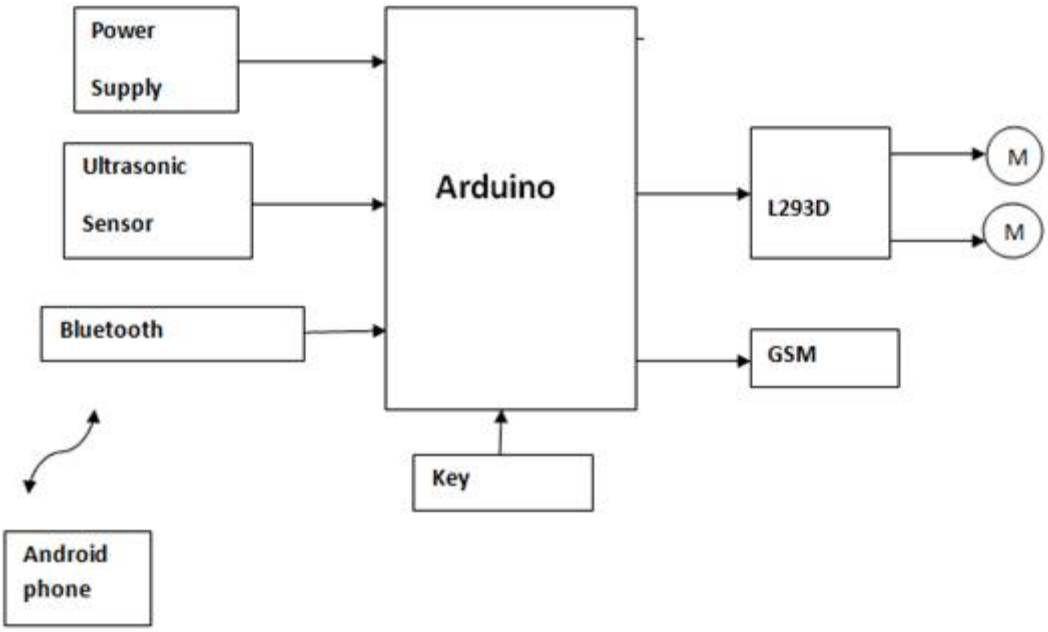

Figure 1: Block diagram

Here we utilize Google speech to text conversion api for convert voice signal into text for that we create android app in which user can give the command from MIC of mobile then this command is converted into text and send it to Adriano microcontroller utilizing Bluetooth for that we interface Bluetooth module hc05 After accepting the order the wheel seat move according to summon for development two 12v dc outfit engine are utilized those are interface utilizing engine driver is L293d engine driver. On other hand here we likewise interface one key and GSM module to framework for emergency condition that means if any emergency condition is occurs that time user can press the key and emergency message is send to its family member that mobile no is already save in microcontroller. And also here we interface the ultrasonic sensor for keep away from the crash ultrasonic sensor measure the separation if separation is not as much as given limit then wheel seat consequently halted.

V. IMPLEMENTATION RESULT

The proposed system of IHNS is shown in figure 1. This system combine with android application is used for the navigation. The real time testing demo was done on wheelchair and response time on voice navigation and switch navigation was calculated. The response time was assuming as the digital outputs from voice recognition android application. By receiving the commands, the Arduino board controls the motors to move in the intended direction.

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Figure 2: shows the starting position of wheel chair

The whole setup sits at the base of the wheelchair which has two wheels. These wheels are attached to the motors to move the wheels.
After giving the commands from android application, the all working position of wheel chair are shows follows:

Figure 3: shows the FORWARD command

Figure 3: shows the REVERSE command

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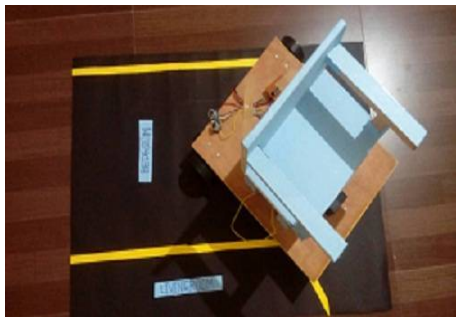

Figure 4: shows the RIGHT command

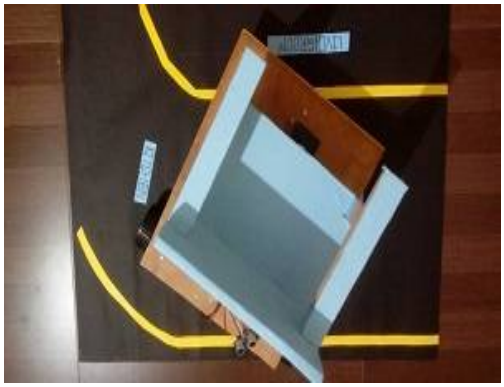

Figure 5: shows the LEFT command

Table 1: shows the Arduino response time for all movements: forward, reverse, left, right, stop. The digital output given by these movements to Arduino board.

Command given	Time (ms)
forward	24
reverse	25
left	23
right	23
stop	22

If the obstacle are occurred in between the path of the wheel chair then the wheel chair will stop immediate . this can be done by ultrasonic sensor which identify the eco of voice .it obstacle are their then eco of sound will not pass to it .hence it stop the motor immediate.

Table 2: shows the time taken to stop the wheel chair when obstacle is much closed

Ultrasonic sensor (distance)	Time taken(ms)
Near 4cm	1 ms to stop

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We can concluded from the graph of figure 9. In this graph the time taken is written on the X axis and command is on the Y axis. form observing the graph it is calculated that the system responds quickly.

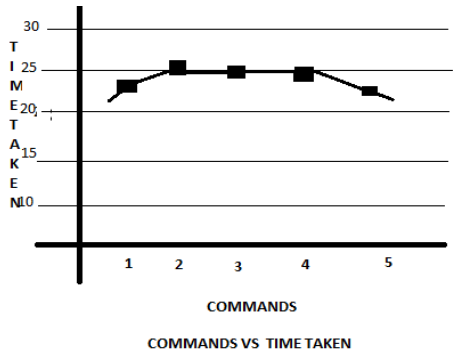

Figure 6: working graph of system

VI. CONCLUSION AND FUTURE WORK

In this paper, propose an Intelligent Home Route System (IHNS) which includes a wheelchair, voice module and route module. It can be utilized by an elderly or, then again physically tested individual to move inside the home without any trouble. This paper also discussed about an automated voice based navigation framework. Which can be utilized by anyone who requires the help of others for their day to day locomotion? This low cost setup is very useful mainly for the elderly and the physically challenged people. For future technology wheelchair would be fully autonomous that will move automatic based on the user expression and behavior. That should be fully automatic and wireless. In this project firstly we are working on the voice based automatic wheelchair and after that we will combine upcoming latest Technology like software based that will be controlled by computer and GSM mobile phones. After that we are thinking on putting a biometric feature in it that should be little bit secured for the use.

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