

Android Based Wheel Chair Control

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Abstract

Innovations has become increased day by day in which it can solves the problems which are faced by the humans. The innovations are in the field of education, medical, research and industries. The main innovations in the medical research to help the physically challenged people in the world. These kinds of people are suffered to walk from one place to another place. So to avoid the problem in this paper they propose the voice controlled robot. It uses the Bluetooth as the protocol communication between the wheel chair and the controller. The Bluetooth is paired with the android mobile. After getting paired the voice command is provided as the input. The input string is compared with the string present in the program. If the comparison is matched the controller works based upon the command. The controller is connected with the driver and the DC motors. The battery is connected separately which provides supply to the controller. This method is highly effective and more helpful to the physically challenged people.

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1. Introduction

Numerous diseases can affects the people in various manners. The disease which can affect the people is mainly due to the unhygienic and food habits. Some of the diseases are genetic disease which can transfer from one generation to another generation. In this category some disease which can affect the movement of hands and legs of the people. Due to the attack of can't able to walk from one place to another place. If they need to move without someone helps they can't able to locomotion. So to avoid the problem in this paper they proposes the voice controlled movement of wheel chair which will helps the physically challenged people in the greater level. The wheel chair movement is controlled by the voice command. The voice command in the form of string. The Bluetooth which is act as the communication protocol. Bluetooth as the TX and the RX pin. The application is developed to make the communication to the controller and the android mobile phone. The Bluetooth and the mobile phone is paired with each other. Once they paired both are ready for communication. The voice command which is act as the input string once the transmitter transmits the data

the receiver receives the data. The data is compared with the string present in the program. Once the command is matched it enters the true statement and operates the DC motor based upon the command. The command to DC motor is driven by the driver circuit which is the L293D. Driver can sends the clock signal in the form of the pulse which is the ON and OFF condition. If the pulse is high the motor will run.

The controller which is used in this method is the ATMEGA328P it has the multiple analog and digital pins. The PWM pins in the controller can send the clock signal to the driver circuit. The string command are the "FORWARD", "BACKWARD", "LEFT", "RIGHT". The string command is separated into characters. Each characters is compared one by one and it is stored in the another variable. The lithium battery which is used for the energy backup. This battery can give supply to the controller and the remaining devices. Various microcontroller devices are used in the place of ATMEGA series. In the project level it easy to make it, the cost is low and the power consumption is also less. The ultrasonic sensor is placed in the front of the wheel chair. The sensor can detects the obstacles in the front of the chair and

give some alert message with the help of the buzzer in the form of sound signal. The wheel chair is much attractive and it helpful to many of the people. This method has been extended by using various kinds of health measuring sensor and update data is upload in the server are to the mobile applications in the future.

2. Literature Survey

Sakurako Hamataniet., al., proposed normally the wheel chair is the four wheeler in which it can be move from place to place in a flat surface area. If the physically challenged people go to the first or the second floor it is difficult to move through the steps. So in this paper they proposes the two wheeled chair. This two wheeled chair does not have a caster wheels, the stabilization is made with the help of the two wheels. Here the steering system is used it can control all the system in the chair. The main concerns are the braking. The experiments are conducted in high inertia. In the fast movement if the brake is applied how the wheel chair is able to stabilize the force and decrease the inertia at every movement is measured. By using the method the physically challenged people can move to any kind of surface either flat or steps. The efficiency of the distance covered by the two wheeled chair is noted with the changes in the pitch angle. The various mechanical parameters takes into concern to design the two wheeled chair. [1]

Umar Mohammad et., al., proposed the wheel chair of the physically challenged people for the each movement of the chair the control is made by the human. So it needs more man power to loco mote from one place to another place. In this paper they propose the movement of the wheel chair guided by the retina movement. The retina movement in which the signal is captured through the web cam or through the mobile camera. The mobile camera can be interlinked with the code through the IP server. From the IP it can able to operate the mobile camera based upon our need we can adjust the contrast and the luminance of the image captured. The retina based wheel chair movement has the low cost. To make the method in the real time a specialized micro controller is used which is the ATmega1284P-IC it is developed by the Atmel. The disabled person whose retina movement is observed by the EOG signal which is the electrooculographic that can detect the signal of the retina movement. The detected signal is sends to the controller through the RS232 protocol. The data communication between the EOG and the controller is made through this protocol. This protocol has the two pins which is the TX and the RX pin. The TX can transmit the signal detected by the EOG and the RX can receive the signal. The matlab simulink is made using the method which can gives the computerized view of the process. The LCD is mounted in the wheel chair for every retina signal the data is transmitted to the LCD through the I2C protocol. This protocol has SDA and SCL pin which can receive the data. [2]

Shayban Nasifet., al., proposed in the wheel chair movement can be made through the hand gesture. The accelerometer or the ultrasonic sensor is placed in the wheel chair. The sensor can detect the movement of the hands at the particular distance and rotate the wheel chair based upon the movement. This can help the physically challenged people who can't able to move the limbs. In this paper they propose the Radio Frequency based wheel chair controller. The RF has the two modes one is the RF transmitter and the other one is the RF receiver. The both are communicate through the controller. The signal can be transmitted in the wireless mode. The data can be travelled in the form of pulse. Based upon the pulse the wheel chair will operate. The signal from the RF transmitter is FORWARD, BACKWARD, LEFT, And RIGHT. In addition to these command a standalone command is used which can make the wheel chair to stand in one place. The radio frequency can be communicated at particular baud rate which is 9600. In that certain frequency the data communication occurs between the RF-TX and RF-RX modes. [3]

Y. Takahash et., al., proposed there are many smart wheel chair is proposed which can be operated manually by voice controlled in the flat surface area. It does not need the assistance to move the wheel chair from one place to another place. For the steps movement the wheel chair designed by the inverse pendulum it can be controlled by raising the front wheel of the chair. The wheel chair can move to the step with the help of raising the front wheel of the chair. The DC motor is connected at the wheels of the chair. The DC motor is light weight for the easy movement of the wheel chair in the steps. When the wheel chair is claimed to the steps the movement is done by the force generated by the wheel chair. For the every time in the movement in the steps the front wheel is raised with the help of the assistance. In this paper they proposes the automatic front wheel raising the wheel is raised by the backward and the forward movement of the wheel chair it can raise the front wheel. So this method can avoid the help of the assistance. [4]

Augie Widyotriatmo et., al., proposed for the paralyzed person they need the wheel chair for the movement. By the advance technology the automatic wheel chair is innovated it can be controlled automatically without the need of the assistance. The wheel chair as the different velocities based upon the speed of the wheel movement. The control strategies are employed to detect the wheel velocities of the chair. The proportional integral derivative algorithm is used to predict the velocities of the wheel. The closed loop system is obtained by providing the feedback of the encoders. The PID algorithm can be varied based upon the signal generated in the input system. The input can be sends to the intermediate part to adjust the velocities of the wheel. The velocities can be depending upon the movement of the wheel chair. This method can be used as the

mathematical calculation for the prediction of the velocities in the both left and the right wheel. The power can be provided to the chair through the battery. The charges can be restored in the battery. [5]

Shayban Nasifet., al., proposed the physically challenged people suffered from the various factors. To help these kinds of people in this paper they introduce the low cost automatic control of the wheel chair. The control of the wheel chair is through the glove. The glove is placed in the fingers of the patient. Microcontroller is used and is connected to the flex sensor and bends sensors. Based upon the limb movement the bend sensor value can be changed. For the each movement of the bend sensor certain value is generated. Based upon the value range the wheel movement can be operated. The signal can be transmitted through the Bluetooth it has the TX and RX pins. It is the unidirectional communication between the controller and the Bluetooth. It gives the exercise to the fingers of the patient. In this method the wheel chair operation can be made simple with low cost effective. [6]

R. Rahulankeret., al., proposed wheel chair is need for the movement of the physically challenged people from one place to another place. The movement can be made in two sections physical and automatic movement. The physical movement it needs the man power to push or pull the wheel chair. The automatic wheel chair movement can be made through the voice controlled or the hand gesture control. The battery can be provided in the wheel chair. The energy is get stored in the battery by use of the energy the locomotion of the chair is made. The DC motor is connected at the wheels of the chair. The DC motor is light weight for the easy movement of the wheel chair in the steps. When the wheel chair is claimed to the steps the movement is done by the force generated by the wheel chair. The BAW method is used which is the battery assisted wheel chair it makes the hardware connection simpler. The simulation is made in determining the battery efficiency at each peak to peak voltage of the charging and discharging time. The experiments are conducted in high inertia. In the fast movement if the brake is applied how the wheel chair is able to stabilize the force and decrease the inertia at every movement is measured. [7]

Mohammad Alqudahet., al., proposed to control the rotational speed of the wheel chair is made through the calculation. For the initial calculation the velocity of the wheels is known. The velocity can be measured by the encoder and the reference model. The wheel stabilization can be evaluated through Lyapunov stability method. By the stabilization of the wheel the velocity of the left and the right wheel are measured. The input which is provided as the feedback to the output terminal. Simulations are made to determine the velocity of the wheel chair and the model reaches the level point a little bit high. [8]

Jatin Sharmaet., al., proposed the independent mobility of the physically challenged people in the society. The disabled people faces the problem to go out it one of the challenging thing. To avoid that in this paper they propose the control the wheel chair using IR radiation. The IR radiation with low intensity is passing through the eye of the patient. The analog value of the IR radiation can change based upon the movement of the retina. So the patient can interact directly to the wheel chair and it helps in reach the target area. It avoids the collision of the data. This method can avoids the help of the another people. The physically challenged people can move to anywhere by their own. It perfectly detects the holes in the path of travelling. [9]

Lekha Daset., al., proposed method the method deals with the eye movement to control the wheel chair. The IGOOGLE guide the wheel chair for the movement it use the infrared sensor is used which can detects the iris movement. Based upon the signal from the Iris the wheel chair is get controlled. For the every iris movement the wheel chair direction is changed. It can avoid the obstacles in the front of the wheel chair. It helps the physically challenged people in a great way. [10]

3. Proposed Method of Android Based Wheel Chair Control

In this paper they find the way for the problem faced by the physically challenged people. They use the wheel chair to move from place to place but they need some assistance. Without someone helps this method innovate the voice controlled wheel chair. The voice signal is provided as the input through the Bluetooth module. The string command can be matched with string present in the code. If the command gets matched the chair will move on the basis of the command. This method helps the physically challenged people to move independently and it is more effective.

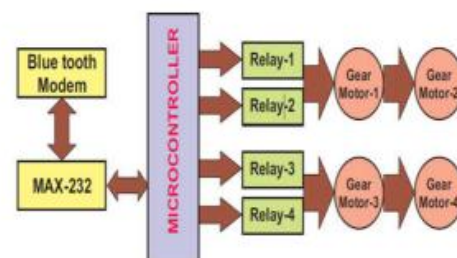


Figure 1: Block Diagram of wheel chair

4. Results and Discussions

Here the project is designed over a wheel chair. Connections are given as per the block diagram. We have specially designed an android app from which the instructions are given. The patient has to give the commands such as LEFT, RIGHT, FORWARD and

BACKWARD by giving voice command in the app. So whenever the voice is been activated the signal from the phone will travel to the kit with the help of Bluetooth connected to it. According to the instructions the wheel chair will move.

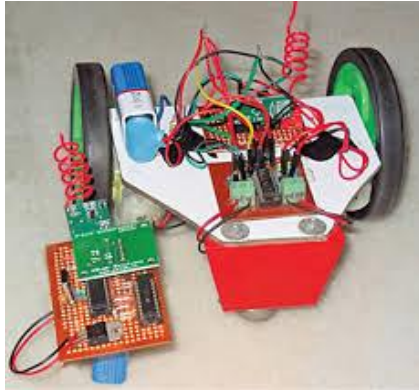


Figure 2: Prototype model

5. Conclusion

The main aim of our project is to build a wheel chair that works fully on android application. Here the setup is very simple and cost effective. We can also alter the design at anytime according our ideas whenever we can. Since we are using android based system the operating speed and receiving speed will be very high thus resulting in high accuracy output.

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