International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395 -0056
Volume: 04 Issue: 05 | May -2017 www.irjet.net p-ISSN: 2395-0072

Android phone controlled Voice, Gesture and Touch screen Smart Wheelchair

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Abstract - *Wheelchairs are utilized by the general population who can't scroll because of physical sickness, damage or other incapacity. In the present day's advancement guarantees a wide degree in creating savvy wheelchair. This paper is to portray a wise wheelchair utilizing advanced mobile phone is creating to control the revolution of wheel seat in light of voice and signal development for the physically tested people. In construct voice and motion capacity are utilized to control the wheelchair and additionally by utilizing advanced mobile phone perusing SMS, E-mail, News. The sensors utilized are 8 in which 2 of them are IR sensors the remaining are for temperature, smoke identification and light recognition sensors. This framework that enables the client to heartily interface with the wheelchair at various levels of the control and detecting. The framework is partitioned into 3 primary units are Voice acknowledgment through Android, Gesture acknowledgment through Android, Motor control through flag moulding. The framework depends on gathering an android phone with an AVR small scale controller and sensors.*

***Key Words*: Mems technology, accelerometer, voicecommands, Bluetooth.**

1. INTRODUCTION

In our fast moving materialistic world, individuals need to modernize and gain ground in their lives. The total populace is raising step by step which builds number of seniority and physically tested individuals. These individuals confront bunches of issue to try and explore inside the house without help of outside guides. The wheelchairs are among the most mainstream assistive gadget in therapeutic zone. Along these lines, the interest for wheelchairs has been perpetually ascending in market. The utility rate of individuals with wheelchairs is almost 3.3 million in this world. The current move in mechanical computerized reasoning gives tremendous extension for outlining a mechanized wheelchair. These days the elderly individuals are changing from customary wheelchairs to robotized wheelchairs simple methods for headway Several Researchers are as of now attempting to create mechanical wheelchairs which are more adaptable and can defeat constraints of the conventional wheelchairs.

1.1 Background

"World give an account of inability" [1] together exhibited by World Health Organization (WHO) and World Bank says that there are 70 million individuals are impaired on the planet. Sadly step by step the quantity of debilitated individuals is continuing expanding because of street mischance and in addition sickness likes loss of motion. Among every one of the incapacities rate of physically crippled individual is most. On the off chance that a man is incapacitated he is subject to other individual for his everyday work like transport, sustenance, introduction and so forth.

1.2 Indian Statistics on Disability

The project realizes that at consistently the number of inhabitants in World and India is expanding quickly. In India 120 million individuals are crippled out of which 41.32% are physically disabled [1] in fig. (a)

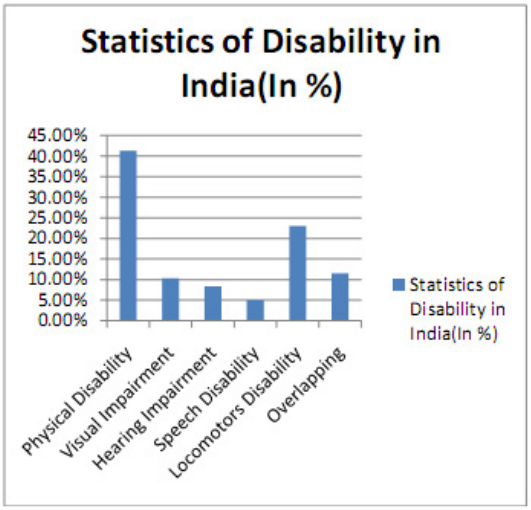

Fig a): Statistics of Disability in India.

The point of the venture is to utilize wheelchair consequently and work by utilizing voice and motion control for pushing ahead, in reverse, left and ideal by keen phone [2]. Quadriplegics and Multiple sclerosis patients have serious incapacities and can't drive joystick worked conventional wheelchairs [9]. Traditionally wheelchairs have a few confinements in substance to adaptability, massiveness and constrained capacity.

A wheelchair is fitted with an obstruction sensors, temperature sensor, Gas sensor, smoke sensor, engine and advanced mobile phone to help driver to accomplish some autonomous versatility. By simply tilting advanced mobile phone which is with the wheelchair (client) can be moved in 4 bearings. The hindrance sensor can help the rider control the wheelchair by taking over a portion of the obligation regarding controlling and maintaining a strategic distance from articles until the client can deal with the employment. The approach enables the client to utilize human voice, signal development PDA and synchronize with the development of wheelchair so they can utilize it with solace.

The unpredictability is decreased by making utilization of advanced cell so that size of the framework is extremely minimal. The wheelchair coordinated with voice, motion developments and advanced mobile phone. So impeded individual who can't walk, can drive seat by motion developments utilizing advanced mobile phone.

Exploiting innovative advancement with a specific end goal to build the personal satisfaction for debilitate individuals and encourage their reconciliation into the working worlds [2].
Keeping in mind the end goal to direct a wheelchair different circumstances can be recognized. On the off chance that the client is equipped for controlling by voice, the perfect arrangement is utilization of voice acknowledgment through android phone generally by utilizing motion acknowledgment through android phone [2].

The home part is by utilizing temperature, smoke, gas sensors the parameter esteem is identified. There is office of frenzy catch in the event of any crisis with the wheelchair client so he/she may call/SMS to the police, relative, and doctor's facilities by utilizing the frenzy catch and also the signal will blow. Another office is by utilizing Android phone the visually impaired client can read SMS, email, news.

2. EXISTING METHODOLOGY

K.Sudheer, et al(2012) proposed voice and signal based electronic controlled wheelchair utilizing ARM utilized mix of discourse and motion acknowledgment .In this discourse acknowledgment module , concealed markov model are utilized. The MEMS sensor is utilized and it detects the point of hand. For Voice acknowledgment the voice IC is utilized.

M. Prathyusha ,K.S Roy, et al (2013) proposed Voice and touch screen based heading and speed control of wheelchair. The discourse acknowledgment framework utilizes programmable discourse acknowledgment circuit. The speed controller works by differing the normal voltage sent to the engine.

Rakhi A. Kalautri et al (2013) proposed Utilized programmed motion acknowledgment framework in view of speeding up sensor here utilized is 2–axis .By figuring measure of tilt and yield of tilt will choose to additional in which bearing.

Jinhua Zeng et al(2012) proposed A characteristic hand motion framework for astute human-PC association and therapeutic help. The hand signal vocabulary in the framework comprise of 5 keys static hand motion and 3 dynamic parts. The hand movement in the vocabulary is restricted to metacarphalangeal joint (MCP) kidnapping and adduction of pointer , ring finger and little finger and the thumb basal joint (TBJ) spiral snatching and adduction of the thumb.

3. SYSTEM IMPLEMENTATION

In the project, made utilization of voice and signal operation utilizing android phone to control the area of wheelchair. The framework is controlled by AVR microcontroller (AT Mega 32) as shown in fig(b) which is likewise controls the Temperature, Light and Smoke sensors.

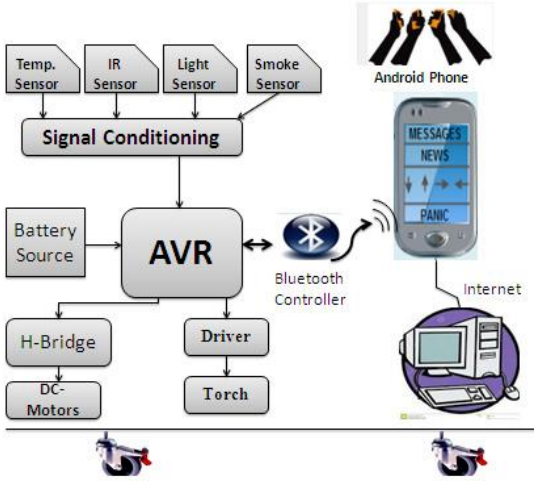

Fig. b) Block Diagram of Smart Wheelchair.

The Panic catch, News perusing, Email Reading, SMS perusing is controlled by advanced mobile phone. DC engines are connected to the wheels of the wheelchair thus in view of pivot of engine course of wheelchair will be effectively controlled.

Engines are interfaced to microcontroller by utilizing engine drivers. The AVR microcontroller is interfaced with Android phone through Bluetooth controller. Contingent upon the client the voice operation or signal operation is finished.

In the event that any crisis issue occurred with the wheelchair client by utilizing alarm catch the message (SMS) will be sent to the overseer or almost healing centre and in addition ringer will blow.

In this venture AVR microcontroller and Bluetooth module are conveying over UART 9600bps. The module

comes in SMD bundle and deals with 3.3V power supply. In this profile the information send and get to module specifically goes ahead the RX stick of microcontroller. It turns out to be truly simple to make your gadget Bluetooth perfect.

HC-05 has just 4 pins: 5V, GND, TX and RX. The 5V stick and the GND stick are utilized for power and the TX and RX stick execute a serial interface. The TX stick is utilized by the module to send data and the RX stick is utilized to get data.

To test the module, I initially associated it to my Laptop. This makes it less demanding to see whether the module is accepting characters or not. By essentially utilizing a terminal program like hyper terminal to imagine what the module is sending from its serial interface.

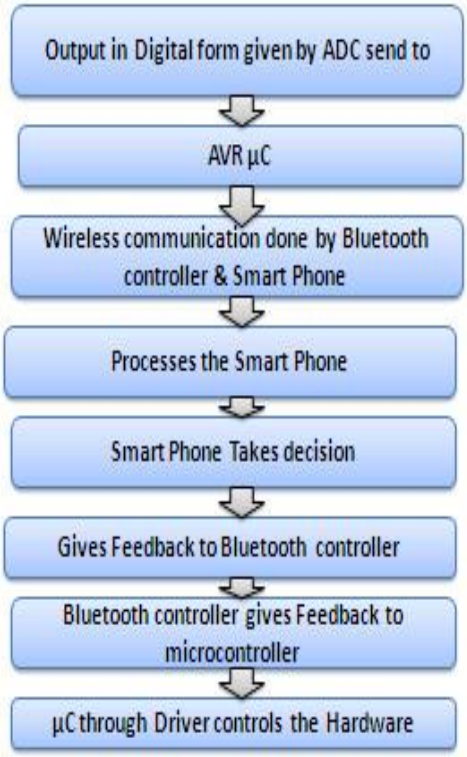

Fig. c) demonstrates the stream graph of operation of control of AVR with Smart phone.

4. RESULTS

By utilizing the methodology equipment setup is done in fig. (d) Demonstrates the interfacing of Android Smart phone and the wheelchair.

Fig d): Interfacing of Android Smart phone and the wheelchair.

Fig. e) shows the Android application for the operation of Wheelchair.

For Gesture Recognition the outcomes demonstrating the position and the yield as depiction. The above done application is completely in light of Android framework.

Android is a working framework in view of the Linux portion. The venture in charge of building up the Android framework is known as the Android Open Source Project (AOSP) and is basically lead by Google.

Components of Android: Open source Media Support ,Huge memory , Fast processor ,Built in I/O gadgets ,Native support for more sensors ,Improved battery proficiency ,Multitasking and have open source programming improvement.

5. CONCLUSION

By utilizing this framework physically crippled individuals find simple approach to explore inside the house without the outer assistance. This gives simplicity of operation. As the framework utilizes Smart phone so that the precision is expanded. The Reading of SMS, E-mail and News can be conceivable. The sensor portrays the parameters like light, temperature, smoke, gas and so on. The IR sensor is utilized for deterrent shirking. In the event that any crisis then the Panic catch is there (HELP) it blows ringer. Wheel chair can be used in hospitals, sports and for physically cripped people.

6. FUTURE SCOPE

The productivity of voice summon based wheelchair can be foreign made by neural based calculation.

Instead of utilizing motion acknowledgment can utilize eye retina utilizing optical sensor to move wheelchair in various headings.

Tongue worked assistive innovation is conceivable to access to android phone applications utilizing Bluetooth connects.

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