# SMART WHEELCHAIR USING

# ALEXA AND ANDROID APP

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ABSTRACT: Nowadays the partially paralysed or physically disabled people become discomfort and more dependent on others by using several types of wheelchairs. Most of the techniques are available in this present scenario. The proposed system is to design wheelchair using alexa and accelerometer. It can be used to make this population more independent and secure. The wheel chair make the users less stress.

Keywords : Alexa, NodeMCU, Android App, Relay, Ultrasonic sensor

# I. INTRODUCTION

Nowadays the people become burden to other due to some form of disabilities .15% of the total population of the world are corresponds to this type of problem .The destination of this project is to develop a smart wheelchair for making these people more independent from others. The wheelchair will be functioned using the voice commands through the alexa.Amazon Alexa also called Alexa is a virtual assistant developed by Amazon which is first used in the Amazon Echo. It is capable of voice interaction , music playback , making to-do lists , settingalarms , playing audiobooks , providing weather , traffic ,sports etc . It also include real-time information such as news and can control several smart devices using home automation system .Alexa offers weather reports , stream music from the owner's Amazon

Music accounts. It canManage voice controlled alarms, timers and shopping and to do lists. It is used in home automationwhich can interact with devices from several manufacturers including Belkin, lightwave RF, Nest etc. Alexa supports subscription based and free streaming services on Amazon and music directly. Alexa allows the users to hear updates on supported sports teams. It can deliver messaging and calls and Alexa for Business is a paid subscription service. Alexa app update brings voice interaction to all Android users, voice assistant. Interfacing of Alexa along with NodeMCU is used in this project .NodeMCU is an open source IoT platform and its hardware is based on the ESP-12 module. This project mainly use Android appandrelay. Android app controls alexa in various ways. The users can control Alexain any situation using this android app . Android app can be control and provide instruction from any corners of the world. Along with android app , relay is also included. It is an electromagnetic switch. It is used in application to turn on and off circuit by low power signal or where several circuits must be controlled by one signal . Relay protects the circuit against the overload. This project solve the problems of quadraplegic patient and make them think free and independent.

#### **II. REVIEW OF LITERATURE**

Today the rate of accidents are increasing day by day. This will be results in the high rate of physically disabled people. Many solutions are found to runover this problems .[1]

Several literatures shown the independent mobility which consists of power wheelchair and manual wheelchair .These wheelchair provides little bit benefits for adults and kids .In the case of voice controlled wheelchair, that is only benefit for people who are able to speak not for dumb people .

Also in the case of voice and gesture controlled wheelchair, there is also certain limitations. In these both cases there is a dependence on caregivers or family. Independent mobility means less dependence on others.[2]

The proposed system is Smart Wheelchair Using Alexa And Android App. The advantages of system are as follows :

- A handicapped person without legs can use this and become independent.
- Less hardware require ie, compact.
- Economical
- Reduce manpower.
- User friendly.

In this system, the Amazon Alexa giving all answers and also move the wheelchair according to the users purpose. The users get more self satisfaction by this proposed system. The kids get more knowledge and feel entertained by the use of Alexa in this wheelchair. Also by the Android App, it helps the family to know the problem faced by the users of the wheelchair.

### **III. PROPOSED SYSTEM**

The system mainly consist of Alexa, Relay,NodeMCU and Android app. The system can move according to our needs by giving commands to Alexa. The Alexa is controlled by NodeMCU. The system can easily controlled at any corners of the world by the Android app. The block diagram is given below:



4 Channel Relay Module is used for controlling motors, light and fan. The NodeMCU consist of 4 pins D0,D1,D2,D3. The NodeMCU has connection to relay module. The relay module consists of 4 pins. In this relay one channel is used to move one motor and second is for next motor. The other two channels are used for turn ON fan and light.By the interfacing of Amazon Alexa and NodeMCU we can move the system according to our needs. The flow chart of the proposed system is given below:



#### **3.1 CIRCUIT DIAGRAM**

This system consist of mainly 4 relays. One relay for one motor and another relay for next motor. Third relay is for turn ON LED and fourth relay is for switch ON the fan. These are the four concepts. Alexa is used for controlling these 4 relays. Activities are done inside the Alexa. There are objections inside Alexa and then we give the instructions move trigger FORWARD, two ports get ON. When instructions given to Alexa is move trigger LEFT, one port get ON and another port get OFF. When move trigger RIGHT is given ,the port which is ON at left get OFF and another port get ON. When move trigger STOP is given, two ports get OFF. Then for moving motor forward,D0 and D4 pin get taken.

When D0 and D4 is 1, 2 motor get work and 2 relay get ON and move the wheelchair FORWARD.When move trigger RIGHT is given,D0 gets OFF and D4 gets ON, then one motor is ON and other motor is off, motor moves to RIGHT.



When move trigger LEFT is given, D0 gets ON (HIGH) and D4 gets OFF (LOW). Then other motor ON and one motor OFF, then move to LEFT . Then move trigger STOP is given, 2 motors gets OFF and port turns to LOW.

Then takes third relay, that is LED ON condition. When D0 is given,D0 port gets ON, then give command LED ON and D0 port is OFF, give command LED OFF. Then we take fourth relay for fan, same function is applied. For NodeMCU ,WIFI is using to control the Alexa function. WIFI means wireless connection. When any information is given to Alexa , move trigger FORWARD is given, Alexa capture these instruction and is given to the server .Server can be from anywhere of these world. Information is passed on to the server just like the signal captured by the satellite and these information is again passed onto the NodeMCU. These is the method of controlling .

#### **3.2 SYSTEM IMPLEMENTATION**

A platform is made, a chair is weld on the top of it. Platform is made using 0.25 inch pipe roll. This pipe roll is taken and cut it into equal parts. Then a plate is welded on the top of the platform. At the two sides, two motors are kept. The long holes are made at the two sides for fixing these motors. A chain is given to the motors and is connected. Make sure that the chain is kept tight.





The NodeMCU, Relay are embedded on circuit board. The jumpwire is used connect D0 of NodeMCU and around of NodeMCU. The glugum is used for the fixation of jumpwire on the circuit board. Then this circuit board is placed on the plate for the functioning of the system.

# **IV. FUTURE SCOPE OF THE PROJECT**

The system help the quadraplegic patients more independent from others. The system also help to reduce the stress of the users by providing music, news etc. The wheelchair can easily move by giving command to Alexa. Android app can control the system at any corners of the world. So the people can know the problem faced by the users. This is more comfort and provide robustness to the physically disabled person.

## V. RESULTS

The system was successfully implemented to move freely in Left ,Right ,Forward or stay in the same position. Due to the presence of Alexa, the users get more entertainment time. The wheelchair detects obstacles at the front and stop the movements. The system is controlled by Android App which control Alexa at any corners of the world.Here the Alexa is completely controlled by NodeMCU. The devolped system help to reduce the strain of users. The system is completely wireless system. Along with Android App 4 channel Relay is also include.The system is more efficient for physically disabled people. With the help of circuit system on the plate below the chair ,it can move easily with the help of Alexa. The system is about 5Kg.So it can handle easily by the users. The wheelchair is easily made and implemented.





# REFERENCES

[1] J.B.A Ghani,"Wireless speed control with voice for wheelchair application", UNIVERSITY TECHNOLOGY MALAYASIA, May-2007.

[2] M.Nishimori, T.Saitoh and R. Konishi: "Voice Controlled Intelligent Wheelchair", Kagawa University, Japan, Sept-2007.

[3] **O.Babri, S. Malik, T. Ibrahim and Z. Ahmed**:" VOICE CONTROLLED MOTORIZED WHEELCHAIR WITH REAL TIME OBSTACLE AVOIDANCE", University of Engineering and Technology, Lahore

[4] **Pramila Kupkar ,Prajakta Pandit, Nikita Dhadhere and PP Jadhav,**" Android controlled wheelchair", International Journal of Interdisciplinary Research(IJIR) Volume -2 Issue-6 2016

[5] **Apsana S,Renjitha G Nair**, "Voice Controlled Wheelchair using Arduino" International Advanced Research Journal in Science, Engineering and Technology (IARJSET), Vol 3, Issue 3, August 2016

[6] **Mr.Tarun Agrawal**, "Review on Voice Recognition Module Working", International Journal of Advanced Research in Computer Science and Software Engineering, May 2014

[7] Ms S.D.Suryawanshi Mr. J.S.Chitode Ms.S.S.Pethakar,"Voice Controlled Intelligent Wheelchair",2013

[8] Kharka Bahadur Rai, Jeetendra Thakur, Nirmal Rai. Voice Controlled Wheelchair Using Arduino, International Journal of Science, Technology & Management, June 2015

[9] **R.Puviarasi ,Mritha Ramalingam,Elanchezhian Chinnavan** "Low Cost Self-assistive Voice Controlled Technology for Disabled People",International Journal of Modern Engineering Research (IJMER) 4, Jul-Aug 2013