International Journal of Scientific Research in Engineering and Management (IJSREM)
Volume: 06 Issue: 04 | April-2022 Impact Factor: 7.185 ISSN: 2582-3930

Smart Wheelchair along with IOT devices

Nishit Bhagat[1], Jyotiprasad Sarangi[2], Rachan Shetty[3] , Deepesh Zagade[4]

[1]BE EXTC & St. John College Of Engineering &Management [2] BE EXTC & St. John College Of Engineering &Management [3] BE EXTC & St. John College Of Engineering &Management [4]BE EXTC & St. John College Of Engineering &Management

---

Abstract - This Signal confirmation advancements are fundamentally more enthusiastic in the space of today. Now there is a huge load of dynamic examination in the field and unimportant in the procedure for clearly open executions. Several methodologies have been made for distinguishing developments and controlling wheelchair. Glove based framework is a wonderful strategy for seeing hand developments. It uses a sensor related with a glove that obviously gauges hand upgrades A Gesture Controlled wheelchair is a sort of wheelchair which can be constrained by hand developments and not as it was done in days of yore by utilizing buttons. The client essentially needs to wear a little sending gadget on his hand which joins a sensor which is an accelerometer for our situation. Headway of the hand in a particular heading will send a solicitation to the wheelchair which will then, at that point, move in a particular course. The conferring gadget joins a Comparator IC for transferring real levels to the information voltages from the accelerometer and an Encoder IC which is utilized to encode the four digit information and from there on it will be sent by a RF Transmitter module. At the not by and large useful end a RF Receiver module will get the encoded information and disentangle it by utilizing a decoder IC. This information is then managed by a microcontroller and went to an engine driver to turn the engines in a noteworthy blueprint to make the wheelchair move in the incredibly bearing as that of the hand. This design has IOT which will remotely screen as far as possible through various sensors, the equipment Node MCU will preprocess the information and send it to Blynk App on your PDAs .

***Key Words*:** Wheelchair, Accelerometer , Gesture control

1.INTRODUCTION

This The movement and improvement of development has reliably affected a few pieces of our lives and will keep on doing as such later on with additional cutoff and more unanticipated new development. In our endeavor we have tried our best to relate between the progress of advancement and the human essential, for human straightforwardness. The essential purpose in this endeavor is to control wheel seat through human bearing. This endeavor is fundamentally expected for genuinely tried people who are dependent upon wheelchairs and especially those people who can't utilize their hand to drag their wheel seat by goodness of some inadequacy. The model of the wheel seat is collected using arduino, picked for its insignificant cost, despite its flexibility and execution. Thusly separate the impediments and pick the most effective way. Lately, strong undertakings have been done to cultivate keen and typical association focuses among clients and PC set up systems based as for human movements. Movements give an intuitive place of communication to both human and PC. Henceforth, such movement based places of cooperation can substitute the typical association point contraptions, yet can similarly be exploited to widen their helpfulness. A wheelchair, much of the time shortened to just "seat", is a seat with wheels, used while walking is irksome or unfathomable in view of sickness, injury, or failure. Wheelchairs show up in a wide combination of associations to meet the specific necessities of their clients. They could join explicit seating adaptions, individualized controls, and may be unequivocal to explicit activities, as seen with sports wheelchairs and sea side wheelchairs. The most comprehensively seen separation is between controlled wheelchairs ("powerchairs"), where drive is given by batteries and electric motors, and actually moved wheelchairs, 2 where the propulsive power is given either by the wheelchair client/occupant moving the wheelchair the most difficult way possible ("self-moved"), or by an expert pushing from the back ("efficient moved"). Signal sort, interface, development used, client types, issues, issues, benefits and inevitable result have been recorded and depicted to give underpinning of Wheel Chair based development headway. In this Wheel Chair, we use MPU6050 accelerometer for advancement identifying and is related with Arduino Nano. The beneficiary side is related with Wheel-Chair Motor for advancement control of Wheel Chair. For this endeavor, Accelerometer MPU6050 put accessible which will recognize the development of hand. This accelerometer, works on X-Y center, so when the hand is pushed ahead or in converse, or left or right, this change the turn of accelerometer from its reference point. Then, this data is moved to Arduino Nano, which is using ATMega328p little controller, and Arduino passes on this message from Transmitter side.

2. Literature Review

1. Lee et al. (2013)is the individual who proposed that a robot has the ability to follow the line on the floor with two wheels using visual analysis. Azlan et al (2007) is the individual who portrayed that a RCX LEGO robot joins an on-board Hitachi H8 micro processor. The IR sensors were used under the robot to distinguish a line drawn whether it is white or dull on a dim surface. To make the robot to comprehend the line way feathery reasoning was used. On account of the size of those robots, the communication resources reachable district unit exceptionally restricted as such more direct models and techniques, as visual servoing, area unit adjusted scale back the cycle. 2. Ibrahim et al (2009) cultivated a line lover from a tank bot used twin line sensors. They moreover arranged a cost capable microcontroller based robot which has two or three IR reflectors added at the base and at both the sides of the robot. 3. Su et al (2010) used the PID controller to make the robot follow the hustling track and PD controller for reducing botch between sensor 55 and track. A couple of structures district unit even fit for working, when given Associate in Nursing right model of the air, misuse solely change finding. 4. Budihatro et al. (2010) - For the humanoid robot he presented an Adaptive Neuro Fuzzy Inference System. On the track the robot follows a dull line. A couple of issues have been remedied in this endeavor. Electric wheelchair needs an IR course however line aficionado wheelchair is on. Manual conclusion and modified conclusion dependent upon causion. Ought to be locked in while 6 controlling its development where as it is a free hand development instrument. Manual stop when blocks appear where as it will normally stop on obstruction distinguishing proof. 5. Dr.Shaik Meeravali(2014)- Development of a Hand-glove controlled wheel seat taking into account MEMS. This paper justification behind day by day everyday practice in the encounters of debilitated people considering MEMS, The objective solidifying the high level techniques for wheel seat components and control and at the same time making it monetarily smart, with the objective that it is sensible to the typical masses. The goal of this investigation is to encourage a wheelchair system which controls its advancement by the simply contorting of a singular's fingers. In this investigation a model of a sensible and precisely advanced wheelchair is to be arranged and made. The proposed model will convey from a distance between the controller and the plant and it will in like manner supersede the regular joystick by the execution of client hand glove control considering MEMS. The MEMS sensors inside the glove can recognize the improvement of fingers. The controller passes the messages on to the recipient region which is set under the wheelchair through a distant development. In The beneficiary region get the signs from the transmitter according to the signs the motor is running which changes the wheel improvement. The advancements presented in this paper suggest a wide area of possible results to a wide arrangement of clients. Furthermore, it also targets making a good tidings tech wheelchairs are made in this manner that control the security issue with Alarm and monetarily sharp by people Disabilities. 6. Amruta S. Magar1 , M.R.Bachute (2014)- This paper, presents hand signal controlled wheelchair using picture dealing with through web camera. This proposed system is completely depend upon the raspberry pi board that contains the Arm11 controller that should controls the advancements of the wheelchair with help of web camera and dc motor. This structure sees hand movement 7 as well as control the wheelchair as demonstrated by the hand advancement for instance wheelchair will proceed according to the amount of finger. The fingers will be seen and the wheelchair advancement will be done in 3600. This System pushes toward the vision-based strategy revealed hand development. This system essentially used for weakened individual having those individuals couldn't move wherever. This system generally controls the wheelchair considered acknowledgment number of fingers. This structure has using the HSV concealing space methodology to acknowledgment of hand movement through picture taking care of. 7. D. Sharath Babu Rao(2016)- Wheelchair is a device expected for moving genuinely tried people, moving patients beginning with one spot then onto the following. All things considered wheel seats are driven truly with the help of another person or through self - pushing. To diminish the complexities for individuals who don't have fortitude to move their seats without assistance from any other person the wheelchairs are robotized. Dependent upon the human bearings as sound, hand signals, or head movements robotization is done. In this wheel seat is motorized using hand and head signals. The mems sensor which is related with head is accelerometer. Contact pad is used for hand movements. In this endeavor there are two modes considering the signs from head or hand.
1. Considering the head movements 2. Considering the hand movements. By using a switch the technique for movement is picked by client. Accelerometer recognizes the exact improvement of the head. Taking into account the data from either the accelerometer or touchpad the improvement of the wheelchair is controlled. Battery is used to give power supply to move the wheels.

3. Architecture

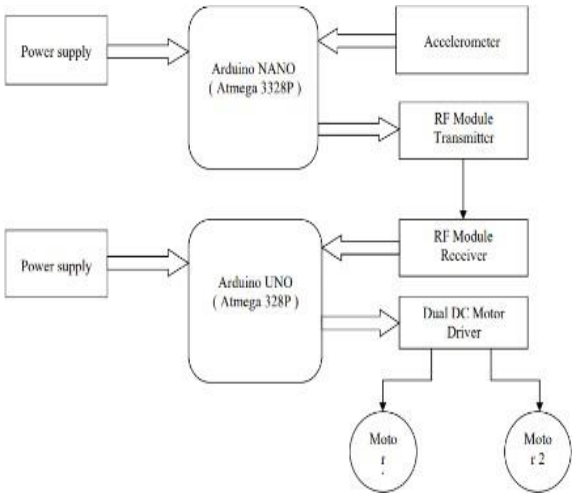

Figure 1: Block Diagram of wheelchair's Micro Electro Mechanical System (MEMS)

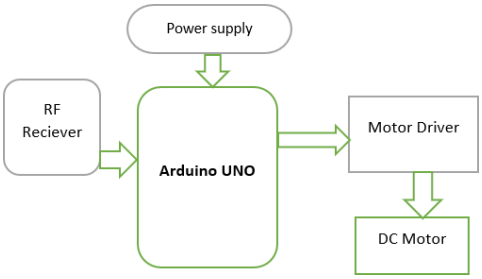

Figure 2: A] Block diagram of Recevier

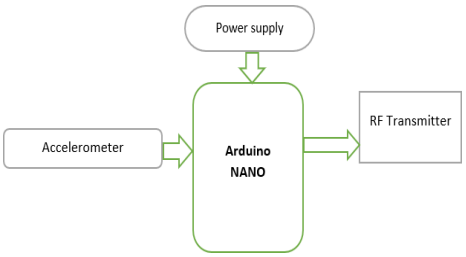

Figure 2 : B] Block Diagram Transmitter

The above figure 1 shows the square graph of the given undertaking. . As shown in the square chart we included accelerometer as our recognizing part to distinguish incline development of the hand. The spot of the wheelchair still hanging out there by the accelerometer mounted on a circuit board added to the headgear worn by theperson. This data is delivered off the microcontroller (arduino nano) which is transported off the transmitter (RF module). Transmitter sends this data from a distance to the gatherer circuit mounted on the mechanical casing. On the mechanical social affair, the beneficiary helps this sign through RF module and sends them consecutively to the microcontroller. The microcontroller processes this sign and converts them into mechanized reasoning to be given to the motor driver circuit. Motor driver circuit gives commitment to the dc servo motors to engage forward and in invert development of wheelchair.

Hardware components:

Power Supply: The 9V and 12V DC power supply is related with transmitter and recipient freely.

Accelerometer: The accelerometer in this work is utilized to measures speed increase by gravity and shifts the explanation for course concerning the earth. The accelerometer further controls the speed and contraption bearing while at the same time moving. The accelerometer is spoken with three key commitments of Arduino NANO processor.

Arduino NANO: Arduino 3.0 is Atmega328 based processor and simple to work. It stays mindful of USB giving. Arduino processor keeps 30 pins, out of which 8 pins can be utilized as straightforward data and 14 pins can be used as electronic

RF Module: The transmitter and authority are cooperated with each other through RF module. The RF module gets hails progressively from transmitter.

Arduino UNO: The ATmega328 based Arduino UNO processor keeps 14 progressed information and result pins and six clear liabilities. The undertakings are given Arduino IDE and it is incredibly easy to associate with structure using head USB interface.

DC Motor driver: The DC motor driver (L293D) controls the DC motor in expected turns. In the cadenced development work the motor driver controls two DC motors meanwhile. That suggests it controls the course of two motors meanwhile which will help in moving vehicle wheels in the mean time.

DC Motors: The central rule of DC motor is it changes over electrical signs into mechanical energy.

Ultrasonic Sensor: The closeness of the article is seen by ultrasonic new turn of events. The transducer sends ultrasonic sound waves and get ultrasonic heartbeats that trade back data about a thing's closeness.

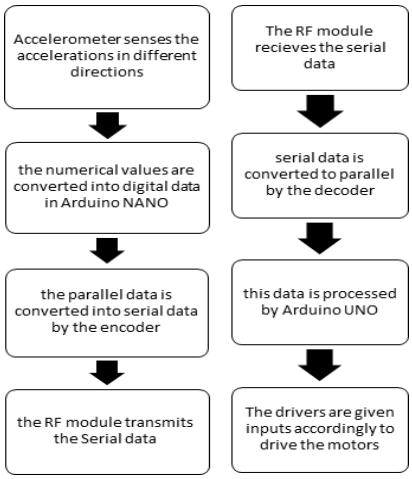

Figure 3: Data flow diagram of Transmitter and receiver side

The introduction of the structure can moreover be improved by introducing by equivalent dealing with part pipeline . The sharp sensor network need equivalent taking care of part for fast and trustworthy assessment.

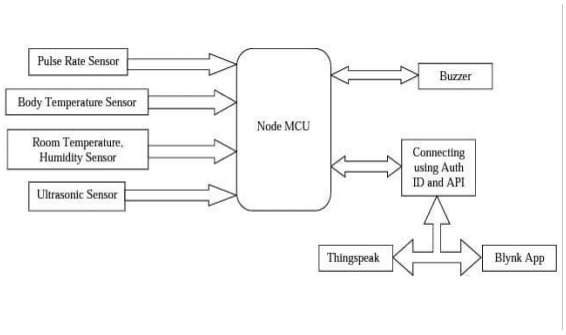

Figure 4: Block diagram for IOT System

Fig4 shows Block diagram for IOT system which will remotely monitor the health parameters. Patients will be given with necessary wearable sensors this sensors will collect the physioloogical data consisting physiological parameters, then the hardware Node MCU will preprocess the acquired data and transmit it to the mobile application called as Blynk App , where we can see this data. To store the acquired data for further studies we use here thingspeak application. The buzzer that's connected with node MCU is used for emergency purpose.

4. Software Used

4.0 : Arduino IDE

Arduino IDE: The IDE is modifying part used to move and change the code established in fused improvement Environment**.**

4.1 Blynk application

Figure 5: Blynk Application

Blynk App is a phase with IOS and Android applications to control Arduido, Raspberry, Pi and Node MCU over the intrnet . It's a high level dashborad where you can build a sensible association point for your endeavor by basically moving devices Each undertaking can contain graphical devices, as virtual LEDs, button, regard shows and, shockingly, a message terminal, and can communicate with something like one devices.

Advantages

•The wheelchair sees the obstacle at the front and stop the movement inside a level of 50 CMs.

•With close to no external help the injured person with canning work his own seat.

•The model of the development is really bleeding edge to move the wheel seat Left, Right, Forward, and Backward headings or remain correspondingly coordinated.

•The individual can screen his critical achievement limits with staying in a line in clinical core interests.

5. Results

The obliging undertakings are executed in the Arduino IDE programming. The portrayal/movement of various orders used in the program is shown in table 1. Table 1 mirrors the different control limits used to control and improvement and bearing of the wheelchair in required heading. The endpoints are made so they composed to give more careful responsiveness and response in moving and bearing change. The response time of the endpoints concerning the sensors is sought after for a really long time span and worked with and changed the program to achieve incredible results. The back() and front() limits are made to control the heading of the wheelchair both in forward and in take a backup course of action. In addition, the reasonable orders left() and right() are made to the control the course of the wheelchair in right and left bearing. The endpoints examines the data signals from various sensors through huge information sources and sends

result to yield contraptions like motors to control the wheels turn.

Palm Movement	Function	Action
Upward	back()	Chair moves backward
Downward	front()	Chair moves forward
Left	left()	Chair moves left
Right	right()	Chair moves right
Horizontal	stop()	Chair stops

Table 1: Functional Table

6. Conclusion

Resulting to summarizing all the examination done being made stage we accept that the, 'Breathtaking Wheelchair,' can be truly appiled for a huge augmentation to the more settled and genuinely injured individuals. In our proposed framework, distant turns of events and sensors with fitting materials and advances have been intertwined with microcontrollers used to chip away at, as far as possible, and objective of the old and sincerely attempted individuals as it will help them to free with not an incredible clarification to utilize any additional contraptions. Additionally with the assistance of IOT technolgy essential thriving cutoff points will be seen on our PDAs. The deferred outcomes of the proposed structure show its expense abundancy and show its extraordinarily strong showcase, accuracy, and proficiency.

ACKNOWLEDGEMENT

I should take action to convey our critical sensation of appreciation to Mr. SUNDAR KHARVI (EXTC) , St. John College Of Engineering and Management, for their consistent course, oversight, motivation and relief quite far during the endeavor, their assistance and clarifications are the kry behind successful completion of this endeavor work.

REFERENCES

1. Sndeept and supriya, "Wheel-Chair Control Using Accelerometer Based Gesture Technology", International Journal of Advance Research in Computer Engineering and Technology (IJARCET) Volume 4 Issuse 5, May 2015.
2. Y. Chen, "Use of Tilt Sensors in Human-Computer Mouse Interface for People with Disabilities", in IEEE Transactions Neural Systems and Rehabilitation Engineering, Vol. 9, No. 3, September 2001, pp. 289-295
3. V. Rajesh et al., "SEMG based human-machine interface for controlling a wheelchair by utilizing ANN", method of Control Automation Communication and Energy Conservation 2009. INCACEC 2009.2009 International Conference.
4. Rajesh KannanMegalingam, Ramesh Nammily Nair, ―Automated Voice based Home Navigation System for the Elderly and the Physically Challenged‖ Feb. 13~16, 2011
5. Rajesh KannanMegalingam et al., "Remote sign controlled wheelchair",2017 fourth International Conference on Advanced Computing and Communication Systems (ICACCS), 24 August 2017, Coimbatore, India