FABRICATION OF HEAD MOTION BASED WHEEL CHAIR FOR PHYSICALLY CHALLENGED PERSON

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Abstract: In India the quantity of crippled people is expanding consistently. Versatility helps are valuable for patients for transportation and are situation for strolling particularly in indoor and outside climate. Moving the patients from wheelchair to cot or to the clinical bed is generally an issue for the chaperon or assistant. Understanding the different issues with respect to the versatility gear and presenting a superior plan will be a resource for the clinical field and assistance for impaired people. There is a requirement for a wheelchair cum cot to work with the debilitated patient's portability and to give an original clinical hardware to use in the Indian emergency clinics. Here we are fostering a framework which is equipped for moving different positions (Seat, Semi-Seat and Cot) physically. These positions can be accomplished by a lead screw associated with a pivot joint. Lead Screw makes an interpretation of transforming movement into direct movement. Likewise, the level of the cot can be changed utilizing a fastener system physically. It is put on a level plane which pushes against a switch which lifts the primary arm. And furthermore, there is a cover on seat which can be opened to wipe out human waste. This is an expense lessening project which assists fundamentally deadened patients with doing their everyday things.

Index Terms – wheel chair, Fabrication, Physically Challenged person, head motion based.

I. INTRODUCTION

A wheelchair is a wheeled portability gadget wherein the client sits. The gadget is moved either physically (by turning the wheels by the hand) or through different robotized frameworks. Wheelchairs are utilized by individuals for whom strolling is troublesome or unthinkable because of sickness (physiological or physical), injury, or inability. Individuals with both sitting and strolling incapacity frequently need to utilize a wheel seat. The earliest records of wheelchairs date back to the sixth hundred years, and were tracked down engraved on a stone record in China. Later dates connect with Europeans utilizing this innovation, tracing all the way back to the Renaissance. The different sorts of wheelchairs are manual wheelchairs, electric-controlled wheelchairs and game wheelchairs. An essential standard manual wheelchair consolidates a seat and back, two little front (caster) haggles huge wheels, one on each side, and a stool. Wheelchairs are much of the time minor departure from this essential plan, yet there are many kinds of wheelchairs, and they are frequently exceptionally tweaked for the singular client's requirements. The seat size (width and profundity), seat-to floor level, ottomans/leg rests, front caster outriggers, movable backrests, controls, and numerous different elements can be modified on, or added to, numerous essential models, while certain clients, frequently those with specific requirements, may have wheelchairs exceptionally constructed. Different discretionary adornments are accessible, for example, against tip bars or wheels, seat straps, customizable backrests, slant as well as lean back highlights, additional help for appendages or neck, mounts or conveying gadgets for props, walkers or oxygen tanks, drink holders, and attire defenders. Tests have additionally been made with

strange variation wheels, similar to the omni wheel or the system wheel. These permit more directional development choices.

Mechanization is the most often spelled term in the field of hardware. The strive after mechanization acquired numerous transformations the current advances, which had more noteworthy turn of events, is the ACCELEROMETER SENSOR. These had more noteworthy significance than some other innovations because of its easy-to-understand nature. ACCELEROMETER SENSOR based gadgets can be effectively battery-powered to the everyday person because of its less complex activity. This gadget is compact and client can wear it to his wrist like a watch and can work it by shifting the ACCELEROMETER SENSOR. This venture utilizes a miniature regulator, which is modified, with the assistance of PIC C guidelines. Furthermore, a 3-hub accelerometer MMA7660FC (I2C yield) is utilized to detect movement. Control hardware fitted patients head or palm is utilized to control wheel seat

II LITERATURE REVIEW

Journal papers and patents explored here are related directly or indirectly to the proposed area of work that is design and development of a Wheelchair cum Stretcher. These papers are to support and enlighten the whole process of design in the specific area. A wheelchair is chair with wheels, designed to help the disabled individuals. Stretchers are mobility devices used to transport the patients from one place to other. These both medical mobility aids are used in hospitals and clinics for helping the patients. Stretchers are simple in construction and the patient needs the support of an assistant to transport from one place to other. Whereas wheelchair is designed in such a way that either patient can control the device manually or with the help of someone's assistance. According [1] Mr. Peter Axelson selection of an appropriate wheelchair will lead a comfortable living to the user. Performance, safety and dimensions are the three categories which have to be considered while selecting a manual or powered wheelchair. An excellent approach to the wheelchair selection is to set priorities based on user's mobility and seating needs. It is highly recommended that a novice can consult with there habilitation specialists in order to select the appropriate wheelchair., [2] James J. Kauzlarich says self excited vibrationis one of the most interesting topics in the field of vibrations and is the science prevailing caster wheel shimmy. Self excited vibration is characterized by vibration that is produced by the motion of the system like wheelchair speed. It can be observed that in most of the cheapest wheelchairs, the design of the casters makes use of a sliding frictional damper in the spindle support to improve the shimmy characteristics. Understanding the theory of damping for the casters show how shimmy prevention works in ultra-light and powered wheelchairs. [3] Mr. Jean Minkel A motion controlled robot is constrained by involving hand instead of some other technique like buttons or joystick. Here one just has to move hand to control the robot. A communicating gadget is utilized in your grasp which contains RF Transmitter and accelero-meter. This will communicate order to robot with the goal that it can do the necessary errand like pushing ahead, invert, turning left, turning right and stop. This large number of undertakings will be performed by utilizing hand motion. Here the main part is accelerometer. [4] Mr.Denise Chesney, Accelerometer is a 3 hub speed increase estimation gadget with +-3g territory. This gadget is made by utilizing polysilicon surface sensor and sign molding circuit to gauge speed increase. The result of this gadget is Simple in nature and corresponding to the speed increase. This gadget estimates the static speed increase of gravity when we slant it. Furthermore, gives an outcome in type of movement or vibration. As per the datasheet of adxl335 polysilicon surface-micromachined structure put on top of silicon wafer. Polysilicon springs suspend the design over the outer layer of the wafer and give an opposition against speed increase powers. Diversion of the construction is estimated utilizing a differential capacitor which consolidate free fixed endlessly plates joined to the moving mass. The proper plates are driven by 180° out-of-stage square waves. [5] Mr. Daniel E. Chipper, Speed increase redirects the moving mass and unbalances the differential capacitor bringing about a sensor yield whose plentifulness is relative to speed increase. Stage delicate demodulation procedures are then used to decide the size and course of speed increase. accelerometer Pin Depiction of accelerometer 1. Vcc 5 volt supply ought to interface at this pin. 2. X-OUT This pin gives a Simple result in x heading 3. Y-OSUT This pin give a Simple Result in y heading 4. Z-OUT This pin gives a Simple Result in z bearing 5. GND Ground 6. ST This pin utilized for set awareness of sensor 3.2.Circuit Outline and Clarification Signal Controlled Robot is partitioned into two segments: 1. Transmitter section 2. Recipient part In transmitter section an accelerometer and a RF transmitter unit is utilized. As we have previously examined that accelerometer gives a simple result so here we really want to change over this simple information in to computerized. For this reason we have utilized 4 divert comparator circuit instead of any ADC. By setting reference voltage we gets a computerized sign and afterward apply this sign to HT12E encoder to encode

information or changing over it into sequential structure and afterward send this information by utilizing RF transmitter into the climate. At the beneficiary end we have utilized RF recipient to get information and afterward applied to HT12D decoder. This decoder IC believers got sequential information to resemble and afterward read by utilizing arduino. As per got information we drive robot by utilizing two DC engine in forward, opposite, left, right and stop heading. [6] Debkumar Chakrabarti, Transmitter circuit This communicated signal is gotten by the RF collector, demodulated and afterward went to the decoder IC. The decoder IC disentangles the coded waveform and the first information pieces are recuperated. The info is a sequential coded balanced waveform while the result is equal. The pin 17 of the decoder IC is the Legitimate Transmission (VT) pin.

III OBJECTIVE AND METHODOLOGY

The Aim of this work is to design and build an automated wheel chair for physically challenged persons for their independent movement. This system is operated with taking head movement as input signal • An accelerometer sensor is used to track the head movements • Cap based sensor is used which will be mounted on the head of the person. • Variation produced in is fed to a microcontroller • Microcontroller produce controlled actions based on the input signal
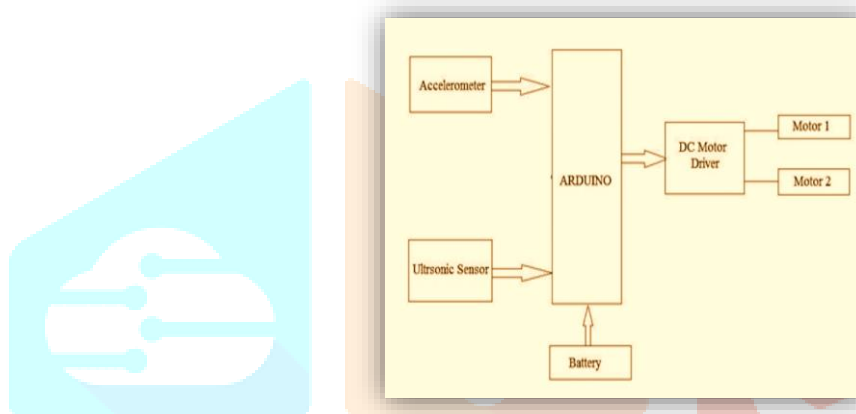

fig 1 block diagram of working methodology

IV FABRICATION

The 2D detailed design has been created with the help of solid works software. Design is analyzed and evaluated thoroughly to understand the various aspects, after the conditional evaluation the actual fabrication work starts at fabrication center. To fabricate the chair, we have used mild steel material with greater strength providing various provisions to accumulate smart application-based tools such as embedded system, controlling units, sensors unit etc. The details about design work are shown in the below figure.

fig 2 design of head motion-based wheel chair

fig 3 working model of head motion-based wheel chair

V.WORKING

This robotic wheel chair allows the patient to have a control over four different directions namely the forward, backward, right and left.   The all controlling sensors are mounted with the help of cap and same to be keep on the physically challenged person to control the motion.
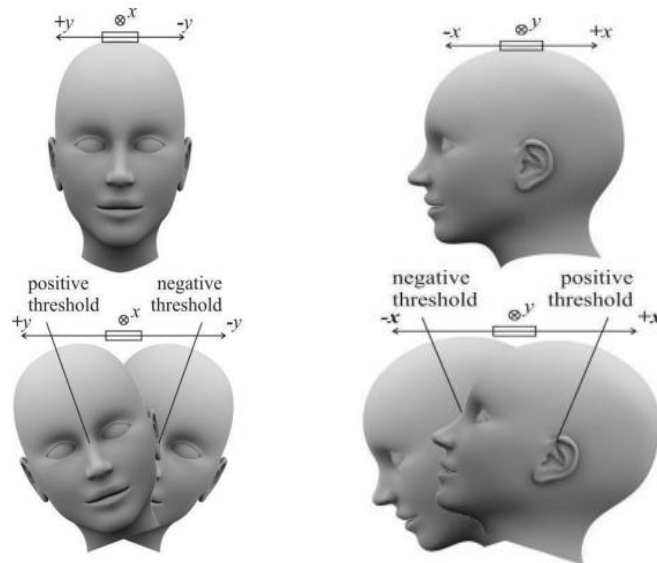

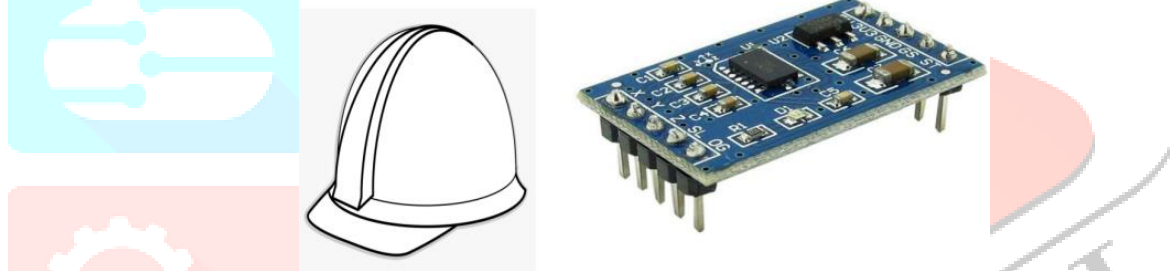**fig 4 head motion-based control to actuate wheel chair**

fig 5 cap with controllers to control the wheel chair movement

The logic used: If the value along the x-axis is under -17, then it should send 'F'. • If the value along the x-axis is above 20, then it should send 'B'. • If the value along the y-axis is above 30, then it should send 'R'. • If the value is under-30, then it should send 'L'. • If none of the above conditions are satisfied, then it should send 'S'. Basically, control system made of an Arduino UNO, Bluetooth module(slave) to receiving data, H-bridge l293d to control direction and speed of motors. 9v battery to power the Arduino UNO and other components. Ultrasonic sensor: an additional sensor to avoid crashes. All components are soldering in the PCB board.

VI RESULTS

The proposed framework is expected to make a financially savvy wheelchair to assist quadriplegic with peopling who think that it's hard to move freely. The structure uses head advancement to control the wheelchair. The tilt focuses made are distinguished and voltages are created by accelerometer. These voltages are taken by microcontroller which in this way controls the course of wheelchair. This venture work was carried on to satisfy the prerequisite of older and impair individuals, giving the autonomous route utilizing head movement-controlled wheelchair. It causes them to move effectively as like ordinary people do. The circuit works appropriately to the order given by the user and the wheelchair is moved in understanding to the head signal given by the individual. Head movement-controlled wheelchair incorporates obstacle detection, which assists with distinguishing the hindrance and stops the wheelchair. Monitoring of the patient's wellbeing condition is possible with the assistance of patient monitoring framework

CONCLUSION

This product will be helpful for paralyzed patients, movement impaired personals, as well as for old age persons. Our product will eliminate the use of separate wheelchair and stretcher in the hospitals, so that we can eliminate the step of shifting patients from bed or stretcher to wheel chair and vice versa. The wheelchair will consume less space and is manufactured at low cost. Such equipment can induce self-reliability and satisfaction in the users. We achieved our goals by the use of engineering. We gained a lot of practical knowledge regarding, planning, purchasing, assembling and machining while doing this work.

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