



PERCEPTIVE WHEEL CHAIR SYSTEM BASED ON HEAD MOMENTS BY USING MEMS

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ABSTRACT

This paper is to develop a wheel chair management that is beneficial to the physically disabled person along with his hand movement or his hand gesture recognition victimisation Acceleration technology. Tremendous leaps are created within the field of chair technology. However, even these important advances have n't been ready to facilitate quadriplegics navigate chair international organization power-assisted. it's chair which may be controlled by easy hand gestures. It employs a device that controls the chair hand gestures created by the user and interprets the motion supposed by user and moves consequently. In Acceleration we've got Acceleration device. after we amendment the direction, the device registers values area unit modified which values area unit given to microcontroller. counting on the direction of the Acceleration, microcontroller controls the wheel chair directions like LEFT, RIGHT, FRONT, and BACK. The aim of this paper is to implement wheel chair direction management with hand gesture reorganization.

Keywords- Micro-electromechanical systems (MEMS), wheelchair.

1. INTRODUCTION:

This paper proposes Associate in Nursing integrated approach to real time detection, chase and direction recognition of hands, that is meant to be used as a human-robot interaction interface for the intelligent chair. This paper is to demonstrate that accelerometers is wont to effectively translate finger and hand gestures into pc understood signals. For gesture recognition the measuring device knowledge is graduated and filtered [1]. The accelerometers will live the magnitude and direction

of gravity additionally to movement induced acceleration. so as to calibrate the accelerometers, we tend to rotate the device's sensitive axis with relevancy gravity Associate in Nursing use the resultant signal as an absolute activity. integration one chip wireless resolution with a MEMS measuring device would yield Associate in Nursing autonomous device sufficiently small to use to the fingernails, due to their tiny size and weight. Accelerometers square measure hooked up to the fingertips and back of the hand. Arrows on the

hand show the placement of accelerometers and their sensitive directions, that the sensitive direction of the measuring device is within the plane of the hand.

II. TECHNOLOGY

Micro-electromechanical systems (MEMS) are unit free scales sanction native technology for acceleration and pressure sensors. MEMS primarily based sensing element merchandise give AN interface which will sense, method or management the encompassing atmosphere. Micro-Electro-Mechanical Systems, or MEMS, may be a technology that in its most general kind are often outlined as miniaturized mechanical and electro-mechanical parts(i.e., devices and structures) that area unit created victimisation the techniques of small fabrication. MEMS-based sensors area unit a category of devices that builds terribly little electrical and mechanical parts on one chip. MEMS-based sensors area unit a vital part in automotive physics, medical instrumentality, disc drives, pc peripherals, wireless devices and sensible moveable physics like cell phones and PDAs. The useful parts of MEMS area unit miniaturized structures, sensors, actuators, and electronics, the foremost notable (and may be most interesting) parts area unit the small sensors and small actuators. small sensors and small actuators area unit suitably classified as “transducers”, that area unit outlined as devices that convert energy from one kind to a different. within the case of small sensors, the device generally converts a measured mechanical signal into an electrical signal. MEMS technology provides the subsequent advantages: cost-efficiency, low power, miniaturisation, high performance, and integration. practicality are often in tecost

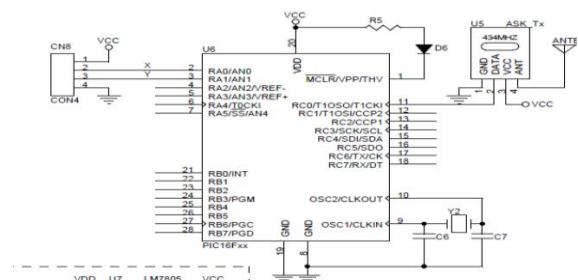
savings. thence with this paper we are able to save the physically disabled persons World Health Organization use wheel chairs they'll management their wheel chair with their hand movements.

III. LITERATURE SURVEY

When associate degree unfortunate event affects the motor capability of an individual, it's necessary to use devices like wheelchairs that provide a method of displacement for patients with motors issues of the lower limbs. Tremendous leaps are created within the field of chair technology. However, even these important advances haven't been able to facilitate quadriplegics navigate chair unassisted. Some patients that can't manipulate the chair with their arms thanks to a scarcity of force or bodily process issues within the superior members, request electrical wheelchairs, manipulated with joysticks; but the joystick manipulation is even not sensible and often it should be handle with the mouth. The present article presents the partial ends up in the event of a chair controlled by associate degree intuitive nterface, wherever the directions area unit given by hand gesture directions.

IV. HARDWARE

TRANSMITTER MODULE



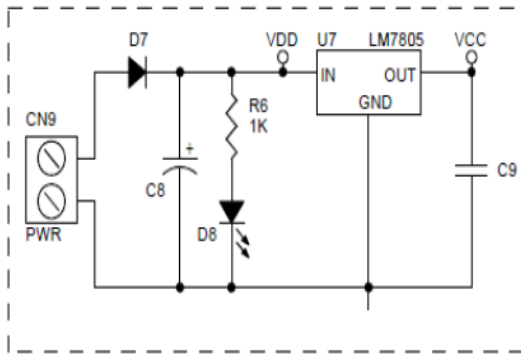


Figure 1. Circuit Diagram Of Transmitter Module

1.1.1. ACCELEROMETER

An measuring instrument is AN equipment, either mechanical or mechanical device, for measure acceleration or swiftness - that's, the speed of increase or decrease within the speed of a moving object. The activity of acceleration or one amongst its by-product properties like vibration, shock, or tilt has become terribly common place in an exceedingly wide selection of merchandise. Compact acceleration sensing element for measure acceleration is 2axis. Our new acceleration sensing element victimisation the high-quality ADXL202 sensing element from analog devices and may live acceleration from -2g to +2g in either X or Y axis. Save time and cash with this pre-mounted and assembled acceleration sensing element unit. No have to be compelled to solder the tiny SMD ADXL half, this unit comes fully assembled and prepared to control. The compact unit will be simply mounted on a automaton or mobile unit, with straightforward to attach header for signal output. Output is in PWM format and may be connected on to a microcontroller.

GENERAL DESCRIPTION

The ADXL202E could be a cheap, low-power, complete 2-axis measuring instrument with a digital output, all on one monolithic IC. it's AN improved version of the ADXL202AQC/JQC. The ADXL202E will live accelerations with aall-out vary of two g. The ADXL202E will live each dynamic acceleration (e.g., vibration) and static acceleration (e.g., gravity). The outputs are analog voltage or digital signals whose duty cycles (ratio of pulse breadth to period) are proportional to acceleration. The duty cycle outputs is directly measured by a silicon chip counter, while not AN A/D convertor or glue logic. The duty cycle amount is adjustable from zero.5ms to 10ms via one resistance (RSET) [2][3]. The information measure of the measuring instrument is about with capacitors cardinal and CY at the XFILT and YFILT pins. AN analog output is reconstructed by filtering the duty cycle output. The ADXL202E could be a complete, dual-axis acceleration measuring system on one monolithic IC. It contains a poly chemical element surface small machine sensing element and signal learning electronic equipment to implement open loop acceleration measuring design. For each axis, AN output circuit converts the analog signal to a obligation cycle modulated (DCM) digital signal that may be decoded with a counter/timer port on a silicon chip. The ADXL202E is capable of activity each positive and negative accelerations to a minimum of 2 g.

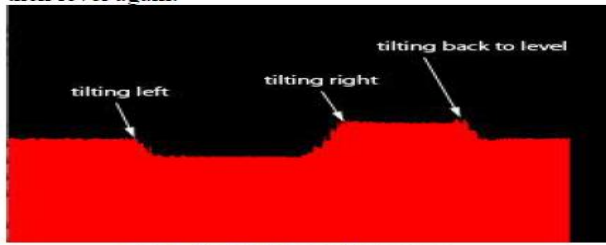


Fig 2. X-axis of accelerometer

This graph shows the Y axis. The accelerometer starts level, and then is tilted forward, then back then level again.



Fig 3. Y-axis of accelerometer

RECEIVER MODULE

RF ASK Receiver Module:

This is AN raise Hybrid receiver module. it's an efficient low value answer to receiving information at 315/433MHz.

2.2.1. D.C. Motor : A dc motor uses voltage to supply energy, terribly usually through the interaction of magnetic fields and current-carrying conductors. The reverse method, manufacturing voltage from energy, is accomplished by AN generator, generator or generator. many sorts of electrical motors are often run as generators, and contrariwise [4]. The input of a DC motor is current/voltage and its output is force (speed).



Fig 5. DC Motor

The DC motor has 2 basic halves: the rotating half that's referred to as the coil and also the stationary part that features coils of wire referred to as the sector coils. The stationary half is additionally referred to as the stator coil. Figure shows an image of a typical DC motor, Figure shows an image of a DC coil, and Fig shows an image of a typical stator coil [5]. From the image you'll be able to see the coil is formed of coils of wire wrapped round the core, and also the core has associate extended shaft that rotates on bearings. you must conjointly notice that the finishes of every coil of wire on the coil square measure terminated at one end of the coil. The termination points square measure referred to as the commutator, and this can be wherever the brushes create contact to bring electrical current from the stationary half to the rotating a part of the machine.

H – Bridge (Dc Motor Driver): The H-bridge is therefore named as a result of it's four change components at the "corners" of the H and also the motor forms the cross bar. the fundamental bridge is shown within the figure to the correct

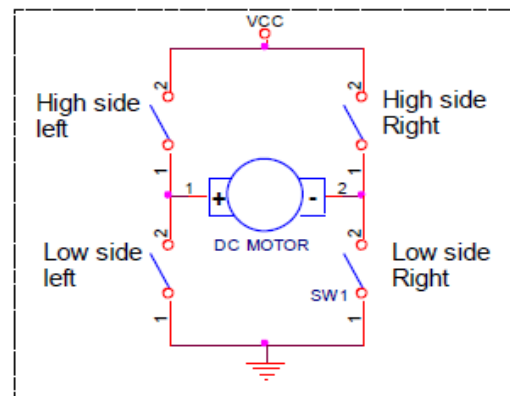


Figure 6.H – Bridge (Dc Motor Driver)

V. APPLICATIONS

In Hospitals for handicapped patients: Some patients that cannot manipulate the wheelchair with their arms due to a lack of force or psychomotor problems in the superior members require electric wheelchair. The wheelchair is operated with the help of accelerometer, which in turn controls the wheelchair with the help of hand gesture. The wheelchair moves front, back, right and left. Due to which disabled and partially paralyzed patient can freely move.

OVERVIEW OF THE PROJECT



VI. CONCLUSION

Our paper is capable to manage the chair motion for disabled folks mistreatment hand gesture. enhancements may be created by mistreatment varied body gestures like eye gaze, leg movement or head movement consequently.

REFERENCES

- [1] "A Wearable Head- Mounted Sensor-Based Apparatus for Eye Tracking Applications" IEEE International Conference on Virtual Environments, Human-Computer Interfaces, and Measurement Systems Istanbul, Turkey, dated 14-16 July 2008
- [2] A. Murarka, M. Sridharan and B. Kuipers. 2008. "Detecting obstacles and drop-offs using stereo and

motion cues for safe local motion".IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS-08).

[3] ShilpaGulati, Benjamin Kuipers2008. "High Performance Control for Graceful Motion of an Intelligent Wheelchair".Proceedings of the IEEE International Conference on Robotics and Automation (ICRA).

[4] Marhic, B. " Robotic assistance: an automatic wheelchair tracking "Intelligent Robots and Systems, 2005. (IROS 2005). 2005 IEEE/RSJ

[5] L.JosefssonandP.Persson, Conformal Array Antenna Theory and Design