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GESTURE CONTROL WHEEL CHAIR CUM STRETCHER.

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Abstract

In this paper use of gesture control method inter face with micro controller for the movement of wheelchair and stretcher by using actuator and motor assembly. identifies the innovation of wheel chair cum stretcher in technology, application and usability. Our findings conclude that GCUI now affords realistic opportunities for specific application areas, and especially for users who are uncomfortable with more commonly used input devices. We deals with different types of gestures, and its users, applications, technology, issue results and interfaces from existing research. This paper also provides a research background for gesture controlled research for disabled people.

***Key Words*: Gesture-control, user interfaces, DOF, RF module.**

1.INTRODUCTION

Keyboard and mouse now provide the input. Use of other options i.e hand, head or body gesture .We will see more elderly people and fewer younger people as a process of huge demographic change. The older population will continue to grow significantly in the future. It's widely accepted that we need to address this issue through more research work.

This paper investigates the research works of gesture controlled technology for user interactions with automation. Gesture type, use of different body parts, gesture commands, gesture application, interface, technology, user type, issues addressed and final result have been listed and described to give the background of gesture based technology development. The goal of this paper is to develop methodologies that help users to control the wheel chair and stretcher, with a high-level of abstraction from the AVR specific language.

2. TECHNICAL REQUIREMENTS

The technical on component requirements chosen as a basis for the efficient functioning of the system are as follows**:**

2.1 Microcontroller

ATmega 8 microcontroller is used as the hardware platform. It is the controlling unit, to which all other components (Accelerometers, Motors, actuator, brake etc.) are interfaced. Two such microcontrollers are used in this project, one at the Receiving end and other at the Transmitting end.

2.2 RF Module

RF stands for Radio Frequency. This module consists of further two parts: Transmitter and Receiver. It is readily available in different operating frequencies with different operating range. An Encoder Circuit and a Decoder Circuit is used along with the Transmitter and Receiver respectively in order to transmit and receive the signal.

The native communication task between transmitter, receiver, the platform and the different hand and leg gestures of the user is done by this module via RF signals. One such RF Module is required in this model. The RF Module used in this project works on the frequency of 315MHz with an operating range up to 500 meters.

2.3 Accelerometer

An accelerometer measures gravitational force . By the movement of an accelerometer along its measured axis, one can read the gravitational force related to the amount of tilt. Most accelerometers available today are small surface mount components with high sensitivity and accuracy, so you can easily interface them to a microcontroller. There are three axes that can be measured by an accelerometer and they are labeled as X, Y and Z. Each measured axis represents a separate Degree of Freedom (DOF) from the sensor-thus a triple axis accelerometer might be labeled as 3 DOF. In this paper, only 2 axes namely X and Y are used.

2.4 Actuator

The actuator is the unit, which converts the operating into a linear movement. The principle of the actuator's mode of operation is that a low voltage DC motor, via a gear system, rotates a threaded spindle, onto which a nut is fitted. As this nut cannot rotate, since the piston rod is restrained, the piston rod will move forwards or backwards, when the rack and pinion rotates.

On the basis of motor type, gearing of rack and pinion arrangement the actuator's thrust and speed are determined. We can used the actuator to adjustment of beds, furniture, table heights and angles, Patient hoists within the care and hospital sector, of dentist chairs/gynecological chairs, industrial processing machines, agricultural machines, ventilation systems. The linear actuators are basically used to convert wheel chair to stretcher v/s.

2.5 DC Motor

The dc motor we are used to travel the wheel chair LEFT, RIGHT and FORWARD direction with high load capacity sustainability. It has 300rpm, 24 volt and 250watt in configuration. It pre- geared so no need to conversion high rpm to low rpm under the consideration of user. Also the wipper motor are used in project to braking purpose which shown in below picture.

3. COMMUNICATION SYSTEM

This part is the heart of the entire paper. Without an effective, automatic and reliable communication system, no system can work. Similar is the case with this project also. The RF Module is the only communication equipment required in this project. This Module is used to transmit the different hand, head and leg gestures made by the user (encoded in the form of 8-bit digital data) wirelessly to the receiver, which decodes the received 8-bit digital data and according to which the arm, gripper and platform moves. The block diagrams shown in Figure 1 & Figure 2 depicts the entire communication system of the project. The Linker (Circle, named "W") in Figure 1 and Figure 2 is used to show the connection (flow of signals) between the Transmitter End and the Receiver End.

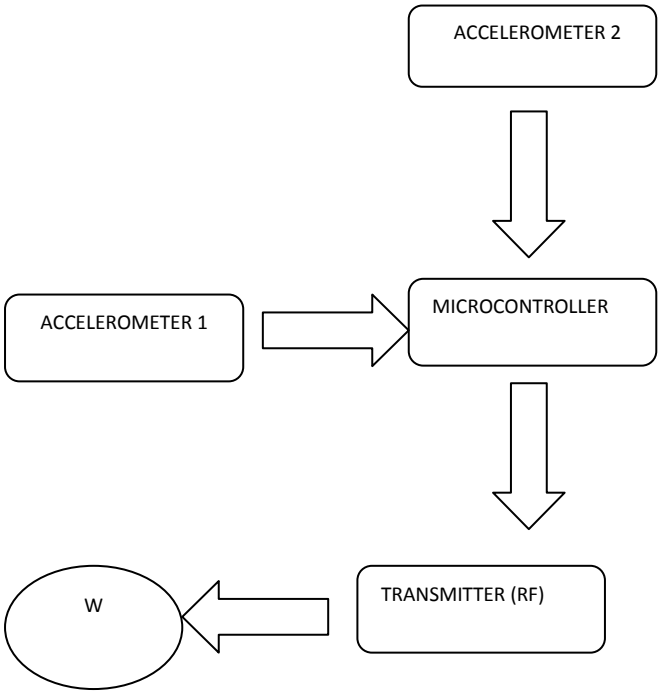

Figure 1: Block diagram of Transmitter End

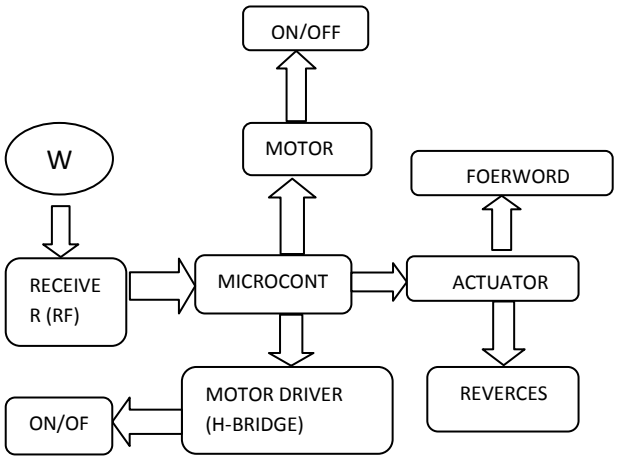

Figure 2: Block diagram of Receiver End

4. HARD WARE IMPLEMENTATION

The components involved in the paper are:

1) MEMS sensor
2) ADC(8085)
3) Micro controller(AT89S52)
4) Motor driver
5) DC motors

The above system represents, any change in the direction of MEMS sensor in X- and Y-axis directions then this MEMS sensor has piezo resistive material at the center of the chip, which is suspended by 4 beams doped with piezo resistive material. When the sensor is subjected to gravitational force in any direction, the movement of the mass causes the 4 beams to deform and so changes the resistance of the piezo material. This enables the sensor to detect the gravitational force motion. The given sensor contains Tilt register. When the changes in the direction, the tilt register values are changed and that values are given to ADC, which converts analog to digital values this values are given to microcontroller. Depending on the direction of the sensor, microcontroller controls the wheel chair directions like LEFT, RIGHT, FORWORD AND BRAKE. Wheel chair to stretcher conversion is takes place by movement of accelerometer UPWORD and DOWNWORD v/s. both actuator work alternately it's depend up on user.By implementing the above circuit, the obtained values are:

Table No. 1 Experimental Value of wheel chair

Position	X-axis	Y-axis
Left	>150&&>200	<200&&<250
Right	>100&&>200	>150&&200
Forward	>150&&>200	<200&&<250
Brake	>100&&>200	<150&&<250

Stretcher:

Wheelchair:

CONCLUSION

This paper is implemented using various components, definitely useful to the entire disabled person, who are physically disabled to move and drive normal wheel chair their own. With their any body part movements they can move wheel chair right, left and front and also made wheel chair into stretcher directions with accelerometer (MEMS SENSOR) which is a highly sensitive sensor and capable of detecting the tilt.

RESULT

By using gesture control method in wheelchair and stretcher are implemented. The main purpose of using this method in our project is it done work fully automatically and it give more advantages. In this system use of micro controller to control the movement of gesture and the whole system are controlled and it form stretcher and wheel chair, it is depend on operator requirement.

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