IOT OPERATED WHEEL CHAIR

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ABSTRACT

Here is implemented a home navigation system, which comprises of a wheelchair which works on the inputs such as gesture commands via an android phone through Bluetooth and navigates according to command. It can be used by an elderly or physically challenged person to move inside the home without any difficulty. It is also equipped with obstacle avoidance technique, where the person may not be able to provide proper command at the right time. This project is to develop a wheel chair control which is useful to the physically disabled person with his hand gesture recognition using Acceleration technology. It is wheelchair which can be controlled by simple hand gestures. It employs a sensor which controls the wheelchair hand gestures made by the user and interprets the motion intended by user and moves accordingly. In Acceleration we have Acceleration sensor. When we change the direction, the sensor registers values are changed and that values are given to microcontroller. Depending on the direction of the Acceleration, microcontroller controls the wheel chair directions like LEFT, RIGHT, FRONT, and BACK.

Keywords- microcontroller, accelerometer sensor, hand gesture, bluetooth.

I. Introduction

The most common image of disability is the people in wheelchairs. Wheelchairs are used by people who find themselves unequipped to move without external aid. The special needs of the elderly may differ from that of a physically challenged person or a large individual but they all have "special needs" and often require some assistance to perform their daily routine. The physically challenged people, who use a normal wheelchair for navigation, usually require an external person to move around. In this busy world, the elderly people may be left alone at home and also may not find an apt person for external help. Here comes the need of an automated home navigation system, which consists of a wheelchair which can be used by the elderly and the physically challenged people without the help of an external person.

The proposed paper can be operated using the gestures of the provided android mobile phone. Patients involved in physical injuries and disabilities with good mental strength struggle to get through places using the conventional hand powered wheelchair.

This paper enables an economic assembly in any existing wheelchair that enables a smart system for automated motion which can be controlled by any Smartphone. The main concept involved is „Smartphone‟ which has an operating system as Android which have inbuilt 3 axis accelerometer and Bluetooth Wireless technology . The purpose of our paper can be extended to other mobile devices which has Android powered mobile phone by sharing the application that we have developed. The main second part of our system architecture has a microcontroller SST89E51RD which drives the various directions of the dc motor for directional movement of wheelchair and powers the DC motor for linear motion of the wheelchair. The DC motor controls the front wheels for turning the wheelchair while the pair of DC motor connected to the rear wheels enable linear motion. The aim of this paper is to use wheelchair automatically for moving forward, backward, Left & Right. The overall wheelchair operation uses DC motor and motor driver module combines with microcontroller system . The physically challenged, find

difficult to move the wheel chair without help from others. By making use of the system, the elderly and the physically challenged can go to different rooms in the house like kitchen, living room, dining room etc by just showing a gesture which is predefined to that particular room. It is also a virtue of the system that even the foot can be substituted in place of the hand for users who might find that more convenient. The aim of this paper is to control a wheel chair and electrical devices by using ACCELEROMETER SENSOR which is a highly sensitive sensor and capable of detecting the tilt. This sensor finds the tilt and makes use of the accelerometer to change the direction of the wheel chair depending on tilt.

II.   LITERATURE SURVEY

In this busy world, gestures play an vital role in humans daily life in order to convey data and motions of human being. So gesture Recognition is a part of the Human computer Interaction (HCI). In recent years Human Computer Interaction has become an attractive field. Hardware devices like mouse, keyboard, joystick can be replaced by compatible touch less technologies. Different proposed models, algorithms and methodologies have been proposed to achieve touch less environment with human interaction. Foreground and background segmentation is an important issue in video processing .The task of video processing becomes difficult when there are moving objects and shadows in the video. In this project we analyze the methods for recognition of hand gesture and different approaches for the segmentation of bluetooth technique. Automated-Guided Wheelchair NEC Corporation, Japan-1992 Follows tracks laid out with magnetic ferrite marker tape. Uses IR sensors to stop when obstacles detected in its path.NLPR Robotized Wheelchair Chinese Academy of Sciences, China-2000 Uses machine vision to identify landmarks for localization. Offers several operating modes, including wall following, collision avoidance, and autonomous navigation to point on map.OMNI University at Hagen, Germany-1995–1999 Omnidirectional wheelchair provides hierarchy of functionality: simple obstacle avoidance, task-specific operating mode (wall following, door passage), and autonomous navigation.
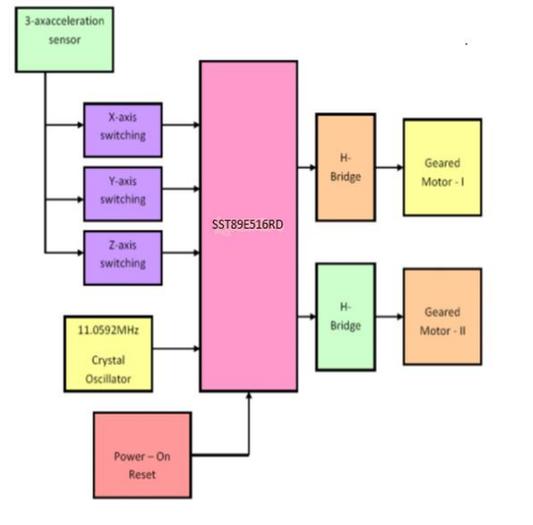
III.   BLOCK DIAGRAM

Fig 1: Block diagram of Wheel chair

3 Axis Acceleration Sensor Board based on ADXL3XX from Analog devices is used for gesture recognition. It is a first generation 3 axis acceleration sensor. User could get acceleration value of X, Y, and Z axis. And it is widely used in shock, slope, and moving detection. Output sensitivity could be select by simply set voltage level on few pins. The output of the sensor is analog mode. A prototype chair is implemented with a small chair and 60rpm motors are used to move the chair. A free-wheel is arranged to change the chair direction according to user's requirement.

This paper uses 12V rechargeable battery.speed and directions of the motors are measured by the accelerometer sensor.crystal oscillator produces a frequency of 11.0592Mhz for the microcontroller unit.H-bridge is a motor driver which drive the motors.

IV.   FLOWCHART
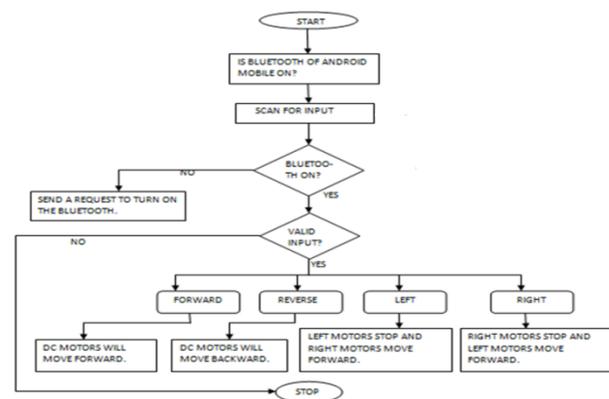
V.   ALGORITHM

➢ When the application is opened at that time a request is generated if the Bluetooth is not turned on.

➢ A connect virtual button is present which is used to connect the Android mobile phone with the hardware Bluetooth HC-05 for wireless transmission of data.

➢ When the Bluetooth is switched on the   application scans the input when the user touches the virtual button.

➢ If the requirement is forward then all the dc motors are supplied with 5V and moved in forward directions for linear movement.

➢ If the requirement is reverse then all the dc motors are supplied with 5V and moved in backward directions for linear movement.

➢ If the requirement is to turn left then the left dc motors are stopped and the right dc motors are supplied with 5V and the wheelchair moves in left direction.

➢ If the requirement is to turn right then the right dc motors are stopped and the left dc motors are supplied with 5V and the wheelchair moves in right direction.

➢ If the stop virtual button is touched then all the dc motors are stopped.

VI.   CONCLUSION

The design and development of this intelligent wheelchair based on novel hand gesture control can be successfully implemented on a commercialized scale for the physically handicapped and old age people. Our paper is capable to control the wheelchair motion fordisabled people using hand gesture. Improvements can be made by using various body gestures such as eye gaze, head movement accordingly.

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