ISSN 2394-3777 (Print)
ISSN 2394-3785 (Online)
Available online at www.ijartet.com

International Journal of Advanced Research Trends in Engineering and Technology (IJARTET)
Vol. 4, Special Issue 19, April 2017

# ANTICIPATIVE SHARED CONTROL FOR WHEELCHAIR USED BY PEOPLE WITH DISABILITIES

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## ABSTRACT

***Wheelchairs are used by the people who cannot walk due to physical illness, injury or other disability. This paper is to describe an intelligent wheelchair using smart phone and Leap motion controller, is to control the rotation of wheel chair based upon voice and gesture movement for the physically challenged persons. This system that allows the user to robustly interact with the wheel chair at different levels of the control and sensing.***

***Keywords: real-time devices, leap sensor, shared control wheel chair***

## I. INTRODUCTION

This paper presents a modified design of an electronically controlled wheelchair which is specifically designed for the people with disabilities. This device helps the paralyzed users to move from one place to the other without the help of the other persons.

Smart wheelchairs usually employ sonar, infrared sensors used to detect obstacles and to ensure that the platform does not collide with them. There are many types of wheelchairs, and they are often highly customized for the individual user's needs.

There are many technologies that can be used for the wheel chair movement they are keypad, MEMS, Touch-pad.

## II. PROPOSED SYSTEM

In this project we are proposing to implement device interface for people with mobility impairment. There are many types of wheelchairs, and they are often highly customized for the individual user's needs. The LEAP sensor is used to move in four directions to operate the wheelchair. LCD is used to display direction which is selected by the person. 1x5 keypad is used to select the mode of inputs.

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## III. PROJECT DESCRIPTION

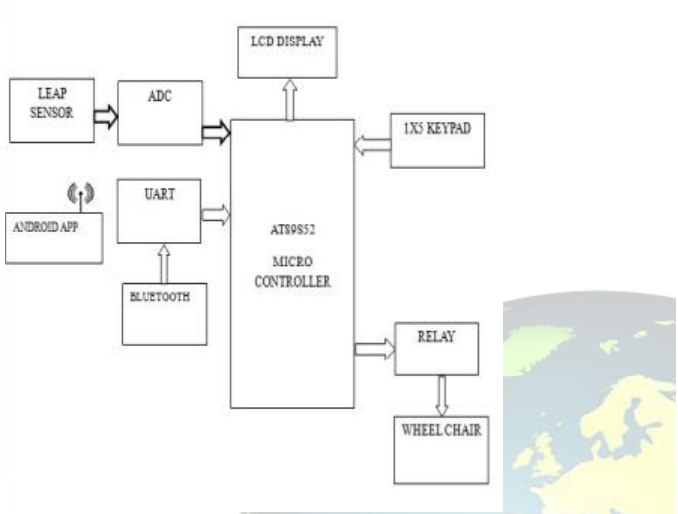


Fig1: Block diagram

Here we are using three input modes to control the wheel chair through 1x5 keypad. First mode is leap sensing control mode here we giving the gesture movement as an input to the leap sensor and those outputs are given to the ADC for the conversion process thereafter it was given to the microcontroller and those output are given to the relay and there those output results in the movement of wheel chair according to the gesture given by patient. Second mode is voice control mode using Bluetooth. Here we using online database instead of using offline database. Online databases are more efficient then offline databases to move wheelchair .Third mode is touch screen control mode using android app in android phone to move the wheel chair

## IV. LEAP SENSOR

The Leap Motion Controller is actually quite simple. The heart of the device consists of two cameras and three infrared LEDs. These track infrared light with a wavelength of 850 nanometers, which is outside the visible light spectrum the device has a large interaction space of eight cubic feet, which takes the shape of an inverted pyramid – the intersection of the binocular cameras' fields of view. Previously, the Leap Motion Controller's viewing range was limited to roughly 2 feet (60 cm) above the device. With the Orion beta software, this has been expanded to 2.6 feet (80 cm). This range is limited by LED light propagation through space, since it becomes much harder to infer your hand's position in 3D beyond a certain distance. LED light intensity is ultimately limited by the maximum current that can be drawn over the USB connection.

At this point, the device's USB controller reads the sensor data into its own local memory and performs any necessary resolution adjustment. This data is then streamed via USB to the Leap Motion tracking software. [4] discussed about an eye blinking sensor. Nowadays heart attack patients are increasing day by day."Though it is tough to save the heart attack patients, we can increase the statistics of saving the life of patients & the life of others whom they are responsible for.

The Leap Motion controller is a small USB peripheral device which is designed to be placed on a physical desktop, facing upward. These observed signals is then sent through a USB cable to the host computer, where it is analyzed by the Leap Motion software using "complex math's" in a way that has not been disclosed by the company, in some way synthesizing 3D position data by comparing the 2D frames generated by the two cameras.

Leap Motion initially distributed thousands of units to developers who are interested in creating applications for the device. The Leap Motion controller was first shipped in July 2013.In February 2016, Leap Motion released a major beta update to its core software. Dubbed Orion, the software is designed for hand tracking in virtual reality.

Figure 2 shows the internal structure of Leap Motion Controller. There are three Infrared Light emitters and two cameras which received the IR lights. Figure 2: Leap Motion Controller internal structure.

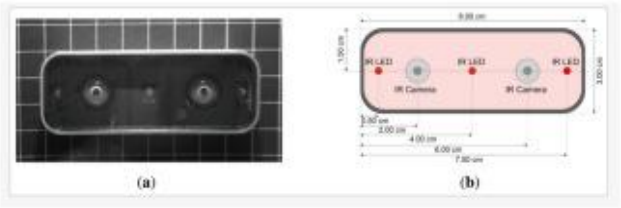


Fig 2: Leap sensor

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## V. MICROCONTROLLER

The AT89S52 is a low-power, high-performance CMOS 8-bit microcontroller with 8K bytes of in-system programmable Flash memory. The device is manufactured using Atmel's high-density nonvolatile memory technology and is compatible with the Indus-try-standard 80C51 instruction set and pin out. The on-chip Flash allows the program memory to be reprogrammed in-system or by a conventional nonvolatile memory programmer. By combining a versatile 8-bit CPU with in-system programmable Flash on a monolithic chip, the Atmel AT89S52 is a powerful microcontroller which provides a highly-flexible and cost-effective solution to many embedded control applications. The AT89S52 provides the following standard features: 8K bytes of flash, 256 bytes of RAM, 32 I/O lines, a full duplex serial port, on-chip oscillator, and clock circuitry. In addition, the AT89S52 is designed with static logic for operation down to zero frequency and supports two software selectable power saving modes. The Idle Mode stops the CPU while allowing the RAM, timer/counters, serial port, and interrupt system to continue functioning.

## VI. ADC 0808/0809:

The ADC0808, ADC0809 data acquisition component is a monolithic CMOS device with an 8-bit analog-to-digital converter, 8-channel multiplexer and microprocessor compatible control logic. The 8-bit A/D converter uses successive approximation as the conversion technique. The converter features a high impedance chopper stabilized comparator, a 256R voltage divider with analog switch tree and a successive approximation register. The ADC0808, ADC0809 offers high speed, high accuracy, minimal temperature dependence, excellent long-term accuracy and repeatability, and consumes minimal power.

The MAX232 is an integrated circuit that converts signals from an RS-232 serial port to signals suitable for use in TTL compatible digital logic circuits. The MAX232 is a dual driver/receiver and typically converts the RX, TX, CTS and RTS signals.

These features make this device ideally suited to applications from process and machine control to consumer and automotive applications.

A relay is an electrically operated switch. Many relays use an electromagnet to operate a switching mechanism mechanically, but other operating principles are also used. Relays are used where it is necessary to control a circuit by a low-power signal (with complete electrical isolation between control and controlled circuits), or where several circuits must be controlled by one signal.

## VII. KEYPAD

A keypad is a set of buttons arranged in a block or "pad" which usually bear digits, symbols and usually a complete set of alphabetical letters. If it mostly contains numbers then it can also be called a numeric keypad. Here the keypad is used to select the mode

## VIII. RELAY

A relay is an electrically operated switch. Many relays use an electromagnet to operate a switching mechanism mechanically, but other operating principles are also used. Relays are used where it is necessary to control a circuit by a low-power signal or where several circuits must be controlled by one signal.

## IX. POWER SUPPLY

Power supply is a reference to a source of electrical power. A device or system that supplies electrical or other types of energy to an output load or group of loads is called a power supply unit or PSU. The term is most commonly applied to electrical energy supplies, less often to mechanical ones, and rarely to others.

## X. RESULTS AND DISCUSION

From the proposed system, it is observed that the system has high accuracy in all three modes control than in the previous models .overall accuracy of the system also increased than the previous models.

## X I. CONCLUSION

From the system proposed, it is observed that the gesture and motion control has high accuracy when compared to

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other modes. This paper describes the system which is driven by the gestures commands, and touch sensor. Further advancements can be done by decreasing the time delay in voice mode.

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