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# Advanced Smart Wheelchair for Handicapped Persons

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**Abstract**
*Everyday, the handicapped persons has to depend on another person for each work. So to solve such problems, the design of a advanced smart wheel chair based on embedded system have been proposed which consist of devices such as AVR Atmega8, RF module, GSM Technology, Gesture Sensor, temperature sensor, heartbeat sensor . The proposed design has three features: first is wheelchair motion control by gesture using accelerometer and RF module , second heart beat information send to doctor by SMS and third is temperature information of handicap person by the same method i.e. SMS, we can also monitor patient heartbeat and temperature by sending SMS . This technique will be very cheap and can easily use.*

**Keyword**
*GSM, AVR ATMEGA8, RF Module, Temperature, Accelerometer, Heartbeat information.*

## I. Introduction

Many people whom create problem in walking or that fully handicapped which without wheelchair can't also move one step. This technical wheelchair is more beneficial for them persons .Which move by power therefore have to not require any labour and can also operate easily by handicapped persons .But now a days various types wheelchair are available in the market but their cost so high. From which poor men can't purchase easily in which something operated by electric power and some move by manually .Many types wheelchair that operate by mobile, Something operate by voice ,Something by eyes motion. Whose price very high and whom can't control easily. But in this paper very low cost wheelchair has been made and whom can also operate so easily .This wheelchair very low cost compare to other wheelchair. That poor men can also purchase easily because of low cost components and devices used in this paper are three applications that very useful for handicapped persons is that , First application in which wheelchair motion control by wireless via RF module and Second application in which heart beat variation information automatic send to doctor by SMS via GSM on his mobile and doctor can also find the heart beat information by SMS via mobile. Third application in which temperature increase or decrease information of handicap person automatic send to doctor by SMS via GSM on his mobile and doctor can Also take the information about temperature by SMS via mobile. This technique very low cost and can also use easily. The system includes many components such as GSM, Microcontroller , AVR, Accelerometer, MAX232, 7805, L298, Thermocouple, RF Module, Temperature Sensor, Heartbeat Sensor,HT12e,HT12d,Bridge Rectifire,Db9,Serial Cable, Capacitor, Resistance, Led, Pcb, Connectors etc.

## II. Literature Survey

In this paper a smart wheelchair has been designed for visually impaired people that controlled by phone. The motion of wheelchair is controlled through cellular phones. And this wheelchair provide defense against obstacle and also provide mobility [1]. In this paper such a wheelchair is designed that controlled by patients or other user voice. This wheelchair very beneficial to that persons which fully handicap and who can't move wheelchair without other persons help [2].In this paper such a wheelchair is designed which is operated by finger operation that based on image processing and embedded technology [3]. In this paper such a wheelchair has been designed that more beneficial for handicap persons and senior citizen because it has multimode that are manual, speech and gesture. From which user can use wheelchair according to himself. That based on ARM processor [4]. In this paper an intelligent wheelchair has been designed. In which a special is attached. From which help patient move wheelchair by pressing button and can also call to doctor automatically by pressing button. When patient press button text display on LCD with sound[5].

In this paper three new features added that very different every day, the handicapped persons has to depend on another person for each work. So to solve such problems, the design of a advanced smart wheel chair based on embedded system have been proposed which consist of devices such as AVR Atmega8, RF module, GSM. The proposed design has three features: first is wheelchair motion control by RF module, second heart beat information send to doctor by SMS and third is temperature information of handicap person by the same method i.e. SMS. This technique will be very cheap and can easily use.

## III. Design of Wheelchair

The design of advanced wheelchair for handicapped persons is based on embedded system using Atmega8 AVR Microcontroller

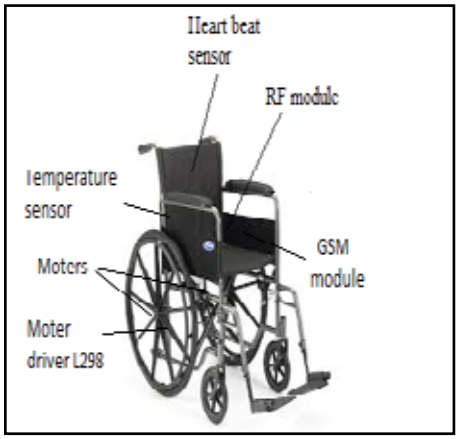


Fig.1 : Wireless controlled wheelchair

**ATMEGA 8 Microcontroller-** The Atmel AVR ATMEGA8 is a low power CMOS 8bit microcontroller based on the AVR RISC architecture. By executing powerful instructions in a single clock cycle, The achieves throughputs approaching 1MIPS PER MHZ .The Atmel AVR core combines a rich instruction set with 32 general purpose working registers all the 32 register are directly connected to arithmetic logic unit(ALU) allowing two independent registers to be accessed in one single instruction executed in one single cycle.

The ATMEGA8 provides the following features:

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- 8kbytes of in-system programmable flash with read-while-write capabilities
- 512 bytes of EEPROM
- 1kbyte of SRAM
- 23 general purpose i/o lines
- 32 general purpose working resisters
- Three flexible timers/counters with compare modes
- Internal and External interrupts
- A serial programmable USART
- A byte oriented two wire serial interface
- A 6-channel ADC (eight channels in TQFP and QFN/MLF packages) with 10-bit accuracy
- A programmable watchdog timer with internal oscillator
- An SPI serial Port
- And five software selectable power saving modes

**Block diagram:**

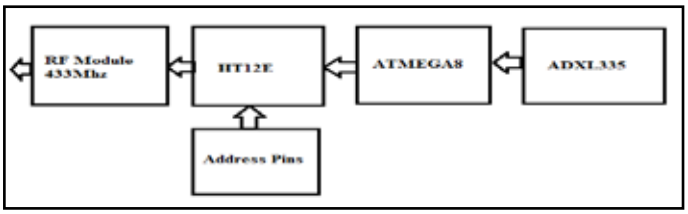


Fig.2 : Block diagram of transmitter section

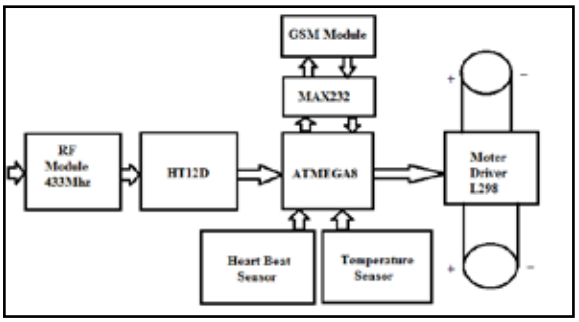


Fig. 3 : Block diagram of receiver section

Flowchart:

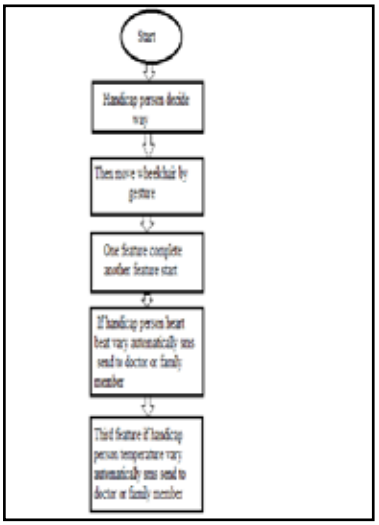


Fig. 4 : Flowchart

**Heartbeat sensor:** Heart beat sensor is a sensor whom connected to heart that give the output signal to the microcontroller. If the heart beat vary this sensor give signal to the microcontroller and microcontroller send this signal to the doctor of patient via GSM on his mobile as a message. And doctor itself can also take the information of his patient heartbeat anytime by SMS via mobile. From which can save the live of patient easily. This sensor very low cost compare to other heart beat sensor because in this sensor very less components used. This sensor automatically sends the signal to microcontroller doesn't need to press any switch.

**Temperature sensor:** Today many types' temperature sensors are available in the market as resistance temperature detector whose resistance vary with temperature because it is a temperature sensitive device. Thermistor is also a temperature sensitive device whose resistance vary with temperature. But these both devices are simple and not more suitable. But IC temperature sensor and self create circuitry give the constant current and resulting voltage. But in this paper if temperatures vary this temperature sensor give a signal to the microcontroller and microcontroller send this signal as a SMS to the doctor of patient via GSM on his mobile and doctor can also take information of his patient before by SMS on their mobile.

**RF module:** RF module generally three types transmitter, receiver and transceiver .These RF module require 5V dc for operate. The transceiver, transmitter and receiver all have 9600 baud serial interfaces and stand alone 3 function switch inputs and outputs. It can communicate over distances till 250 feet. But in this paper two types modules used transmitter and receiver. Transmitter module send signals to receiver module and from receiver go in HT12D and HT12D convert serial to parallel and give microcontroller and microcontroller give signal to motor driver and move the motor.

**ADXL:** Accelerometer used as a sensor .Accelerometer gives analog signal because it is a analog device.ADXL335 is a low power, small, thin, complete 3-axis accelerometer with signal conditioned voltage outputs. The product measures acceleration with a minimum full scale range of ±3 g. It can measure the static acceleration of gravity in tilt sensing applications, as well as dynamic acceleration resulting from motion, shock, or vibration. In this paper ADXL335 gives analog signal to microcontroller and microcontroller convert analog to digital and give to HT12E and HT12E convert parallel to serial and give to RF module.

Applications: Three applications are given below

1. Motion of wheelchair controlled by gesture-

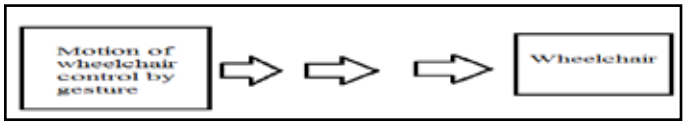


Fig. 5 : Movement of wheelchair

In this feature user move the wheelchair according to wish in four ways forward, backward, left, right. And it's application easy to use. wheelchair motion is controlled by wireless and it wheelchair can also be used as a robot.

2. Heartbeat monitoring-

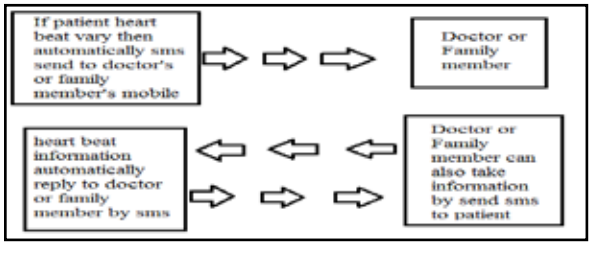


Fig. 6 : Heartbeat information

In this application if handicap person heart beat get high or low to normal automatically sms will be sent to his or her doctor or family member and doctor or family member can also take information automatically by send sms to handicap person.

3. Temperature monitoring

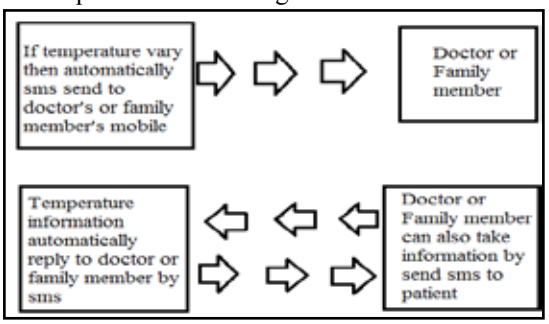


Fig.7 : Temperature information

In this application same method use i.e. if handicap person temperature increase or decrease to standard level automatically sms will be sent to his or her doctor or family member and doctor or family can also get information automatically by send sms to handicap person.

## IV. Conclusion

In this paper an advanced smart wheelchair has designed for handicapped persons that based on embedded system. This wheelchair is very different from all other wheelchair. Because in this paper three new applications added which so useful for handicapped persons that are this types first application in which wheelchair move by wireless switch from which don't has to need anyone labour Second application in which heart beat variation information send to doctor or family member as a message and third application in which temperature variation information send doctor or family member as a message. Temperature and heart beat variation information can also take before by send SMS to patient. From where automatically reply come on the mobile of doctor or family member as a message.

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