



## **Accelerometer Based Gesture Controlled wheel chair with GPS, GSM navigation**

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### **ABSTRACT:**

The development in the science and technology, especially in the field of automation is taking the place like never before. And the gadgets which can make human independent of the assistance of others, are developing at exponential rate. Keeping in mind, the problems faced by handicapped people and their co-ordination with their wheel chair, we are introducing a futuristic and reliable system named "Accelerometer Based Gesture Controlled wheel chair with GPS, GSM navigation" which can interface gesture with micro controller. In this system the wheel chair movement is wirelessly controlled by the hand gesture. Moreover, the entire activity of the user, wheel chair combination is transmitted to a control room. And the determination of the location of the user is identified by the navigation application.

**Keywords:** Hand gestures, wireless control, co-ordination, gesture control, determination, , control room navigation application.

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### **I. INTRODUCTION**

People having physical disabilities and partial paralysis, face difficulty in order to navigate themselves without any assistance. Current development in the field of robotics and artificial intelligence, this project is developed to overcome this problem. In this project, the wheelchair is controlled by the remote. It can be handled wirelessly with hand gesture methods [1].

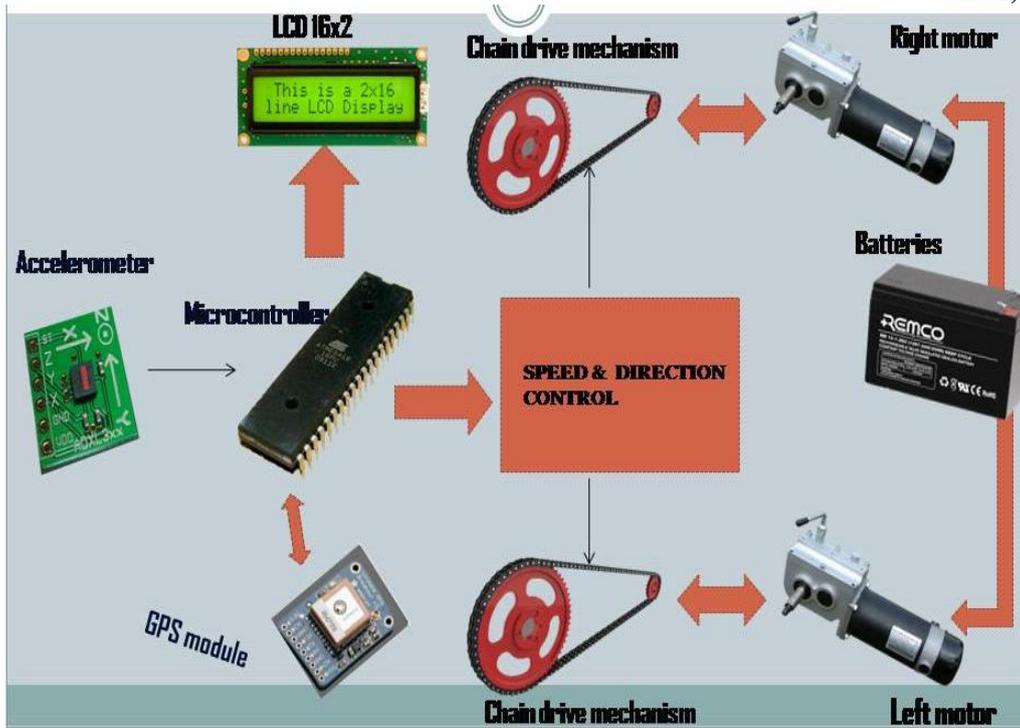
Gesture control robot is divided into two practical parts:

1. Transmitter: the Gesture remote
2. Receiver: the wheel chair

The hand gesture reorganization needs both hand gestures. By this model, assembling of the wheelchair will be easy and it can be controlled remotely from several meters away. Person will be able to control the chair in narrow space, because this project uses the proximity sensors which are also helpful in avoiding collisions. In addition, the SMS will be sent to the family members in the case of emergency by pressing a single switch. Wheelchair will also contain an edge avoider, modules on the back which will help to detect the edge or stair in the backward motion. In such case, the chair will move forward and will alert the family members whose number are pre-saved in distress call module[6].

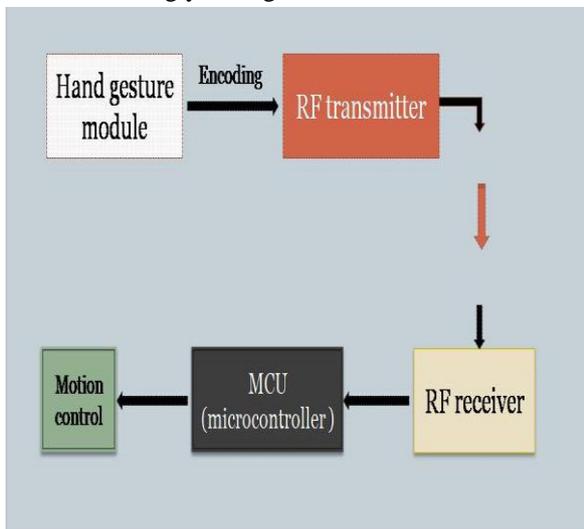
### **II. WORKING**

Figure1 shows the block diagram of the complete project the movement of gesture transmitter section [1] is sensed by the accelerometer and the voltage levels corresponding to movement of the robot along X and Y axes are compared by a comparator following which corresponding instruction are transmitted through the RF transmitter to control the robot. The robot receives the instructions. The microcontroller drives motor corresponding to the instructions received and display the related message on LCD [2].

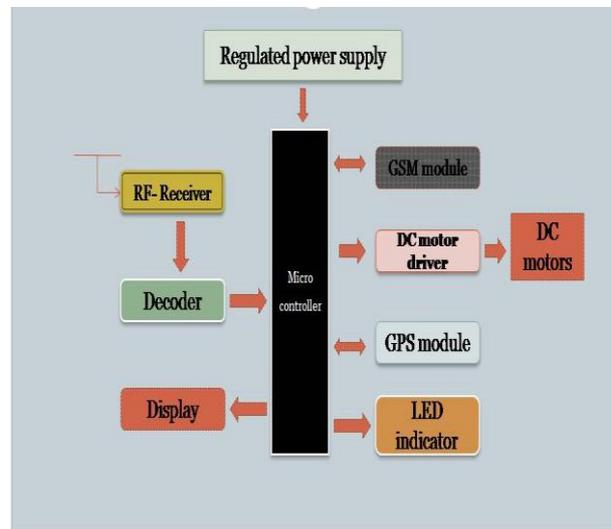


**Figure 1. Block diagram**

figure 2 and 3 shows the transmitter section of the wheel chair[5], the hand gesture module consist of an accelerometer which is use to convert mechanical movement into the electrical signal[1] which is given to the encoder. Encoded signal is given to the RF transmitter which transmits the signal which is received by receiver and further decoding is done by decoder and signal is given to the microcontroller. According to the signals microcontroller gives commands to the motor driver and accordingly the signal motor driver drives the motor in all directions.



**Figure 2. Transmitter section**

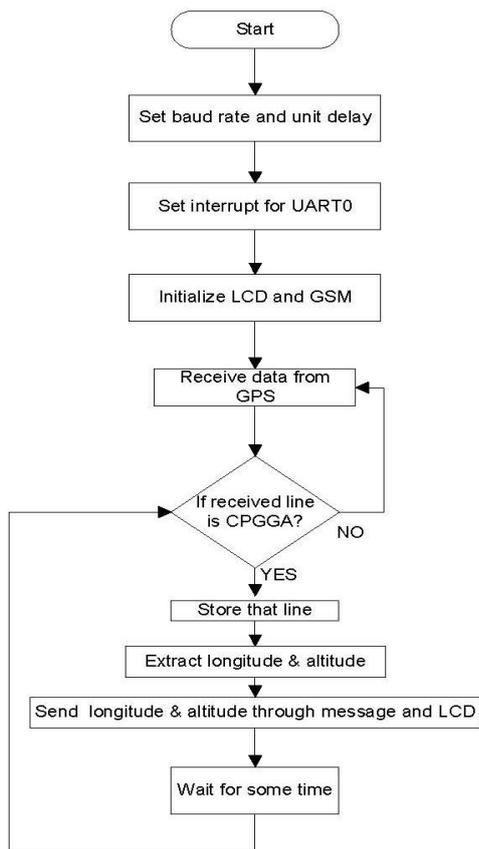


**Figure 3. Receiver section**

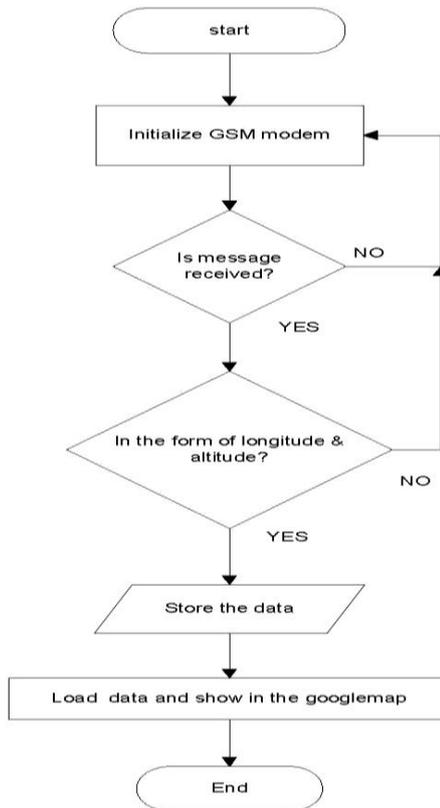
### III. NAVIGATION OF WHEEL CHAIR

#### A. Conversion of longitude and altitude from NMEA code

For the finding the exact location of the wheel chair we developed navigation system in visual basic software. For finding location, GPS receiver is needed. The output of the GPS receiver is in form of NMEA [3] (National Marine Electronics Association) code. First we have to extract altitude and longitude from the NMEA code. Figure4 shows the algorithm of it [4]. After that altitude and longitude will be sent over the GSM network. GSM receiver receives the message and this message will be received serially in to the computer.



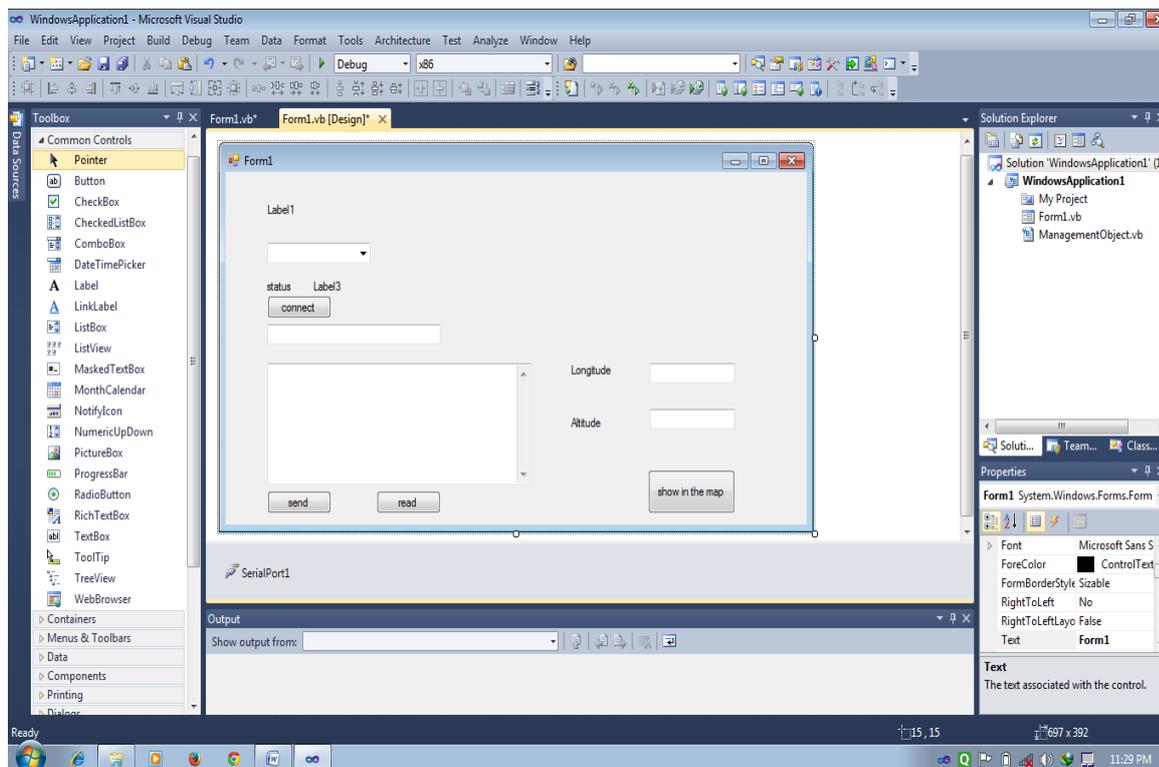
**Figure 4. conversion longitude and altitude from NMEA code**



**Figure 5. flow of navigation software**

**B. Navigation application**

Using the visual basics based navigation application we can find the location of wheel chair [4]. It shows the real time location of the user by their coordinates. Below figure5 shows the flow chart of navigation software.



**Figure 6. Screenshot of Application**

#### **IV. CONCLUSIONS**

This project will intend to make the wheelchair automated. As we know that for handicapped person, wheelchair is the integral part of their day-to-day life. By implementing this project, we can improve their lifestyle. This can be proven a boon for them. Although this project concerned around application as wheelchair it can be extended to a wide variety of applications such as simple vehicle control as well as vehicle tracking, gaming, car parking system, navigation etc. Future scopes are also possible. Like considering various body gestures such as eye gaze, leg movement or head movement accordingly.

#### **ACKNOWLEDGMENT**

I want to use this opportunity to thank everyone who guided us to the right way. I am thankful for their aspiring guidance, invaluable constructive criticism and friendly suggestions during the project work. That helps us to elaborate our project in right and appropriate way. Because of such valuable guidance we are able to build the project that can help and support millions of people who were not able to lead normal day to day life. This project will be a boon for them. We show our gratitude to everyone who helped us directly or indirectly.

#### **REFERENCES**

- [1] Francisco Arce, Jose Mario Garcia Valdez, "Accelerometer- Based Hand Gesture Recognition Using Artificial Neural Networks", vol 318, pp 67-77, 2011
- [2] Muhammad Ali Mazidi, Janice Gillispie Mazidi, Rolin D. McKinlay "The 8051 Microcontroller and Embedded System Using Assembly and C", second edition, pp 536-551, 2008
- [3] V. Sinivee MSc, "simple yet efficient NMEA sentence generator for testing GPS reception firmware and hardware", pp207-210, 2010
- [4] Modi Nirav D, "Vehicle Tracking system with GPS GSM Interface and Self Created Map", International journal of application or Innovation in Engineering & Management (IJAIEM) ", Volume 3 issue 4, April 2004
- [5] Shreedeeep Gangopadhyay, Somsubhra Mukherjee, Soumya Chatterjee, "Intelligent Gesture Controlled Wireless Wheelchair For The Physically Handicapped", 5<sup>th</sup> IRAJ international conference, september 2013
- [6] Losif i. androulidakis, "Voice, SMS, And Identification Data Interception in GSM", pp 25-38, 2012