GESTURE CONTROLLED CAR DRIVING SYSTEM TO ASSIST THE PHYSICALLY CHALLENGED

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***Abstract*- This paper presents a car driving system which is controlled according to the gesture movement based on the input signals given to the MEMS accelerometer. According to the movement of the head(i.e. left, right, up and down), the vehicle move in a forward, backward, left and right direction. Now a day's transportation has made every individual's life very easier to reach the destination on time as every one is having their own vehicle. And the people with the body parts are fortunate but when it's come to the physically challenged people it's very unfortunate that the people with partially disabled with hands can't drive the vehicles with help of the steering. In Buses or trains they are provided with minimum reservation and which will very disappointing and they also don't dare to buy vehicle and assist with a driver which will cost a lot. So this project will be greater solution for them.**

***Keywords*- MEMS accelerometer**

I. INTRODUCTION

Today no one can thinks his/her life without transportation. A normal person can easily reach to their destination on time by using their own vehicle. But a physically challenged person cannot drive their vehicle due to their disabilities. This project has made a solution for them by using a MEMS accelerometer sensor. The movement of the head in left, right, up and down direction will move the vehicle in left, right, forward and backward direction respectively. To stop the vehicle, the head should be placed in a normal position i.e. to look straight.The MEMS accelerometer is fixed on the head of physically challenged person. The MEMS accelerometer senses the movement of the head and passes the signal to the microcontroller. The microcontroller transmits the data to the zigbee and through the zigbee it is transmitted to the vehicle unit. In the existing system the hand controlled brake, accelerator and clutch is provided for the physically challenged, but when it's come to the physically challenged people with partially disabled with hands can't drive the vehicle. In the proposed system there is no hand controlled brakes and accelerators; all the movements of the vehicle will be controlled by the microcontroller according to the movement of the head who is driving the vehicles .So this project will be greater solution for the physically challenged partially disabled with hands.

II. BLOCK DIAGRAM

A. Head Sensor Unit

The microcontroller operates at 5 v which is supplied by power supply.

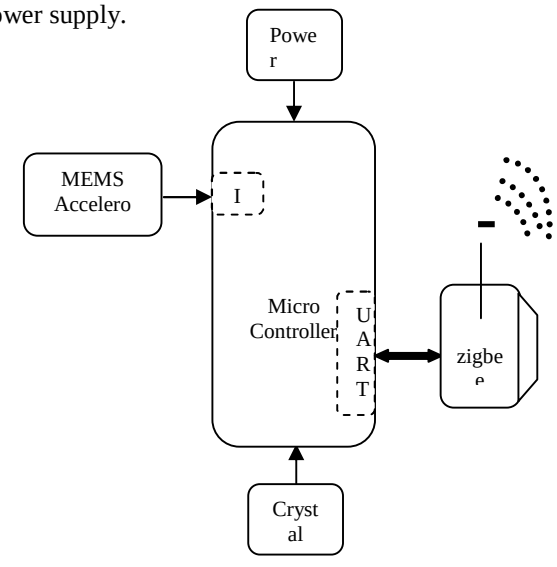

Fig 1 MEMS unit

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The mems accelerometer senses the movement of the head and transfer the data to the microcontroller through I2C port..The crystal oscillator is used to generate the clock pulse. Then the data is serially communicated to zigbee through UART port. The zigbee then, transfers the information to the vehicle unit

B. Vehicle Unit

The information is received by the another zigbee in the vehicle unit which is connected through another microcontroller. And according to the instruction given by the microcontroller in the head sensor unit, the vehicle move in the respective direction

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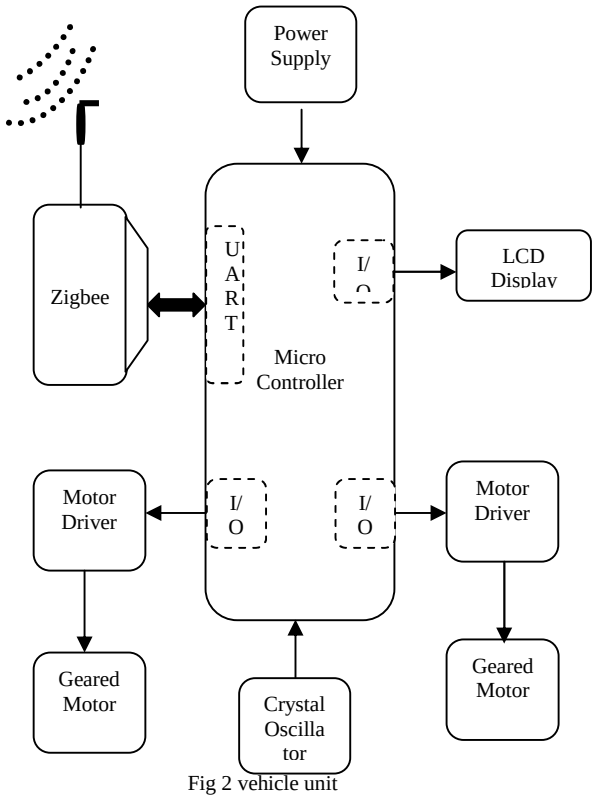

Fig 2 vehicle unit

III. CIRCUIT DIAGRAM

A. Head sensor unit

A 230 V power sopply is given through step down transformer to get 12 V ac. Then it is passed through bridge rectifier to get 12 V dc. To get the pure dc i.e. ripple free, capacitor is used. Then pure dc is obtained. Voltage regulator is used to obtain 5 V dc. This 5 V dc supply is supplied to the pic microcontroller (PIC16F877A) as the microcontroller operates at 5 V. The MEMS accelerometer (LIS302DL) senses the movement of the head and passes the analog signal to the microcontroller. The ADC present in the pic microcontroller converts the analog signal to digital signal. The crystal oscillator is used for generating clock pulse or frequency. The zigbee is having 3 pins i.e. Rx, Tx and ground. The digital pulses from the microcontroller is transferred through UART to zigbee. The zigbee is a full duplex, wireless communicating device used for transmitting and receiving data simultaneously. Zigbee operates at 3.3 V so a voltage regulator is used to convert the voltage from 5 V to 3.3 V. Zigbee of head sensor unit transmits the data to the zigbee of vehicle unit. The different resistors are used to limit the current.

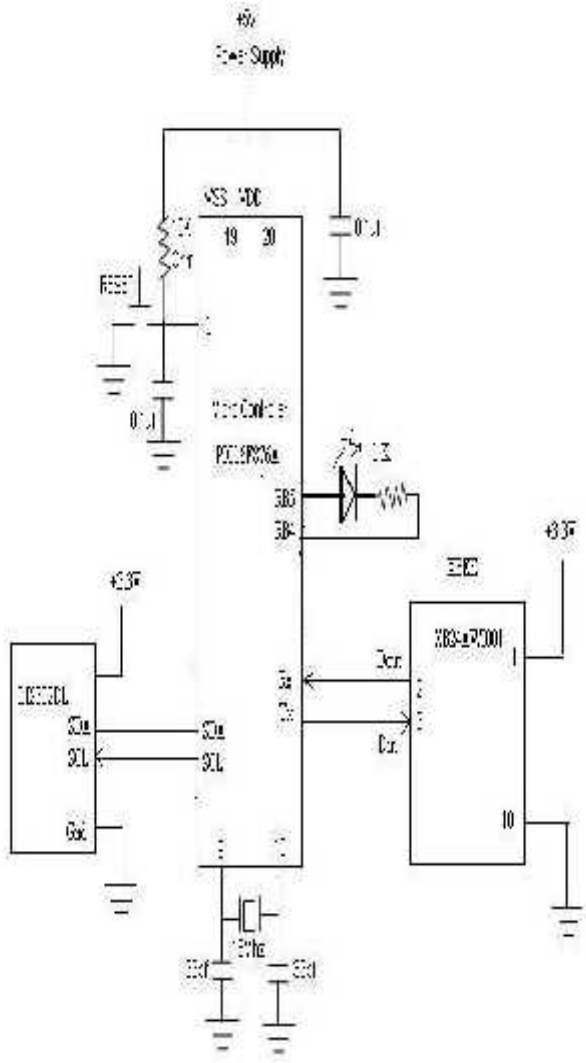

Fig 3 Head sensor unit block diagram

B. Vehicle unit

In the vehicle unit, another power supply is used for microcontroller. The same process took here also to convert 230 v to 5 V. The data is transferred from the zigbee of vehicle unit to the another microcontroller. The microcontroller sent that information to the motor driver (L293D). The motor driver is used to drive the motor which is connected to two motor. The motor driver operates at 6 V which is obtained by using voltage regulator. According to the instruction given by the microcontroller to the motor driver, the motor runs in respective direction.

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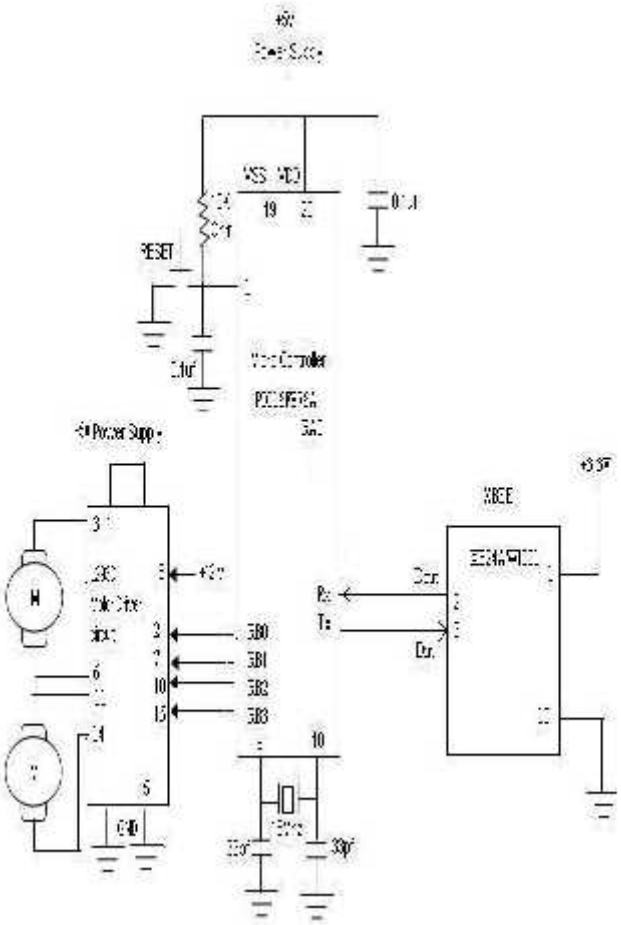

Fig 4 Vehicle unit circuit diagram

.IV. SENSOR DESCRIPTION

The sensor used in our project for head movement data collection is a MEMS accelerometer (LIS302DL) which includes a sensing element and an IC interface able to provide the measured acceleration to the external world through I2C/SPI serial interface. The LIS302DL is an ultra compact low-power three axes linear accelerometer. The programming used in our project were implemented and run on a PC. When the sensing system is switched on, the accelerations in three perpendicular directions are detected by the MEMS sensors and transmitted to a PC via Bluetooth protocol. The gesture motion data then go through a different program coding which automatically identifies the start and end of each gesture and according to that the instruction will be sent to the microcontroller.

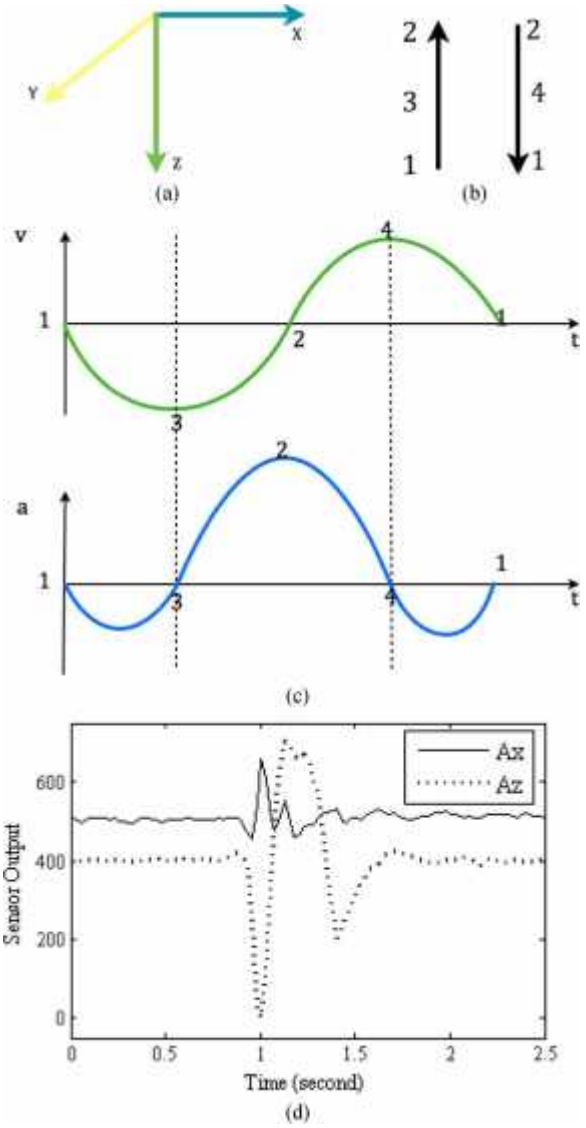

Fig 5 MEMS output waveform

V. CONCLUSION

This paper describes a gesture recognition car system using MEMS accelerometers for a physically challenged person. A program is implemented in the microcontroller and according to the gesture movement, the gesture code is compared with the stored program. And after that the instruction is sent to the microcontroller of the vehicle unit. Thus the vehicle moves in the respective direction.

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