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MULTIPROGRAMABLE IOT BASED AUTO WHEELCHAIR FOR DISABLED

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ABSTRACT*:* The main idea is to implement a gesture-based wireless smart device that allows the movement of the patient depending on the hand movements. The patient sitting on the chair assembly can move in three directions i.e. left, right, and straight just by little moments of hand. In addition to that, the chair will also be able to detect the barriers or obstacles coming on the way with the help of ultrasonic sensors. Also, we add GPS tracking and send message to close ones in an emergency. This model presents the design, development, and implementation of a Hand moment to control the wireless wheelchair based on gesture which is simple in design, reliable in terms of feasibility.

Key Terms – Ultrasonic sensor, Health monitoring system, GPS tracking, Arduino IDE and Accelerometer.

I. INTRODUCTION

Human beings always have the intention to control every incident occurring around them so that they can lead a comfortable life. Many inventions happened due to this instinct of mankind. Controlling some things is also a need of human life. In day-to-day life, man has to do certain basic things that need control over their body or specific body parts. In general, to move from a place to another we must have control over our bodies. The so-called handicapped people of the world do not have control over all of their body parts. But some persons are so severely paralyzed that they cannot move on their own. Science and technology have been evolving regularly. In this modern era, the world is becoming smart with the rapid development of science and technology. Smart Houses, smart cars, smart technologies make life simpler and quicker than it has been in decades. Yet there are growing classes of people who are unable to benefit from new technology advances because of their disability. Particularly disabled people with limited mobility are still living miserable life. A smart wheelchair is a new tool designed to enhance the life of disabled people. Application of artificial intelligence in a wheelchair to the controller a system where the DC motor is used to move the wheelchair. Nowadays, handicapped people face problems controlling wheelchairs by themselves. This paper will provide a new way to control the movement of a wheelchair as this paper includes the wheelchair that can control by using Hand Gesture, GPS tracking, Emergency messages, object detection, health monitoring. Also, it checks the body conditions of the user and according to unnecessary changes in his heart and brain conditions and informs it any changes happen so, this proposed product will be very effective for them. Moreover, according to WHO there are almost 650 million people or more who are solely physically challenged. Among these, around 70 million are in India. Besides, various reports also show that there is a strong relationship between the age of the person and the level of handicap, the latter being commoner in persons of advanced age. Given the growth in life expectancy in the world, a large part of its population will experience functional problems. People suffering from such miserable condition and living a cursed life in this advanced technological century. Science & technology must provide them with a better quality of life by making them able to move without others' help.

II. METHODOLOGY

Accelerometer (ADXL335):
This is a complete 3-axis acceleration measurement system, and also it has a measurement range of ±3 g minimum. It contains a polysilicon surface-micro sensor and signals conditioning circuitry to implement open-loop acceleration measurement architecture.
The output signals are analog voltages that are directly proportional to acceleration, and the accelerometer can measure the static acceleration of gravity in applications to sense the tilt as well as dynamic acceleration resulting from motion.

Wi-Fi (esp826): It is a self-contained SoC with an integrated TC/IP protocol stack that can give access to a Wi-Fi network. One of the useful features of Uno Wi-Fi is support

for OTA programming, either for the transfer of Arduino sketches or Wi-Fi firmware.

IR Sensor: An Infrared sensor is an electronic device that can radiate infrared rays. It can be used to sense some aspects of its surroundings. In our system, we have used this module to detect the object around it. If there is any object in front of the wheelchair, the wheelchair automatically stops.

GSM GPS Module: For emergency message system. If accidentally, a person falls from a chair using this function person can send a help message to friends.

III. PROPOSED SYSTEM

The proposed method is controlling the wheelchair by hand movement using Arduino Gyroscope. Hand movement controlled wheelchair is to enable the complexly paralyzed patient to make their life more accessible and to provide them opportunities for independence and movement. However, to steer own wheelchair through a conventional joystick is difficult for people who experience total paralysis in all four limbs, such as muscular dystrophy, spinal cord injury, amyotrophic lateral sclerosis, etc. The idea of gyroscope control is of great use to not only the future of natural input but more importantly the handicapped and disabled. People who are not able to walk and are using wheelchairs expert great amounts of energy using physical strength to turn a steer the wheels of the chair. With tilting hand Bering their guide, the disabled would save being their guide, the disabled would save energy. To design a system that detects and senses input given by hand we use a code which is used forgives the commands according to the gesture controller. The signals pass the motor driver to associate with the wheelchair itself. The motor driver will control both the speed and direction to enable the wheelchair to move forward, back, and left.
Accelerometer (ADXL335) is used to measure 3-axis acceleration measurements, Then the different positions will be used for the different motions for a wheelchair. Like the motion of the wheelchair left, right, and forward. The result of the accelerometer can measure the static acceleration of gravity which senses the tilt applications as well as a dynamic acceleration. The principle behind this prototype is based on Arduino gyroscope movement technology. The need to design this application is specifically for physically paralyzed people. Code in embedded systems is quite a faster rate in the Arduino environment. An embedded system-based Arduino module will be very efficient to overcome the requirement. We decided to use an emergency message system for accidental points of view and a health monitoring system for continuously monitoring blood pressure, heartbeat, and body temperature of disabled persons. For simplicity and to make a prototype, we are going to design a small, motorized, wooden platform and we will attach the IR sensor for obstacle detection on the chair. We will use Wi-Fi and GPS modules to share the location of disabled persons with friends and family.

There are two major components of the system design. Standpoint –

a) Gesture Controller.
b) Emergency Message.
c) Health Monitoring.
d) Obstacle Detection.

IV. SYSTEM ARCHITECTURE

The proposed model is controlled by hand moments by using gestures, other than this we include some anther features too. To perform daily their life activities without others' help.

1. Health Monitoring System: It monitors the health of a person and shows it on the screen. Which include oxygen level, heart rate, and temperature.
2. Object Detection: It detects objects the object in the path on both the front and backside of the wheelchair by using IR sensors to avoid a collision.
3. GPS Tracking: GPS tracking is used in this model to the security of wheelchairs and people and shows the current location on mobile.
4. Gesture controller: The navigation of the chair is controlled by hand gesture moments.
5. Emergency Message: It shares a current location of a user to preregistered mobile of close ones.

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