Gesture Controlled Robotic Wheelchair

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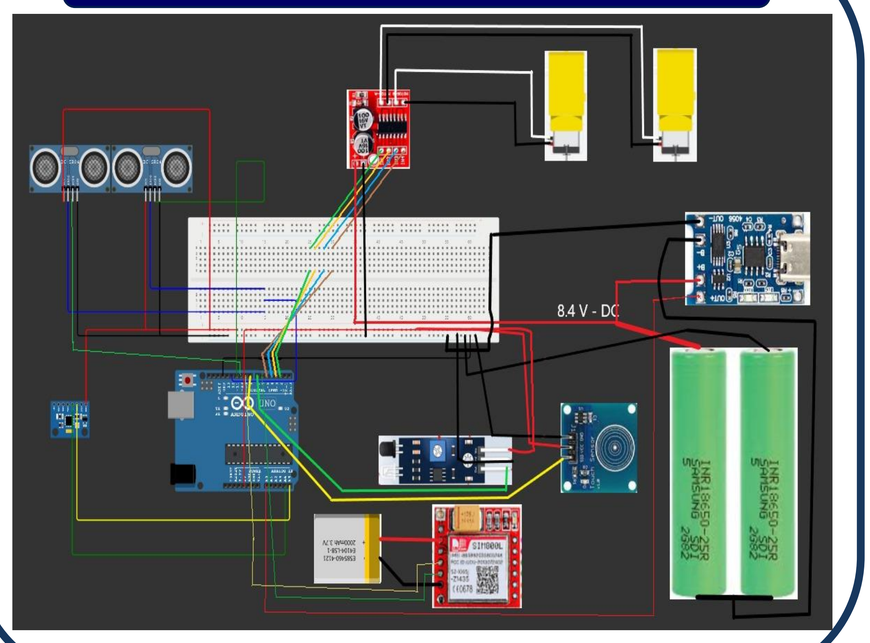
INTRODUCTION

Aging brings many dysfunctions of body parts along with mobility decline. About one-third of the group over 65 years often fall every year and get injured. With this growing number of aging population, disabled, and severely injured people. This gap is being filled with autonomous robots which provide assistance to them. One solution was given in the form of wheelchairs. Thus it is necessary to design a robotic wheelchair that navigates safely, has an intrinsic fault detection system especially for outdoor environments.

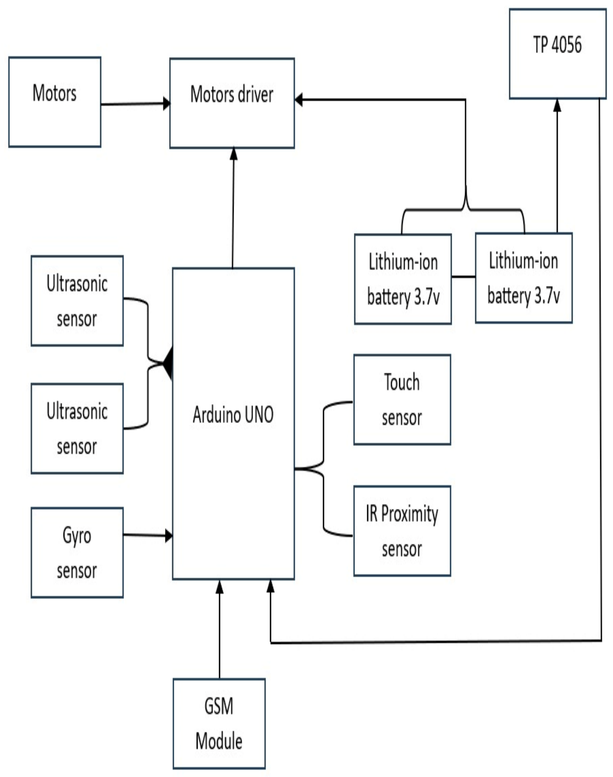
PROBLEM STATEMENT

A number of elderly people and individuals with mobility issues have more difficulty to steer a manual wheelchair. There are many handicapped people with an addition of neuromuscular syndromes which do not allow the user to drive a one even with a remote controller or a joystick. Existing technologies also include brain controlled wheelchair and head motion sensing but it's difficult for brain to differentiate numerous thoughts to focus on movement for controlling a brain controlled wheelchair, and head motion ones are not viable for the people with neck injuries. Therefore a gesture controlled robotic wheelchair with a gyroscope navigation technique is designed to address the issues encountered by such individuals.

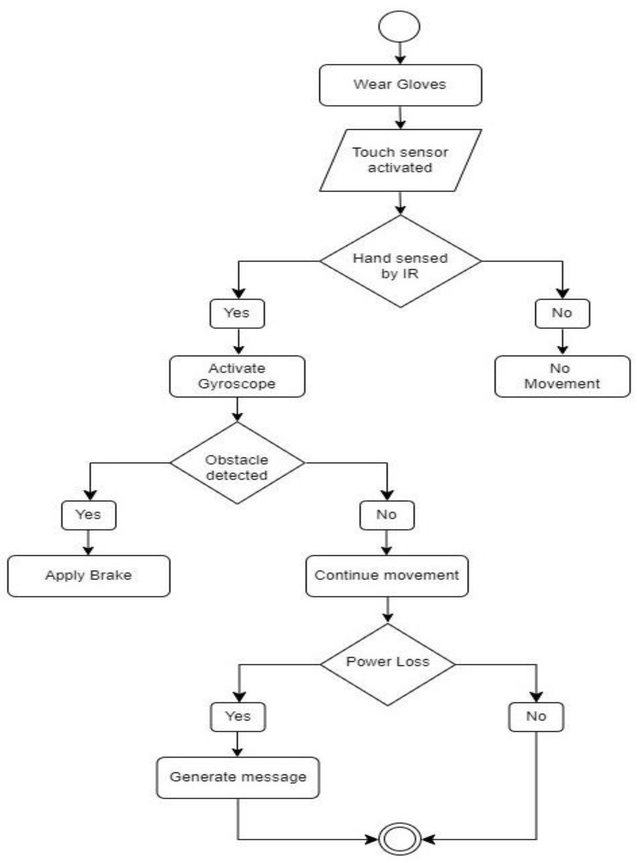
SYSTEM DESIGN



BLOCK DIAGRAM OF THE SYSTEM



METHODOLOGY



CONCLUSION

Upon thorough research, it is concluded that the designed system operates at very low human efforts as compared to the manual one which costs high human intervention and resources. . Its seamless integration of cutting-edge hardware components, including the gyroscope sensor, IR sensors, ultrasonic sensors, and GSM module, not only reduces the physical wrench on users but also improves their overall quality of life. Substituting traditional joystick controls to automatic hand gestures recognition provides a new sense of autonomy empowering users, lessening the burden of care givers and encouraging independence.

AIM AND OBJECTIVES

The main aim of this project is to develop a cost-effective prototype of an autonomous wheelchair to transform the traditional wheelchairs. The primary objectives are:

- To develop a wheelchair prototype that can be controlled using a gyroscope sensor.
- To implement IR sensors to limit the movement when necessary.
- To incorporate obstacle sensing and avoidance.
- To integrate GSM module for message generation.

SCOPE OF PROJECT

This system takes one step in the right direction to fulfill the demand of improved mobility solution by proposing an automated wheelchair integrated with gyroscope sensor. The basic idea behind this innovative initiative is to give people suffering from muscular dystrophy or Spinal Cord Injury (SCI), a kind of control and independence by utilizing small hand movements that do not need much muscle effort.

FUTURE RECOMMENDATIONS

Some future work recommendations are given as follows:

1. Inclusion of more safety measures that can give a profound look to the designed system such as fall detection.
2. Backup power supply for any emergency or when the power loss occurs.
3. Powerful motors for safe lifting of the wheelchair at inclined surface.
4. GPS for the remote tracking of the wheelchair by the guardian.

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