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Smart Wheel Chair

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Abstract: *In this paper a smart wheel chair has been proposed. The existing wheel chairs in use either makes the physically challenged person dependent on someone or has to use his own physical strength to move. The main purpose of this paper is to make physically challenged peoples life easy. With the proposed system user can control his movement on wheel chair with an android application without anybody's help. User can control his movement using voice recognition technique. User can either use sound or can use buttons to give input, with this even people with difficulty in moving hands and the people with speech impairment can use the system. With the proposed system user can be informed about the hurdles in his path and the hurdles are sensed by sensors. Collision with objects and accidents will be avoided with the proposed smart wheel chair, thus providing security to the disabled person.*

Keywords: *Android application, Bluetooth, DC Motor, IR Sensor, Micro controller*

I. Introduction

Technology has reached all its heights. With new inventions people's life has become more sophisticated. With the help of technology we can provide a helping hand to disabled people by creating a smart wheel chair that is cost efficient and easy to use. To help all disabled people a smart wheel chair is proposed. This system can be used with the existing wheel chair thereby making it affordable to all kind of people. The main component is android mobile device, where navigation control and speech recognition is possible with android application installed in it. This system is very easy to use as it uses voice recognition technique. Android application is connected to smart wheel chair using Bluetooth. Users' commands are sent from application via Bluetooth to Bluetooth of wheel chair. This system will be a great help for the disabled community all over the world by making them independent.

II. Objectives

- To provide easy movement for physically challenged people.
- To control a system with voice recognition system using android app. To help movement in and out of house without any network restriction.

III. Literature Review

Physically challenged people face a lot of problems in their life. It is mostly seen that this kind of people depend on others for mobility. A wide population among them belongs to poor economic background; hardly have they money to appoint home nurse to help them in their day to day activities. Most of the disabled people are not able to get the facilities and privileges provided to them by government reason being they have to go and apply for these facilities, but travelling is the main issue faced by them. With introduction of smart wheel chair their life would be easy, they can travel anywhere, and with sophisticated infrastructure they can travel anywhere.

IV. Design Overview

The proposed system consists of two parts. First interaction of user with the android application. To work with the system Bluetooth must be on first. The user uses his voice to give commands which are recognized by voice recognition technology of android application. Bluetooth of mobile device firstly pairs with the Bluetooth of wheel chair, and then user's voice command is converted to string and passed to Bluetooth of microcontroller. Second part of the system is the interaction of microcontrollers, Bluetooth, Dc motor and alarm. The wheel chairs system will have power controller, microcontroller, Dc motor and sensors which process the commands and help navigation of wheel chair.

Navigation can happen in following direction

Left

Right

Forward
Backward

User can also stop the movement of wheel chair by sending stop command. When the command sent from user doesn't match with the instructions already stored in microcontroller no action is performed that means no more actions except movement in left, right, top, bottom and stop will work.

V. System Requirements

5.1 ANDROID APPLICATION

Android application takes input from user. It provides interface to send voice of user. It will have recording functionality to take inputs from user and predefined voice messages to notify user about hurdles in path.

5.2 BLUETOOTH

It is the main communication channel between the android application and the system. Bluetooth in the phone pairs with Bluetooth in the wheel chair to send commands. Once pairing occurs, connection is established between the Bluetooth devices.

5.3 MICRO-CONTROLLER

It reads input from the system, turns on alarm and notification from sensor. It is also linked with power controller.

5.4 DC MOTOR

Movement of wheel chair happens when the dc motor starts its work. Conversion of electrical energy to mechanical energy is done with help of this motor.

5.5 IR SENSORS

Sensors are used to detect obstacles in the path the user is travelling. In this system two sensors are used to avoid collision and are assembled in back and in front of wheel chair.

5.6 ALARM:

It helps to inform user about the obstacles in the path so that user can change his path and avoid accidents.

5.7 MOTORS AND WHEELS

The system will have two motors-left and right, at both sides of wheel chair that will move in the direction specified by the driver of the system.

5.8 BATTERY

The necessary power supply required for the movement is supplied by the battery which is interfaced with microcontroller.

VI. Diagramatic Representation Of System

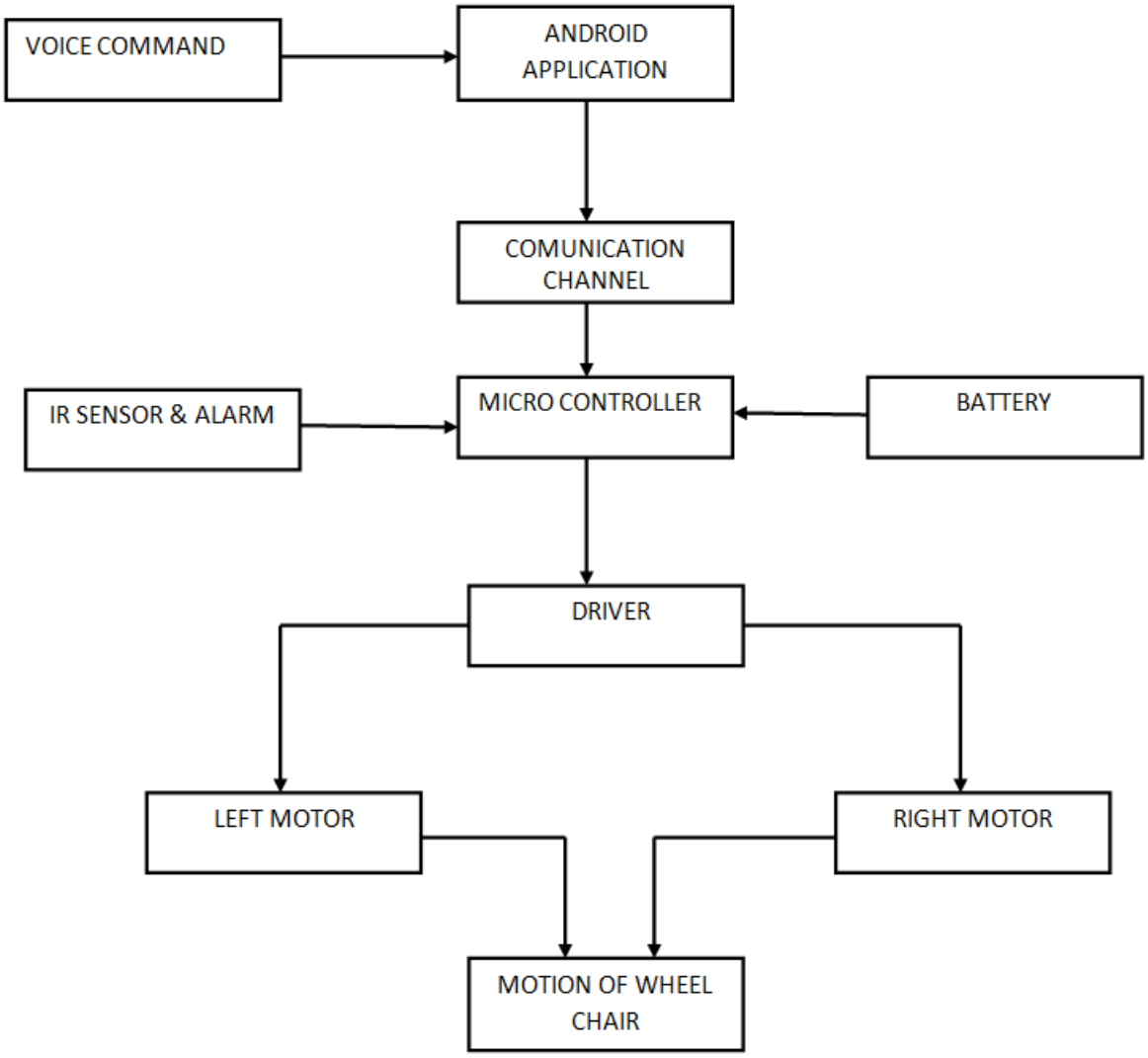

Fig. 2: Architecture of the system

VII. Working

Interaction with the system is done with android application. User will give input with voice recognition technique. User will also have the facility to click on buttons provided by GUI application rather than giving input by sound. According to the input Bluetooth sends commands to the Bluetooth of wheel chair based on sound or button click. Bluetooth of wheel chair further sends signal to the microcontroller in the wheel chair. Microcontroller will be supported by power controller and IR sensors. Power controller provides the necessary power supply needed for microcontroller and motor to work with the help of battery. IR Sensor senses the hurdles in the path. To detect hurdles or obstacles two IR sensors are used in the system which are assembled in front and back of wheel chair. The sensor check for obstacles in the path user is travelling with help of its inbuilt mechanism. If sensor detects hurdles it sends signal to microcontroller. As soon as microcontroller is notified by sensor it rings alarm which is interfaced to it. According to the command the motor makes movement in the specified direction.

VIII. Conclusion

Dependency on others will be highly reduced with this project implementation. It requires very less human intervention as the system is completely automated. The system is very easy to use and helps people for easy mobility. The system is cost efficient and affordable. Reason being this wheelchair can be easily mounted on existing wheel chair there by making it beneficial for all kind of disabled people. The major advantage is that it doesn't have any network restriction, as the system uses simple android application and Bluetooth technology. It can be used inside home as well as outside efficiently. People with all most all kind of disability

can use this wheel chair. This system will be a great help for disabled people in their day to day activities. This can also be used in hospitals where there are less number of ward boys and nurses to provide services thereby increasing accessing to medical facilities to patients. With new infrastructures, there are already facilities for handicapped people to move in buildings, malls etc so this systems usage will help handicapped people to travel theses places without any dependence on others.

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