

Multipurpose Wireless Robot for Physically Challenged People

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Abstract—The main purpose of this project is to help for aging persons and physically challenged people. The objective is to reduce the manpower resource for taking care of seniors and patients. The motivation here is to increase the time Efficiency by the design of an intelligent vehicle that can perform tracking, obstacle avoidance, remote control and to grab the objects with the help of digital camera used to capture the video and send by transmitter of camera attached on the robot through continuous video streaming concept. The communication between robot and laptop is done with zigbee module.

Index Terms— Microcontroller, zigbee, DC motor, wireless camera. (*Keywords*)

I. INTRODUCTION

The major problem faced during the aging period is inability to move from one place to another place and the laziness to pick up the small objects. Nowadays everything had became automation, so by introducing the multipurpose robot which can be operated either through remote control or tracking mode helps the patient's to save his energy. In addition users can switch to manual remote control mode according to the actual situation. With the development of science and technology like computer technology, automation technology, wireless technology and sensor technology it is easy to build an intelligent robot to do the multipurpose functions. This reduces the requirement of nurses who are all working for the aged people and this type of vehicle can be implemented in hospitals and nursing homes.

II. PROPOSED SYSTEM

In the proposed system totally eight motors have been interfaced to PIC microcontroller through the driver motor ULN2003. The input to the robot is given from the laptop by creating a visual basic screen. (figure1: illustrates the proposed system block diagram). The communication between the robot and laptop is done with the zigbee module CC2500. A camera is embedded in the robot to get the continuous video which is been transferred through the wireless medium and the receiver will be interfaced to the laptop, where we can get the output video.

III. PIC MICROCONTROLLER

The PIC16F877A is 8 bit micro controller, which is been used for this multipurpose robot for doing pick and place of an object. The PORT B is used for controlling the movement of the robot. PORT C and PORT D are used for controlling the arm of the robot. UART of the PIC microcontroller is initialized for serial communication. The instructions which are being sent from the laptop to the PIC micro controller is done through the ZIGBEE module CC2500 serially. The serial values will be received by the PIC controller and runs the motor according to the program written to control the eight motors of the robot.

IV. Block diagram

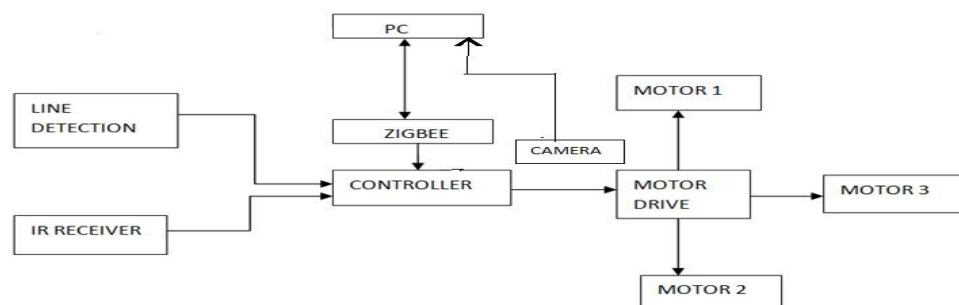


Figure 1: Block diagram

The working of block diagram is the sensors which are attached in front of the robot will give the values to the PIC microcontroller. If the values received from sensors the controller commands the motor driver and it drives according to the user written program. The camera with transmitter will send the videos and it is tuned up to get the exact video in laptop. Zigbee module will act as bridge between wireless connection pc and controller. An input screen is made with the help of visual basic to give our input.

V. DC motor

The project uses DC motor and it can hold any position from 0 to 180 degree. It accepts four mounting screw. The communication is through the driver motor ULN2003. The purpose of the DC motor in the project is to monitor a vast area in a quick manner. By using two different DC motors of various rpm the robot can be controlled in a perfect manner. The motors used in the wheels are 160 Rpm that makes the robot to perform fast movements and it needs a supply of 12v. The arm of the robot consists of 9v DC motor and the Rpm of it is 60 which can be used to lift up the objects slowly and to avoid accidents.

VI. ZIGBEE MODULE CC2500

The zigbee module consists of two transceivers. First transceiver is interfaced with the laptop and second transceiver is interfaced with the PIC controller which is presented in the robot. The TX and RX pins are connected to the 25th and 26th pin of the controller to get the inputs from user. It operates with 5v and the range of zigbee module is 250 meters.

VII. CAMERA

A digital camera is fixed in the robot and it is supported with the inbuilt transmitter. The receiver part will be connected to the laptop to view the streamed video. To get the exact video we have to do tuning in the receiver and software called split cam should be installed with the driver.

VIII. INPUT SCREEN

The figure 3 shows the user created window where he can give his input to the robot to do its operation. The screen is made with the help of visual basic. It sends the data serially to the controller through the zigbee module which is connected to the laptop.

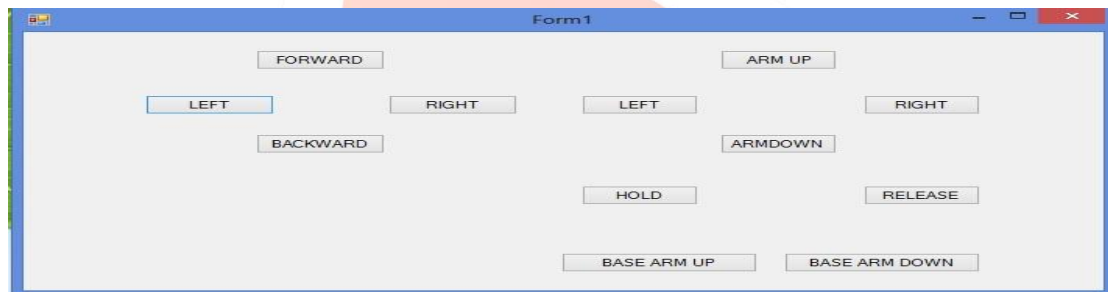


Figure 2: Input screen window

IX. RESULTS



Figure 3: Hardware setup

The figure 3 shows the base arm of the robot which is capable of rotating 360 degrees and the other arm are capable of rotating 180 degrees. The whole set up of the project is shown above in the figure .



Figure 4: Hardware with camera

The above figure 4 shows the robot with its arm and camera attached to it. The sensors like IR are interfaced for obstacle avoidance and tracking the predefined track. The picture shows the holding operation of a screw driver which could be delivered to the user without moving from his own place.

X. CONSULSION & FUTURE ENHANCEMENT

In the proposed system the intelligent vehicle that can perform tracking, obstacle avoidance, remote control and other functions has been introduced for modern medical service industry. This paper presents for the aged people and nursing homes, who are all unable to move from one place to another place easily. This robot can be able to pick up an object whose over all weight will be a maximum of 100grams and the video can be watched in the laptop through video streaming. It proposes a detailed solution for some patients and seniors who cannot walk independently. In future this robot can be implemented with fully automation to make the pick and place object and with advanced obstacle avoidance technique.

REFERENCES

- [1] Mochizuki Tatsuyal, Hayashi Eiji, "Navigation system for a mobile robot using an omni-directional camera," 12th International Symposium on Artificial Life and Robotics, AROB 12th'07, pp. 450-453, 2007
- [2] S. Ahmad, M.O. Tokhi, "Forward and backward motion control of wheelchair on two wheels, " Industrial Electronics and Applications, 2008. ICIEA 2008. 3rd IEEE Conference on, pp. 461 - 466, 01 August 2008
- [3] Sun Shaojie, Qi Xiaohui, "Research on Intelligent Cars Servo Control Algorithm Based on Fuzzy Control, " Microcomputer Applications, 2011.
- [4] Zhaoxia Wang, Yongxin Liu, "Design of road tracing navigation control for smart car use CCD sensor, " E-Health Networking, Digital Ecosystems and Technologies (EDT), 2010 international Conference on, pp. 345 - 348, 28 June 2010.
- [5] www.robopedia.com