

Wi-Fi ROBOT FOR VIDEO MONITORING & SURVEILLANCE SYSTEM

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Abstract— In present days any engineering application invariable uses microcontrollers. The world wide trend is use of micro controllers. A robot is a machine designed to execute one or more tasks repeatedly, with speed and precision. There are as many different types of robots as there are tasks for them to perform. A robot can be controlled by a human operator, sometimes from a great distance. In such type of applications wireless communication is more important. The nature of many of these challenging work environments requires the robotic systems to work fully autonomously in achieving human supplied goals. One approach to designing these autonomous systems is to develop a cost effective robotic system that can accomplish particular goals more reliably in a given environment. This paper presents the Designing the robot with sensory device, Wi-Fi controlling, programming the system to recognize and to track the robot using GPS

1 INTRODUCTION

Robots are being used in variety of industrial applications for various activities like pick and place, painting, assembling of subsystems and in hazardous places for material handling etc.. Robots are becoming more and more intelligent as technology advances in the areas of CPU speed, sensors, memories etc. And there is ever demanding applications even in defense. USA is planning to field robo soldier while Europeans are designing robot to replace farmer to do farming activity, while Japanese wants robo worker for homes and offices.

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In general any kind of robots shall have body movement control with two DC motor and an vision system with camera which acts as electronic eye to the robot, vision is one of main parameter for effective functioning of the robot. Vision is a generic requirement for robots which has large applications across wide industrial and general activities for home and other areas such as agriculture, office etc...

2. Problem Statement & Objectives

The need for implementation of new and advanced technology has motivated research in various embedded based system solutions. Currently, there exist numerous approaches for the advancement in communication protocols which requires

many facilities and costly systems.

All electronics devices that we use today are based on embedded system technology, where the processors of such a system play a very important role. Microcontroller based system are low cost, low power consumption devices. It is cheaper investment when considered for the specific task.

Problem of the work can be stated as "Designing the robot with sensory device, Wi-Fi controlling, programming the system to recognize and to track the robot using GPS"

The main aim is to design and implement Wi-Fi based controlling the robot, with front end wheels help it to take left and right turns and rear end wheels to move forward and reverse. Creating a data base of objects in the environment, by capturing images of the object. Person/ object recognition using Neural Network and tracing the robot using GPS.

3 PROPOSED SYSTEM

It is proposed to develop a robot which can move in autonomous mode as well as to control in remote mode as per the user control for video monitoring and relay to the user. The proposed robot motion will be controlled with PWM techniques using a Microcontroller and Bidirectional DC Bridge for Motor Driving. It is proposed to address the low cost, efficient, high speed processing & control hardware for the self-navigating robotics application.

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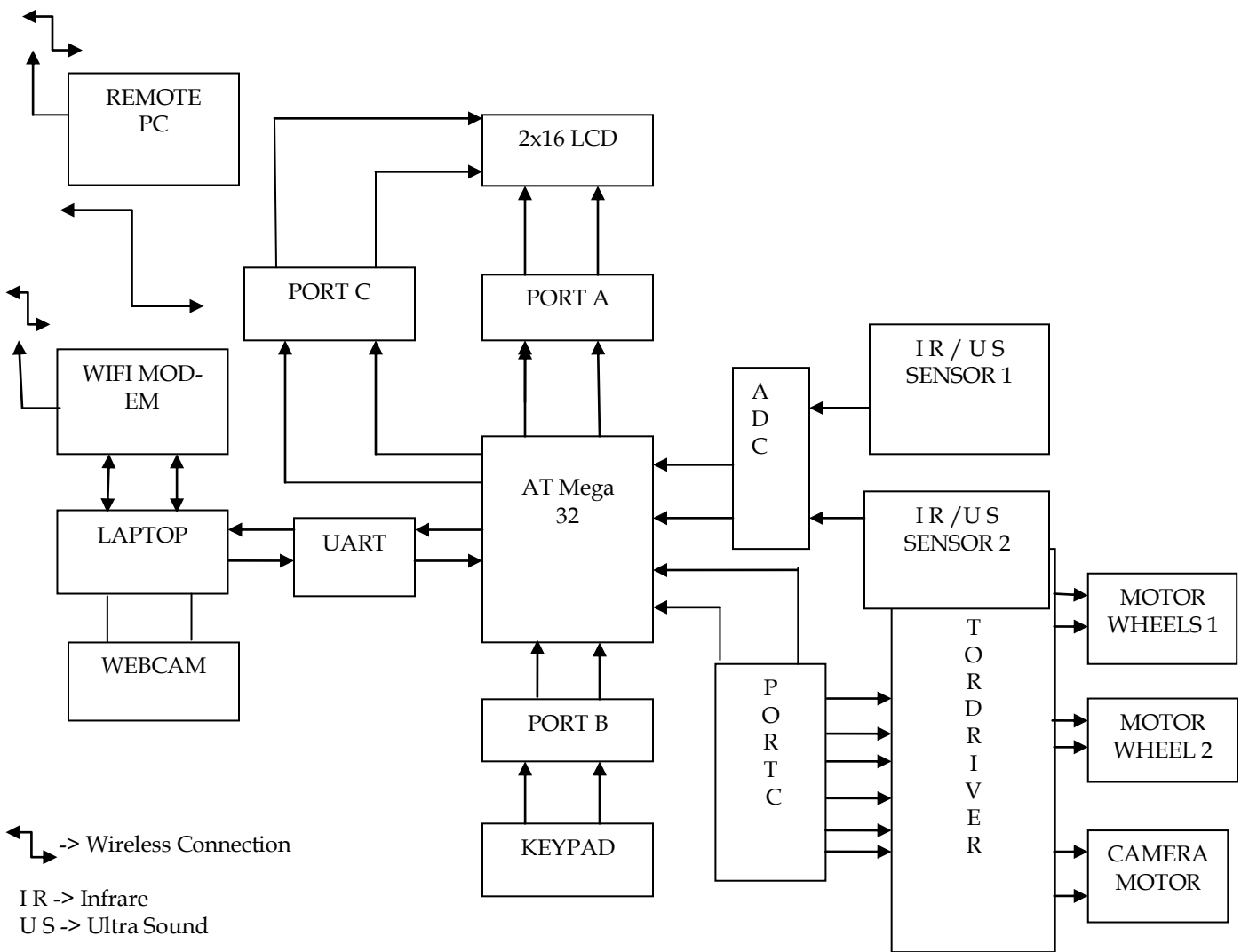


Figure 1 Block Diagram OF Wi-Fi Robot

4 Descriptions

This paper presents the utilizes Wi-Fi that is specification for wireless personal area network (a network for interconnecting the individual's device) in which the device connection are wireless. The Atmega 32 is an 8 bit micro controller with 32 Kb in system programmable flash memory. This microcontroller is interfaced with the help of AVR studio to the system serial port tat used RS323 standards. There is a camera fixed to the robot, which transfer the video to the pc / note pad using wi-fi. The laptop is connected using Rs232 to the micro controller. There are three motor drivers which are connected to the Atmega 32, two dc motor drives are used for wheels and one to the camera. The 2 ir sensors are used in order to sense any object that comes close to it.

4.1 H Bridge for Motor Drive



Figure 2: Structure of an H-bridge (highlighted in red)

An **H-bridge** is an electronic circuit which enables a voltage to be applied across a load in either direction. These circuits are often used in robotics and other applications to allow DC motors to run forwards and backwards. H-bridges are available as integrated circuits, or can be built from discrete components.

The term "H-bridge" is derived from the typical graphical representation of such a circuit. An H-bridge is built with four switches (solid-state or mechanical). When the switches S1 and S4 (according to the first figure) are closed (and S2 and S3 are open) a positive voltage will be applied across the motor. By opening S1 and S4 switches and closing S2 and S3 switches, this voltage is reversed, allowing reverse operation of the motor.

Using the nomenclature above, the switches S1 and S2 should never be closed at the same time, as this would cause a short circuit on the input voltage source. The same applies to the switches S3 and S4. This condition is known as shoot-through.

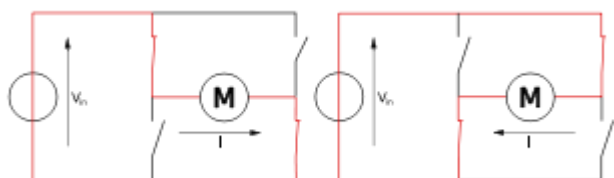


Figure 3: The Two Basic States of an H-bridge

The H-Bridge arrangement is generally used to reverse the polarity of the motor, but can also be used to 'brake' the motor, where the motor comes to a sudden stop, as the motor's terminals are shorted, or to let the motor 'free run' to a stop, as the motor is effectively disconnected from the circuit. The following table summarises operation.

S1 S2 S3 S4 Result

1	0	0	1	Motor moves right
0	1	1	0	Motor moves left
0	0	0	0	Motor free runs
0	1	0	1	Motor brakes
1	0	1	0	Motor brakes

4.2 Interfaces between LCD And ATMEGA

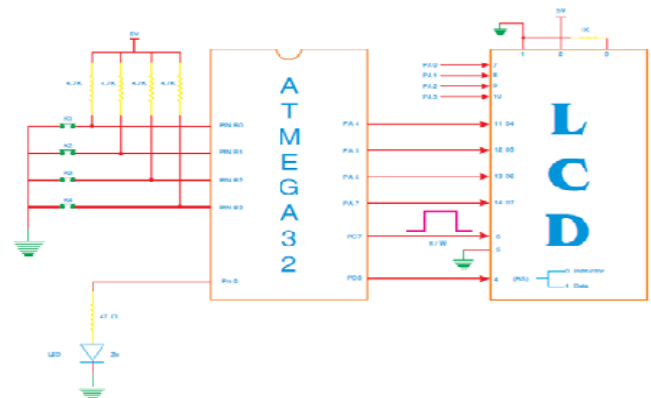


Figure 3 Interfaces between LCD And ATMEGA

The above figure shows how the lcd is connected with ATMEga as well as keyboard with ATMEga. The port B are used for keyboard , 4 keys are used , 4 pins of port A is connecte to LCD 2x16, one pin from port C is connected to LCD

Once this implementation is done, using a LABVIEW version 11 data and client is created to communicate between the robot and the user, person/object reorganization is done with the help of LABVIEW, using a GPS the latitude and longitude could be found out.

5 ADVANTAGES & DISADVANTAGES

- ❖ This robot can be used for defense purpose.
- ❖ This robot could be used as spying robot.
- ❖ This robot could be used in mining fields where humans can't go inside.
- ❖ This robot can also be used in house hold security etc...

- ❖ The size and weight of this robot is more.
- ❖ GPS tracking system works only during clear sky.
- ❖ Signals will be weak in deeper mining regions.

[6] http://www.wpi.edu/Pubs/E-project/Available/E-project-030310-235516/unrestricted/Why_Do_Humans_Imagine_Robots.pdf

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6 Conclusion & Discussion

This paper presents an overview of the design, implementation, testing, and performance of an innovative digital wireless remote control unit, developed for the purpose of directing the movement and operation of a robotic vehicle and displaying status feedback to the operator.

In this paper, we had proposed to design a robot which works wirelessly. The wireless method used here is Wi-Fi, using the Wi-Fi robot is controlled. The robot has a camera which sends the live video to the user, where the user will be using a LABVIEW to monitor the robot, as well as other objectives of this project is fulfilled. I am successful in building the circuit and implementing them on the PCB.

In this paper, we had used ATmega32 micro controller as it has advantages over 8086 micro controller. ATmega32 can perform up to 30 tasks in a single cycle. The camera will capture the picture and send it to the user. For sending and receiving, Wi-Fi is used one of the wireless method. There are 2 Wi-Fi used, one at the user side one more with the robot. The user uses LABVIEW version 11 to observe and control the robot, this v 11 has a image processing technique. There are two sensors used here, this is just to avoid the hitting to wall or any object, if the user fails to see them. There three DC motors used, one for the camera and remaining for the wheels in order to control its moment, for the camera it is used just to rotate it as the user requires. Using GPS tracking system, robot could be traced +/- 50m approximately during the clear sky. Using the object recognition system, the object or face of a person could be recognized, this is done with the help of Lab VIEW.

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