

Hydro Robot

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Abstract: Need for security is growing day to day due to enormous development in the field of technology, but man wants to achieve this security at the minimum cost and minimum risk to human life. This is the factor which has encouraged us to develop this project which can achieve security at minimum risk and cost. Here instead of exposing the soldier to do the hazardous job such as dangerous gas or hostile environment detection we have designed a machine which will do the same job more efficiently. Here a new guaranteed technology of RF transceiver is used to control the robot accordingly to the operator. For Video surveillance application our design offers wireless technology which is flexible, cost- efficient and quick way to deploy, particularly over a large area as in parking lot at a military surveillance application. This idea actually has a lot of chance for further research and development using advance technology. Many more application can be added in this project to monitor more parameter. Similar project have been undertaken by NASA for its other planet missions.

Keywords: Amphibian Robot.

I. INTRODUCTION

In this project we have designed hydro robot which can work on land and also on water simultaneously, it can communicate with the person. Hydro robot can be controlled underwater plus it will sense the desired data and give back the information on land for further processing. In this project eyes is given to robot by fitting a camera and other sensor which will give us the awareness of situation. It is very essential to have a robot during disaster conditions like earthquake or bomb blast live human beings life can be quickly saved. All of these tasks are performed mostly by human and trained dogs, often in very dangerous and risky situations. This is why, these robot have been proposed to help them. Embedded technology predominates as it overcomes the drawbacks of all the existing mechanical and electrical system. An embedded system is housed on a single microcontroller board with the program stored in ROM. Embedded system typically do not interface with the outside world through familiar personal computer devices such as mouse, keyboard and graphic user interface. Instead, they interface with the outside world through unusual interfaces such as sensors, actuators and specialized communication link.

II. BASIC WORKING

Hydro robot is controlled wirelessly by RF remote. On land hydro robot will be in the motor mode and on water it will be in pump mode. To change the mode we are using water sensor basically water sensor has two electrodes which are used for sensing the water to get the hydro robot in pump mode. When robot is on water the electrodes of water sensor are short circuited and pump get started. When switch of remote pressed the transmitter send signals. Then receiver received the signals and forwards it to microcontroller. Microcontroller process these incoming data and send controlling signal to relays which drives motors and pumps. The wireless camera is used in robot which can be rotates from top to bottom.

The image captured from camera will be displayed on the TV monitor.



Fig 1: remote diagram.

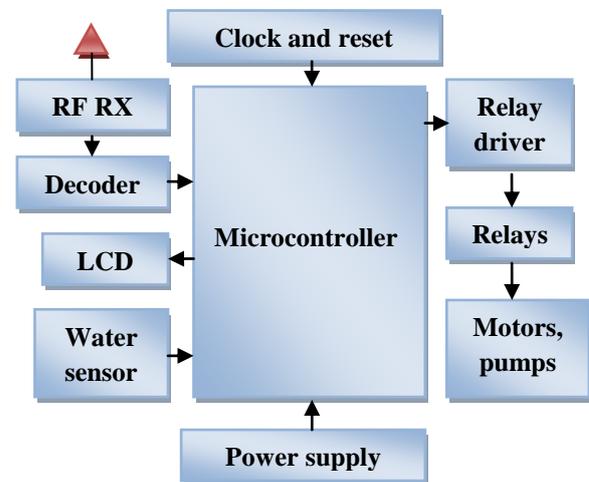


Fig. 2: Block Diagram

III. HARDWARE OVERVIEW

1. 89s51 MICROCONTROLLER

The AT89S51 is a low-power, high-performance CMOS 8-bit microcontroller with 4K bytes of In-System Programmable Flash memory. The device is manufactured using Atmel's high-density nonvolatile memory technology and is compatible with the industry-standard 80C51 instruction set and pinout. The on-chip Flash allows the program memory to be reprogrammed in-system or by a conventional nonvolatile memory programmer.



Fig 3: AT89s51 Microcontroller

By combining a versatile 8-bit CPU with In-System Programmable Flash on a monolithic chip, the Atmel AT89S51 is a powerful microcontroller which provides a highly-flexible and cost-effective solution to many embedded control applications. The AT89S51 provides the following standard features: 4K bytes of Flash, 128 bytes of RAM, 32 I/O lines, Watchdog timer, two data pointers, two 16-bit timer/counters, a five vector two-level interrupt architecture, a full duplex serial port, on-chip oscillator, and clock circuitry. In addition, the AT89S51 is designed with static logic for operation down to zero frequency and supports two software selectable power saving modes. The Idle Mode stops the CPU while allowing the RAM, timer/counters, serial port, and interrupt system to continue functioning. The Power-down mode saves the RAM contents but freezes the oscillator, disabling all other chip functions until the next external interrupt or hardware reset.

2. RELAY



Fig 4: 12V Relay.

A relay is an electrically operated switch. Many relays use an electromagnet to mechanically operate a switch, but other operating principles are also used, such as solid-state relays. Relays are used where it is necessary to control a circuit by a low-power signal (with complete electrical isolation between control and controlled circuits), or where several circuits must be controlled by one signal. A type of relay that can handle the high power required to directly control an electric motor or other loads is called

a contactor. Solid-state relays control power circuits with no moving parts, instead using a semiconductor device to perform switching. Relays with calibrated operating characteristics and sometimes multiple operating coils are used to protect electrical circuits from overload or faults; in modern electric power systems these functions are performed by digital instruments still called "protective relays".

3. 16x2 Alphanumeric LCD display



Fig 5: 16x2 LCD display

LCD (Liquid Crystal Display) screen is an electronic display module and find a wide range of applications. A 16x2 LCD display is very basic module and is very commonly used in various devices and circuits. These modules are preferred over seven segments and other multi segment LEDs. The reasons being: LCDs are economical; easily programmable; have no limitation of displaying special & even custom characters (unlike in seven segments), animations and so on. A 16x2 LCD means it can display 16 characters per line and there are 2 such lines. In this LCD each character is displayed in 5x7 pixel matrix. This LCD has two registers, namely, Command and Data. The command register stores the command instructions given to the LCD. A command is an instruction given to LCD to do a predefined task like initializing it, clearing its screen, setting the cursor position, controlling display etc. The data register stores the data to be displayed on the LCD. The data is the ASCII value of the character to be displayed on the LCD.

4. WATER SENSOR

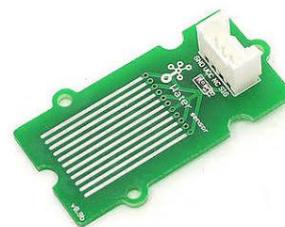


Fig 6: water sensor.

Water Sensor provides highly accurate water level measurement for a wide variety of applications, including those in severe environments. The features of water sensor is Compact, rugged design for easy installation, Minimum maintenance and care. It contains two electrodes when robot enters on water these electrodes are short circuited then processor select the pump mode.

5. WIRELESS CAMERA

Super mini wireless camera and wireless receiver set for wireless transmission and receiving of video.



Fig 7: wireless camera.

This is a great low priced option for convert surveillance and security, as well as with a little modding, an excellent choice for sending video direct form your model RC as it is being used. It features an excellent wireless transmission range, broadcast on 1.2GHz to avoid interference, and a receiver with video OUT so it can easily and quickly be set up with a TV for viewing the image from the camera as they are being sent. This product used the PAL colour system.

6. ULN2803 IC

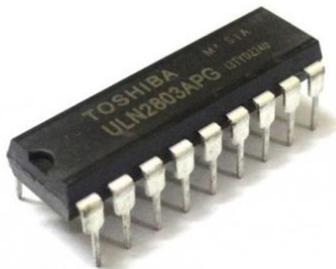


Fig 8: ULN2803 IC.

The eight NPN Darlington connected transistors in this family of arrays are ideally suited for interfacing between low logic level digital circuitry (such as TTL, CMOS or PMOS/NMOS) and the higher current/voltage requirements of lamps, relays, printer hammers or other similar loads for a broad range of computer, industrial, and consumer applications. All devices feature open-collector outputs and freewheeling clamp diodes for transient suppression. The ULN2803 is designed to be compatible with standard TTL families while the ULN2804 is optimized for 6 to 15 volt high level CMOS or PMOS.

IV. CONCLUSION

This paper's objective is to implement a hydro robot for exploration of application of automation and robotics to minimize the risk of disasters. Frequency around the world and their impact in terms of humans, structural and economic losses can be reduced. The goal of this paper was to provide a sensor suite for human detection and increase its security within its own territory.

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REFERENCES

- [1] M. Likhachev and D. Ferguson. Planning long dynamically feasible maneuvers for autonomous vehicles. *Int. Journal of Robotics Research*, 28(8):933–945, 2009.
- [2] Relay circuits and devices Available: <https://en.wikipedia.org/wiki/Relay>
- [3] Alphanumeric 16x2 LCD display Available: <http://www.engineersgarage.com/electroniccomponents/16x2-lcd-module-datasheet>
- [4] Evolution Robotics, ERI Personal Robot Datasheet. Available: <http://www.evolution.com/er1>
- [5] V.V.D. Bergh, et al., "New assessment modes within project-based education the stakeholders," *Studies in Educational Evaluation*, pp. 345-368, 32, 2006.