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UNDERWATER METAL DETECTING ROBOT USING WIRELESS COMMUNICATION

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ABSTRACT
In recent trends the robots are working in many vast applications. This paper concept will increase and enhance monitoring function done by the robot. The robot is going under the water which uses wireless communication system. Here we use ZigBee communication to communicate with under water robot. In that ZigBee communication, the data will be transmitted and also received from the robot. Data will be provided to the ARM controller first, after depending upon the commands, the robot will be operated. Commands are used to specify the operation such as moving forward, moving left, moving right, up & down, or current position. Basically the ZigBee communication system is the simple and having advanced communication unit. The receiver and transmitter pins of ZigBee are connected to transmitter and also to the receiver of ARM controller respectively. Main application of this robot is under water metal detection which also measuring two parameters of water one is its pH & second is temperature.

KEY WORDS: ARM7 LPC2138 Microcontroller, Zigbee, Temperature Sensor (LM35), Metal Detector, Camera (Wireless Digital camera) DC Motors.

INTRODUCTION

For robot mobility action under the water wireless communication is efficient. Once a communication is occurs then we can easily operate underwater robot. In this paper robot is going to control under the water using ZigBee wireless communication system. Here the robot will be operated on the water to detect underwater metal resources. Underwater wireless communication can enable many civilian and military applications such as oceanographic data collection. Which consist of devices with sensing, processing, and communication capabilities that are deployed to perform monitoring tasks. To make underwater applications efficient.

1.1PROBLEM STATEMENT

The problem statement of underwater robot using wireless communication is used for Metal detection purpose, to check quality of water, To sense the temperature of water, For sensing the pH value of water

LITERATURE SURVEY

1)Authors: Suraj rathod, Dagade Megha, Nakhate Mayur,Lokare Supriya
Paper name: Wireless under water metal detector robot
In this paper, methodology used is Using ARM controller and Zigbee wireless communication. In this paper sensors are interfaced to ARM controller and zigbee is used for wireless communication.

2)Authors: D. sparsha, G. vandana
Paper name: Remote controlled metal detecting robot
In this paper, methodology used is using remote image transmission. Wireless camera is used to capture images. this robot is controlled in remote areas.
3) Author: Sejal jaiswal
Paper name: Underwater wireless communication
In this paper, methodology used is Electromagnetic wave for wireless communication.for transmitting and receiving data electromagnetic waves are used for wireless communication.
4) Authors: J Batlle, P. Ridao, R. Garcia
Paper name: Underwater Robotic intelligent system
In this paper, methodology used is Using instruction via acoustic links.here acoustic links are used for fast underwater wireless communication.
5) Author: Aubrey Lee Kozak
Paper name: Underwater metal detection
In this paper methodology used is, Video image processing.
This paper is used for taking underwater video surveillance.

BLOCK DIAGRAM

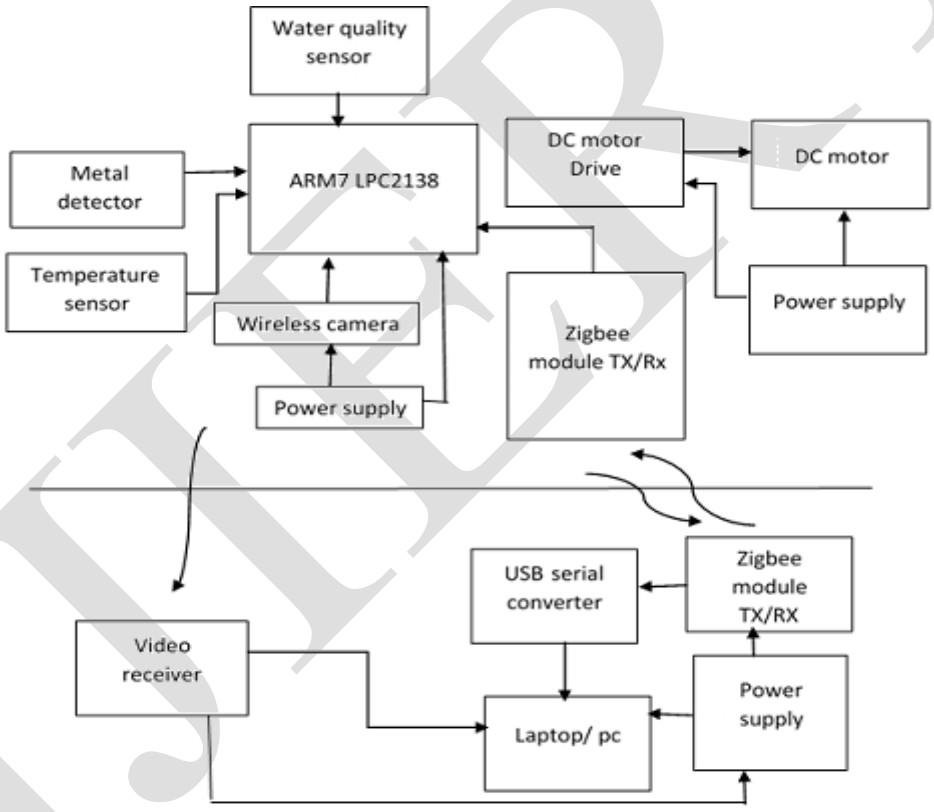


Fig -1: block diagram

3.1WORKING

As selected ARM7 LPC2138 micro-controllers for operating all the blocks to operate Robot under the water. Using multiple sensors taking different parameters from water.ph sensor is used to test ph of water by which we can differentiate between acidic water or neutral water or basic water. Metal detector for detect metal under the water. It also performs detection operation of shipwrecks. Temperature sensor is used to sense the temperature of water. Camera is used to take the live video under the water by which we can move our robot without crashing. Also we can see multiple insects, sharks and fishes and multiple habitats in the water. Motors are used to move robot in multiple directions. All this data is taken and transmitted via ZigBee transmitter to ZigBee receiver. zigbee receiver is connected to the PC which is placed outside the water. PC receives all the information and it displays this data to user.

BLOCK DIAGRAM DESCRIPTION

4.1 METAL DETECTOR

A metal detector detects the presence of metal nearby. A metal detector is an electronic instrument. Metal detectors are useful for finding metal. They consist of a handheld unit with a sensor probe. a metal detector consist of an oscillator. Oscillator produces an alternating current that passes through a coil, which producing an alternating magnetic field. eddy currents will be induced in the metal, If a piece of electrically conductive metal is close to the coil and this produces a magnetic field of its own. The change in the magnetic field due to the metallic object can be detected, If another coil is used to measure the magnetic field.

4.2 ZIGBEE MODULE

ZigBee is a low-cost. It is a low-power. ZigBee operates in the industrial band. It also operates in scientific band and in medical band that is (ISM) radio band. 2.4 GHz worldwide,784 MHz in China, 868 MHz in Europe and 915 MHz in the USA and Australia. Data rates from 20 kbit/s (868 MHz band) to 250 kbit/s (2.4 GHz band) .Both meshes and trees allow the use of ZigBee routers to extend communication at the network level.

4.3 TEMPERATURE SENSOR

The LM35 series are accuracy integrated-circuit temperature sensors. LM35 series are output voltage is linearly proportional to the Celsius temperature. The LM35 thus has an advantage over linear temperature sensors calibrated in ºKelvin. the user is not required to subtract a large constant voltage from its output to obtain efficient Centigrade scaling. The LM35 does not require any external calibration or trimming to provide typical accuracies of ±1/4ºCat room temperature and ±3/4ºC over a full -55 to +150ºCtemperature range. Low cost is assured by trimming and calibration at the wafer level. The LM35's low output impedance and linear output. As it draws only 60mA from its supply, it has very low self-heating, less than 0.1ºC in still air. LM35 is operates from 0 to 30 volts. The LM35 is rated to operate over a -55º to +150ºC temperature range, while the LM35C is rated for - b40º to +110ºCRange (-10º with improved accuracy).

4.4 PH SENSOR (WQS SENSOR)

A pH **meter** is an electronic device used for measuring the pH value. The concentration of Hydrogen ions in an aqueous solution or the activity of the Hydrogen ions in an aqueous solution. The pH will indicate if the solution is acidic or not acidic. pH is not a measure of acidity or alkalinity. pH meters work in liquids. to measure the pH of semi-solid substances, special probes are used sometimes. A pH meter consists of a special measuring probe (a glass electrode) connected to an electronic meter For very precise work the pH meter should be calibrated before each measurement. The reason for this is that the glass electrode does not give a reproducible E.M.F. over longer periods of time. Calibration should be performed with at least two standard buffer solutions. That two standard buffer solutions span the range of pH values to be measured. For general purposes buffers at pH 4.01 and pH 10.00 are admissible.

4.5 CAMERA PARAMETERS

Imaging Sensor: 1/3" CMOS ,Power Output: 200MW
Picture Area: PAL: 5.78 x 4.19mm NTSC: 4.69 x 3.45mm
Scan Frequency: PAL/CCIR: 50HZ NTSC/EIA: 60HZ

4.6DC MOTORS

3 DC Motor used; without gear,With 12V DC supply & current 1.3AH.
Initial current is less than 0.39A,2400 RPM

4.7 L293D

The L293D devices are quadruple.L293D devices having high- current half-H drivers. The L293 is designed to provide bidirectional drive currents of up to 1 A and at voltages from 4.5 V to 36 V. The L293D is to provide bidirectional drive currents of up to 600-Ma and at voltages from 4.5 V to 36 V. Both devices are designed to drive inductive loads. inductive loads such as solenoids, relays, DC and bipolar stepping motors

as well as other high-current/high-voltage loads having positive- supply applications. Drivers are enabled in pairs. drivers 1 and 2 enabled by 1,2EN and drivers 3 and 4 enabled by 3,4EN.The L293 and L293D are characterized for operation.

ALGORITHM

1. Initialize I/O ports.

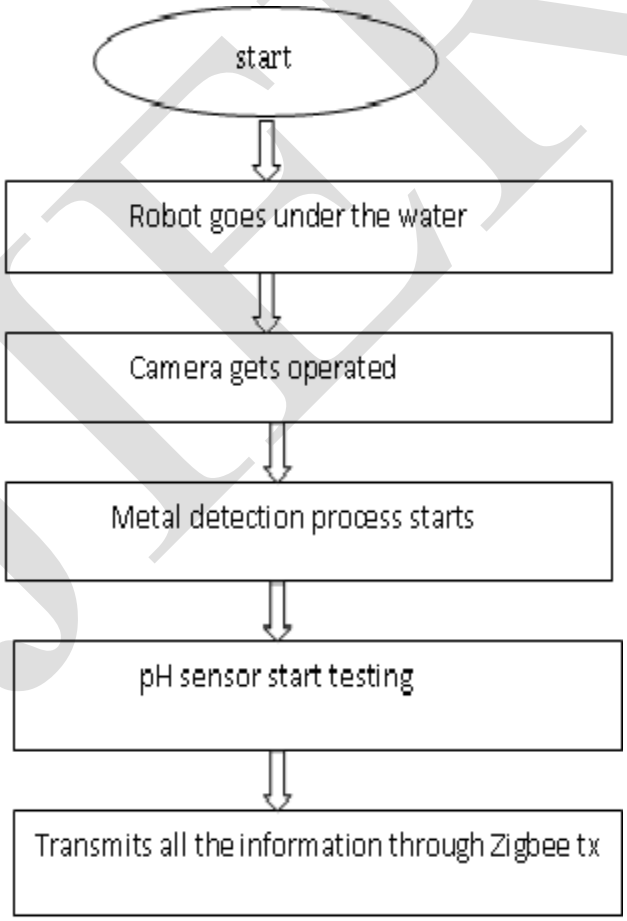
2. Initialize timer.

3. Initialize sensor.

4. Initialize ZigBee.
4.1 Communication in between two ZigBee station.
4.2 Send commands.
4.3 Receive data.
4.4 Stop communication

5. Stop.

6. FLOWCHART

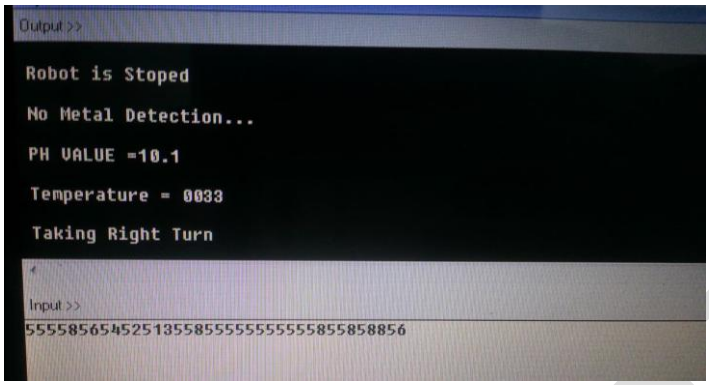


CONCLUSION

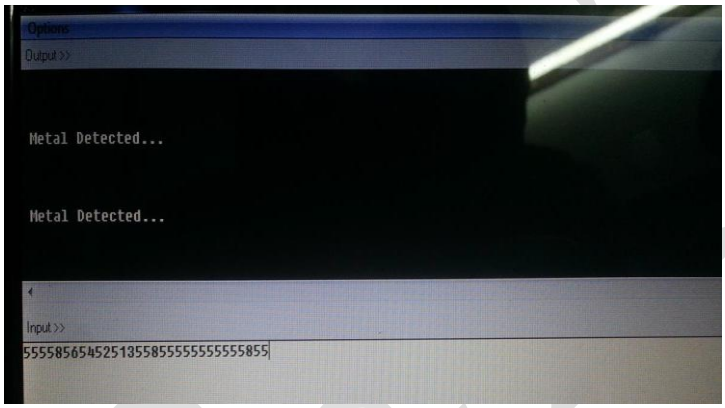
In this paper, we introduce wireless underwater robot control system which is used to detect underwater metals by using metal detector sensor along with pH and temperature sensors. The wireless underwater robot control system used ZigBee standard to control the moving robot by PC/Laptop.

RESULTS

8.1 SENDING PARAMETERS



8.2 METAL DETECTION



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