

SOLAR POWERED UNMANNED MARINE ROBOT WITH RADAR SYSTEM

Nirmala M ¹Sowmya S ²Sujatha B T ³Vaishnavi rani ⁴K P Linija Shylin ⁵^{1,2,3,4} Final Year Students, ⁵ Assistant Professor

Department of Electronics & Communication Engineering

Sri Sairam College of Engineering, Bengaluru.

Abstract:

This robot can be implemented in some latest achievements in the area of military robotics with main demands to management of advanced unmanned system formulated. An unmanned robot is designed using the concept of radar to detect the invasion of enemies or movement of unauthorized objects. In a marine or river they have the practice of dumping garbage into nearby water bodies. It will help to remove the garbage in the water bodies. Weather and pH of the water bodies also need to be known for the various applications. A multi-application robot can be designed having sensors to fulfil the above requirements. Wireless sensor network technology for real time online water quality monitoring. Wireless sensor network (WSN) for a water quality monitoring. Which are deployed at different overhead tanks and water bodies in an area. Each sensor node consists of an Arduino microcontroller and water quality sensors, the sensor probes shall continuously measure at different quality parameters like pH, Temperature, Conductivity. The parameters are measured in real time by the sensors and send the data to the data centre. Solar panel is used to power the system for each node. Data collected from the remote nodes are displayed in the user PC. And also the aim of this research is to design a robot that replaces human force for floating waste scooping and investigate performance of the designed waste scoopers installed on the floating waste scooper robot. Thus is mainly concerned about four modes of operation in surveillance mode, in weather forecasting, in water monitoring and as a cleaning unit.

Keywords: Radar, WSN, Arduino microcontroller, Solar panel, Weather forecasting

I. Introduction

This robots used in military are usually employed within integrated systems. Military robots also have different shapes and sizes according to their purposes and they may have the autonomous machines or remote-controlled devices. There is a belief that the future of modern combat will be fought by automated weapons systems. Military robots are usually associated with the following categories like ground, aerial and marine including those oriented on collective use of robots. Most military robots are still pretty dumb and

almost all current unmanned systems involve humans in practically every aspect of their operations. Military systems including and particularly. It also used to remove the water contaminants and sense the pH level of water. Thus is mainly concerned about four modes of operation- in surveillance mode, in weather forecasting, in water monitoring and as a cleaning unit. Radar system, which is constructed by ultrasonic sensor and servo motor, which will monitor the presence of enemies or unauthorized objects and send the information to server unit. Wireless camera unit, which will capture the live video and send it central station. Weather monitoring system, to monitor the environment conditions like Air Pressure, Temperature, Seismic waves. All monitored data will be uploaded into cloud for future analysis. Water pH sensor, to monitor the lake or river's water pH level. Based on the output of the pH sensor value we can use water for agriculture, industries or drinking purpose. Used in river or lake cleaning purpose, to collect the floating wastage from river. The whole robot will be powered by solar panel. Robot application is controlled from central station. Robot wings are made up of plastic and dc motor, for robot movement.

II. Techniques

a. Arduino Mega:

The Arduino Mega 2560 is a microcontroller board based on the AT mega 2560(datasheet). Arduino mega has 54 digital input and output pins (of which 14 can be used as Power outputs), 16 analog inputs, 4 UARTs (hardware serial ports), a 16 MHz crystal oscillator, a universal serial bus connection, a power jack, an in circuit serial programming header, and a reset button. Arduino mega contains everything needs to be supported to the microcontroller, simply connect it to a computer with a USB cable or power it with an AC-to-DC adapter or battery to get started. The Mega is compatible with most shields designed for the Arduino diecimila.

b. Wireless camera

As we know the Wireless security camera contains the video, audio signal that is sent to a wireless receiver through the radio band. All wireless security cameras needs at least one cable or wire for the power "wireless" that refers to the transmission of video and audio. Moreover some wireless security cameras are battery powered, making the cameras

truly wireless from up to down. Wireless cameras are prove in their low installation costs (there is no need to run expensive video). Surveillance of the public using CCTV is common in all areas around the world. In this coming years, the usage of video cameras has been introduced as a new form for surveillance, often used in law enforcement, with cameras located on a police officer's chest or head. Video surveillance has created significant about the balancing its use with individual's right to privacy even when in public. In industrial areas, CCTV technologies are used to observe parts of a function from a central control room, for example when the environment is harm full for humans. CCTV systems operates continuously or can monitored for the required event. An advanced form of CCTV, utilizes digital video recorders (DVRs) and provides recording for possibly many years, with a variety of quality and performance options and extra features (such as motion detection and email alerts). In this recently, decentralized IP cameras and that supports the recording directly for the network-connected storage devices, or internal flash for operation.

c. Sensors

Pressure sensor:

Simple pressure sensor alarm is built using readily available cheap components. When this is powered by a 9V compact battery, the active piezo-sounder at the output of integrated chip1 starts giving sound for a short time and then goes into normal state. Whenever, the pressure sensor element (Piezo-ceramic wafer) is gently tapped mosfet T1 is fired by the electric pulse from the sensor through related components and IC1 is again enabled by T1. As a result, the piezo-sounder starts sounds for a short duration, Piezo-sounder at the output of integrated chip1 can be replaced with a low current 6 to 9 V electromagnetic or solid-state relay.

pH sensor:

pH is usually used for water measurements, and it measure of acidity and alkalinity, other caustic and base present in a given solution. It is normally expressed with a numeric scale and it varies from 0-14. The value 7 characterizes objectivity. The numbers on the scale rise with increasing alkalinity, while the numbers on the scale reduction with increasing sharpness. Each unit of change represents a tenfold change in alkalinity or bitterness. The pH value is also equal to the negative logarithm of the hydrogen-ion absorption or hydrogen-ion activity. The most common method of adding pH is to use an electrochemical pH sensor. Combination pH sensors are a type of electrochemical pH sensor that features both a measuring electrode and a reference electrode. The determining electrode detects changes in the pH value while the reference provides a stable signal for comparison. A high impedance device, known as a pH meter, is used to display the signal in pH units. Grouping pH sensor technology can be used to construct different products, including laboratory pH sensors and industrial or process pH sensors.

Ultrasonic sensor:

This Ultrasonic device consists of a set of ultrasonic receiver and transmitter which function at the same occurrence. When something moves in the area covered the route's fine balance is troubled and the alarm is started. The ultrasonic circuit is very sensitive and can be familiar to reset itself automatically or to stay triggered till it is reset manually after an alarm.

DHT-11 sensor:

The digital humidity temperature11 is a basic ultra-low cost digital temperature and humidity sensor. It uses a capacitive humidity sensor and a thermistor to calculate the surrounding air, and divides a digital signal (no analog input pins needed). It's too simple to use, but requires careful timing to get data. The humidity sensing component of the digital humidity temperature11 is a moisture containing substrate with the electrodes applied on the surface. The digital humidity temperature11 converts the resistance measure menthol relative humidity on a chip mounted to the back of the unit and transmits the humidity and temperature readings directly to the Arduino Nano.

d. D.C Motor:

The speed of a direct control motor can be controlled by changing the voltage which is applied to the armature. The introduction of variable resistance in the armature circuit or field circuit that allows the speed control. The rotary electrical machines converts direct current electrical energy into mechanical energy. The most common types depends on the forces produced by magnetic fields. All types of direct current motors have some internal mechanism, either electromechanical or electronic, to continuously change the direction of current flow in part of the motor. Direct current motors were the first type largely used, since they could be powered from developing direct-current lighting power distribution systems. A direct current motor's speed can be controlled over a wide range, using either a variable supply voltage or by changing the strength of current in its field windings. Small direct current motors are used in tools, toys, and appliances. The universal motor can operate on direct current but is a low weight brushed motor used for portable power tools and appliances. Larger direct current motors are used for electric vehicles elevator.

e. Servo motor:

A servomotor is a rotating actuator or linear actuator that agrees for accurate control of angular or direct position, velocity and acceleration. It consists of a right motor coupled to a sensor for position response. It also needs a quite classy manager, recurrently a devoted unit intended explicitly for custom with servomotors aquatic automation using radar organization servomotors are not a definite class of motorized although the term servomotor is

regularly used to denote to a motor proper for use in a closed-loop regulator scheme. Servomotors are used in applications such as manufacturing, CNC equipment or automated industrial.

III. ESP8266(Wi-Fi Module)

This tiny and extremely cheap module is a communication module that allows you to establish a full and autonomous Wi-Fi connection with your Arduino or Raspberry Pi microcontroller. A Wi-Fi Serial Module works in both directions: it not only uses a TX/RX serial link to receive and send data, thus acting as a host for your Wi-Fi applications, but can also entrust all the Wi-Fi network-related functions to another application processor. By using serial commands, you'll also be able to change the configurations of the Wi-Fi Serial Module. You can get all these characteristics by simply using 2 cables to link your microprocessor card (Arduino, Nucleo, Seeeduino, Raspberry Pi, etc.) to the ESP8266 Wi-Fi Serial Module (TX and RX pins): connecting the two is extremely straight forward. With the arrival of the Internet of Things in the world of electronics, communication modules like the ESP8266 module provide very simple solutions for using Wi-Fi connectivity in DIY projects. The ESP8266 module is got even more useful by creators of electronic projects because it's extremely compact, meaning it can be integrated into small connected objects (watches, bracelets, etc.). It nonetheless has excellent data storage capacities, and an on-board processor powerful enough to reduce response time to a minimum. Thanks to its GPIO pins, it can be easily included in projects requiring use of sensors and other application-specific devices.

IV. Conveyor Belt

A conveyor belt is the carrying medium of a belt conveyor system (often short end to belt conveyor). A belt conveyor system is one of the those types of conveyor systems. A belt conveyor system has two or more pulleys (sometimes referred to as drums), with an endless round of having medium conveyor belt that rotates about them. One or both of the pulleys are given, moving the belt and the material on the belt forward. The given pulley is called the drive pulley while the unpowered pulley is called the idler pulley. There are two main industrial types of belt conveyors. This helps in collecting materials like coal, ore or any minerals or waste particles floating on the water. Conveyor belt in this project is made up of stainless steel.

V. PVC Pipes

PVC pipes are used in a wide variety of piping applications, from transfer the drinking water to a drainage solutions to

advanced fire-sprinkler systems. This popularity owes to a unique combination of properties: safety, durability or cost efficiency, environmental performance and recyclability. Their high degree of inertness and resistance to corrosion, made them free from biofilm contamination that can be a breeding ground for bacteria. PVC pipes have clear environmental advantages. As PVC is a low carbon plastic, PVC pipes require less energy and resources to manufacture. Due to their low weight, less energy is used during sending. PVC pipes with a minimum of maintenance and they are easily recyclable. Many new PVC pipes contain recirculates. The three-layer pipes where the core layer is made of recycled PVC. However, the ultra-smooth surface of PVC pipes reduces pumping level and energy use, and their leakage during water loss. This is good for the environment and also the utility bill. PVC pipes are easily recyclable and can be recycled several times without losing their technical properties. Traceability and certification schemes for recirculates ensure a high degree of safety and quality for the recycled PVC. Using recycled PVC helps meet resource-efficiency.

VI. Thing speak.Com

An operating system is ability to communicate with the internet or with the other things. One of the key elements of a generic IoT system that bridges the various 'things' is an IoT service. It should have an ability to connect to other 'things'. But the real power of IoT is harness when the things connect to a 'service' directly or via other 'things'. The systems service plays the role of unseen a manager by providing capabilities ranging from simple data collection and monitoring to complex data. Thing Speak is provides a different type of services exclusively used for building IoT applications. It provides the real-time data collection, imagine the collected data in the form of charts, and it ability to create plugins and apps for cooperate with web services, social network and other APIs.

VII. Conclusion

Nowadays there is no safety methods to our borders therefore implementation of android-based robot for border security could be more helpful. It reduces human involvement in the borders. This method reduces the risk in the lives of our soldiers. Ultrasonic sensor is used to track motion of intruder and camera for video surveillance. Alert message is being send to the control room, and the provision the risk of soldiers. We can also use this system for river/lake water quality testing and cleaning floating.

VIII. Reference

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