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Smart Engergy Harvestment On Marine Environment With Wsn Border Crossing

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Abstract :

The aim of the project is to warn the fisherman boats & other merchant boats that they have crossed their territory in the ocean and also to alert the police patrol boat about the border crossing. There is a transmitter section is located at the border which contain RF receiver to detect an approaching vessel and it also contains a solar panel and wind mill for power generation. A LDR sensor is present in the unit that sense day &night based on light and accordingly switch the power source for charging the battery. Humidity and temperature sensor are also used for determining the condition of ocean at the border. A zigbee transmitter transmits a message to the vessel that cross the border. There are two receiver section one for the patrol and other for the fisherman boats. The fisherman boats receive the message that they have crossed by border unit and the patrol unit is also intimated.

Keywords

RF receiver & transmitter, RFID, Zigbee receiver & transmitter.

1. Introduction

In modern world, wireless sensor network(WSNs) are significant current research subject in the world. It the collection and combination of distributed devices with the microcontroller for monitoring environmental condition and objects through sensing devices. Radio frequency readers play a major role in advanced techniques because the radio frequency signal might not be affected by the environmental conditon such as in various climatic condition and also in case of natural disasters. In real world applications, WSN is used to provide tremendous facilitiesin deployed surrounding such as military applications, automation, defence, health monitoring etc. A RFID is a technology which uses one or more readers and number of tags and a backend database. The object of a boat is identified physically and the information about owing person of a boat and the person who are in the boat also contained in the RFID tags. This RFID tags are tuned for particular frequency and has a different unique ID numbers. In RFID,the main part is data base contain all secret information for security purpose environmental detection,,assisted living ,site security.

2. OBJECTIVE

The main objective of this paper is to safe guard the fisherman from other country territory, natural disaster. Some fisherman enter into the sea before some days so the unaware of the climatic conditions . So inorder to intimate the fisherman we use the temperature and humidity sensor to prevent them from disaster. If they prolonged in the sea, sudden changes occur in the weather with the help of these sensors we can intimate them earlier about the weather conditions. The changes in the climatic conditions can be viewed in a RF receiver which is placed in a control panel and can be viewed in a PC automatically. Then we are using RFID which gives the personel info of the boat. This is also a way to protect the fisherman from the danger.

3. EXISTING SYSTEM

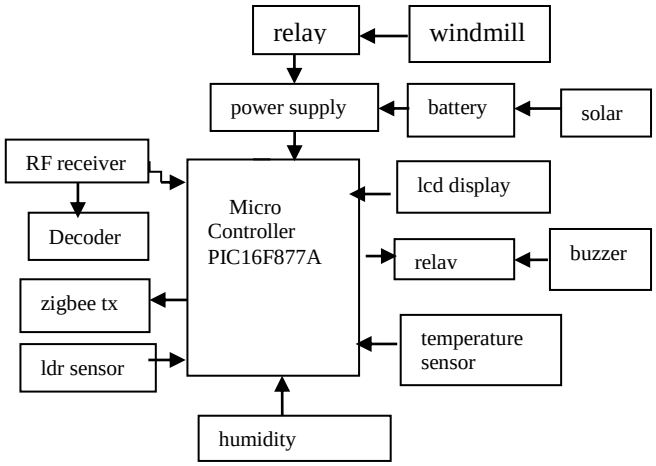
Power generation doesn't exist in this system, therefore not utilizing the wind & solar energy. Lack of border alert cause fisherman to go to uncharted territory. There is not a proper border crossing guidance system, only patrol boat is present. Boats use GPS system for knowing the border and to know the location of the boat. But RFID is highly helpful for, to know who is caught ie, to know the particular boat which is missed. We cannot able to predict the weather conditions. And there is no natural power harvestment.

4. OVERVIEW OF PROPOSED SYSTEM

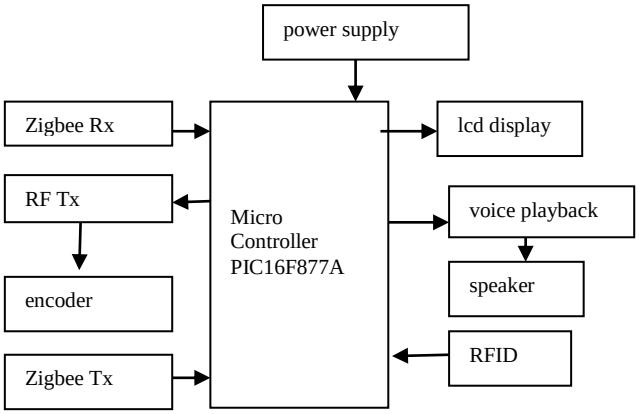
A. BLOCK DIAGRAM

TRANSMITTER SECTION

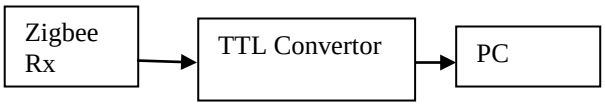
This is to transmit the signals. We have more communication process .We are using more sensors to measure the weather conditions.



B. RECEIVER SECTION 1



C. RECEIVER SECTION 2



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5. BLOCK DIAGRAM EXPLANATION

. There is a transmitter section that is located at the border which contains RF receiver to detect an approaching vessel and it also contains a solar panel and windmill for power generation. An LDR sensor is present in the unit that sense day and night based on light and accordingly switch the power source for charging the battery. Humidity and temperature sensor are also used for determining the conditions of ocean at the border. A ZIGBEE transmitter transmits a message to the vessel that crosses the border. There are two receiver sections one for the patrol and other for the fisherman boats. The fisherman boats receive voice message that they have crossed by border unit. LCD displays are used in the receiver section of the vessels in the sea which shows all the information. Received session is mounted on the patrol boat and it receives the id of the boat or ship that crosses the border. This unit contains a Zigbee ▫ receiver that transmits info serially to the Pc.

D. ADVANTAGES

Low cost setup which can be used by fisherman both monitoring the border cross as well as power generation.

6. DESIGN AND IMPLEMENTATION

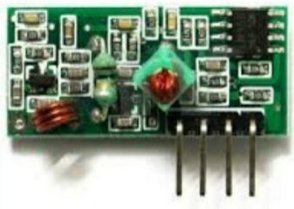
A. PIC CONTROLLER

PIC16F877 is one of the most advanced microcontroller from microchip.This controller is widely used for experimental and modern applications because of its low price,wide range of applications ,high quality and ease of availability.

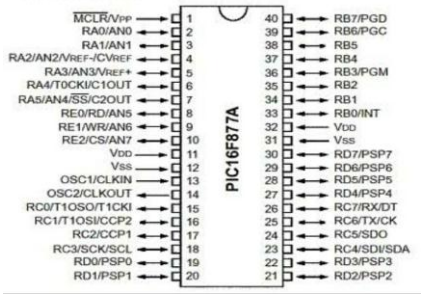
GENERAL FEATURES :

- High performance RISC CPU.
- It consist of program memory,data memory
- Power on reset

B. RF RECEIVER



Radio frequency (RF) is a rate of oscillation in the range of about 3 kHz to 300 GHz, which corresponds



to the frequency of radio waves, and the alternating currents which carry radio signals.

RF usually refers to electrical rather than mechanical oscillations, although mechanical RF systems do exist when you turn the emitter switch on, the lamp of the receiver begins to glow. When you turn the switch of the emitter off, the la of the receiver darkens. And so on. If the receiver has been build a basic way, then the distance over which the communication works will be a few meters or a few tens of meters. If you put the receiver, say 50 meters away of the emitter, then there will be no more communication. When you turn the switch of the emitter on, the lamp of the receiver will not begin to glow. It will remain dark.

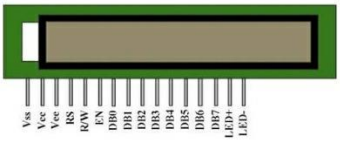
C. Solar panel

Solar panel produce electricity from the sub light,conversion of light energy to electrical energy using a phenomenon called photo-volaticeffect.

Conversion of light energy in electrical energy is based on a phenomenon called photovoltaic effect. When semiconductor materials are exposed to light, the some of the photons of light ray are absorbed by the semiconductor crystal which causes significant number of free electrons in the crystal. This is the basic reason of producing electricity due to photovoltaic effect.

Special Features:

- 85W solar panel, for 12V DC applications
- Made of multi-crystalline solar silicone cells
- Peak power: 85 Watts (day time with fully sun shine)
- Open voltage circuit (Voc): 22V
- power voltage in Maximum (Vmp): 17.5V
- power current in Maximum (Imp): 4.9A
- Short circuit current (Isc): 5.3A
- Nominal working temperature: 43±2 degrees C
- Dimensions: less 1,172 x 541 x 35mm



- Installation: solar panel face directly to the sun
- Working life: more than 25 years
- Standard testing condition: 25 degrees C, AM1.5 spectrum, 1,000W/m2 irradiance
- Insulation: ≥ 100MΩ
- Voltage standoff: AC 2,000V, DC 3,000V
- Wind pressure: 60m/s (200kg/m2).

D. RF Transmitter

The function of a radio frequency (RF) transmitter is to up convert, modulate and amplify signals for transmission into free space. An RF transmitter a modulator, that modulates an input signal and a radio frequency power amplifier that is coupled to the modulator to amplify the modulated input signal. The radio frequency power amplifier is coupled to an antenna that transmits the amplified modulated input signal. RF transmitter include bandpass filter such as surface acoustic wave.

E. RELAY

A relay is electromagnetic switch operated by a relatively small electric current that can turn on or off a much larger electric current. The heart of a relay is an electromagnet (a coil of wire that becomes a temporary magnet when electricity flows through it). Relay is a switch it on with a tiny current and it switches on another appliance using a much bigger current.

F. LCD display

A LCD is used to display the information from the transmission session. It is fixed in the receiver session. It is combination of two states of matter, the solid and the liquid. LCD uses a liquid crystal to produce a visible image. Liquid crystal displays are super-thin technology display screen that are generally used in laptop computer

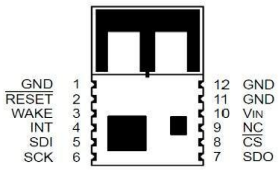
screen, TVs, cell phones and portable video games. LCD's echnologiesallowallow displays to be much thinner when compared to cathode ray tube (CRT) technology. LCD display is made up of active matrix or passive matrix.LCD works on the principle,when the electricity is applied it tend to untwist.LCD consume less power & cost is low

G. Voice playback

Voice play back is also a way of communication,it intimate the information about border crossing through voice.
APR33a33Voice play back provides high quality recording and playback with 11 minutes audio at 8 KHz sampling rate with 16 bit resolution. The aPR33A series C2.x is specially designed for simple key trigger, user can record and playback
the message averagely for 1, 2, 4 or 8 voice message(s) by switch, it is suitable in simple interface or need to limit the length of single message.

H. Zigbee

ZigBee is a specification for a suite of high level communication protocols using small, low-power digital radios based on the IEEE 802.15.4-2003standard for Low-Rate Wireless Personal Area Networks such as wireless light switches with lamps, electrical meters with in-home-displays, consumer electronics equipment via short-range radio needing low rates of data transfer.



7. Conclusion

Hence by this we can able to safeguard the fisherman from natural disaster and from terrorist. By using the license we can able to find the particular boat which will be in danger.

8. Result

9. Reference

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