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Novel Wireless Weather Data Communication for Fishermen

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Abstract— Fishing is one of the primary occupations of India .Atmospheric conditions play a vital role in fishing. Fishermen have to take care of their safety while fishing for long distances. Since weather is not uniform and it keeps on changing, so it is difficult to predict weather condition. So in this paper for the welfare of the fishermen we provide the fishermen the information about the atmospheric conditions .The design consists of two modules. First module is a shore module which consists of a transmitter to send the data from the shore and second module is a sea module which consists of a receiver placed in the boat which will receive the signal and display it on the LCD. The data will be sent continuously and information of the weather conditions will be of the area of fishing .The fishermen will be able to get the weather reports when they are at sea and can be able to know about the weather conditions and make a safe return.

Keywords— Fisherman welfare, atmospheric condition, shore module, sea module, weather information.

I. INTRODUCTION

India is surrounded by water bodies on three sides (Arabian Sea, Bay of Bengal and the Indian Ocean) and 7517 kilometres of coastline area. Thus has a vast area for fishing [1]. India has secured second position in the production of fish in the world, after China. The Fishing Industry is a major industry in the coastal states, employing over 14 million people [2].

A significant proportion of fishing society is at risk because of unreliable information and uncertain climatic condition. Over the sea, fishing boats can be networked wirelessly to transfer data to the coast stations [3]. Practically, radio electronics can be associated with fishing boats to support boat-to-land and vice versa communications. Data for transmission may indicate boat position, emergency announcements, rescue signals, weather alert etc that will efficiently help raise fishermen and boat safety in occurrence of storm, tsunami, etc. These disasters claim thousand lives yearly in coastal regions such as Japan, India, and America etc[4]. The boats used in traditional fishing are inexpensive and small; equipping any modern electronic devices like satellite transceivers is thus unrealistic.

A practical solution is to share walkie-talkie's radio channels for transmitting and receiving the data. However, deployment of such pervasive systems obviously faces numerous technical challenges due to node mobility and channel errors [5]. Missed or altered data may lead to wrong decisions by fishermen or coastal mission teams. For example, if the coordinates of a fishing boat in danger is incorrectly reported to the monitoring station, the rescue effort will be of no use. Likewise, if the boats fail to receive correct messages of weather alert, the lives of fishermen are definitely at risk [6].

Now the fishermen are adopting mobile phone at a very place. Now rather than the phone being used as a voice communication device, it is also used as a business device. This invariably calls for digital connectivity like GPRS or data. But the phone also has some disadvantages like sometimes the area of fishing is out of network coverage zone [7].

So we have designed and developed a system which can send weather information to the fishermen when offshore. It consists of simple devices like a microcontroller, transmitter receiver and LCD display. After the survey done in Hosabettu, Mangalore, we came to know from the fishermen about the little facilities provided to them. When on sea they are not provided with the weather information. So safe fishing is difficult for the fishermen using traditional fishing method. So this paper resolves this problem by giving them the weather conditions when offshore and can head towards safety before the danger strikes. Thus fishing can be done more efficiently .It is not only helpful to the fishermen but has varied other applications like in boating resorts, mining etc.

II. SYSTEM DESIGN

The system consists of two modules. First module is a shore module which consists of a transmitter to send the data from the shore and second module is a sea module which consists of a receiver placed in the boat which will receive the signal and display it on the LCD. The data will be sent continuously and information of the weather conditions will be of the area of fishing.

A. Hardware Design

- **Shore module**

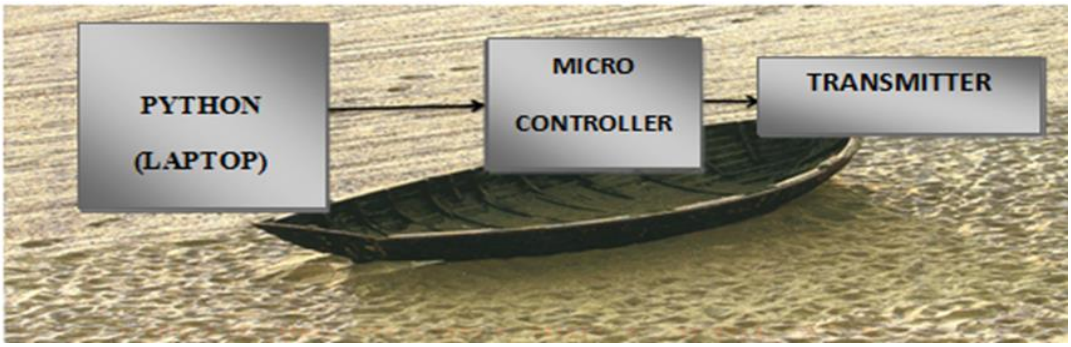

Fig. 1 Block diagram of shore module

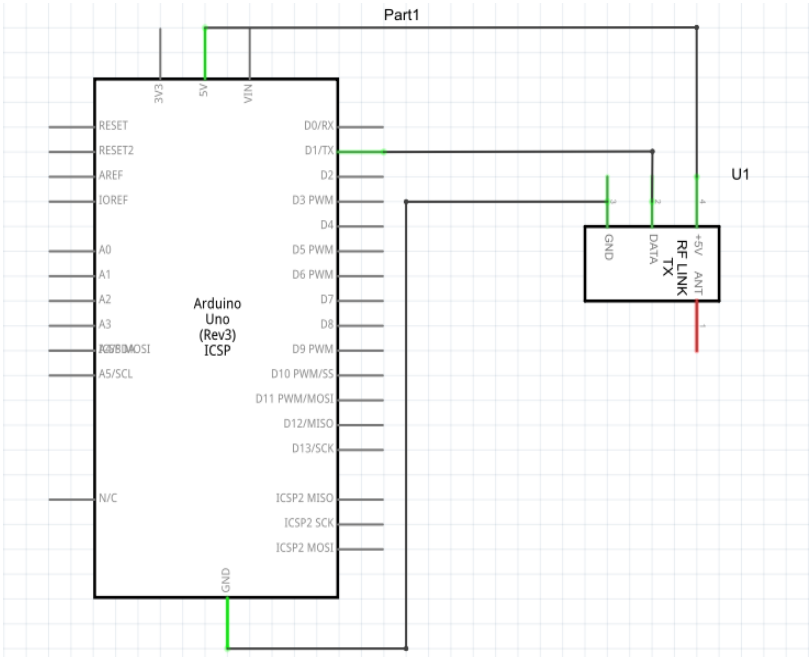

Fig. 2 Shore module pin configuration

Fig. 1 represents the shore module; It is the transmitting part of the system. It is placed in the sea shore or main port. This part consists of components like microcontroller (arduino UNO), a transmitter (434MHz) and a laptop or computer which contains the codes in python. The python programming language is linked with the microcontroller . The codes are in such a way that it will take information from the weather site through internet. This is in html format, which is then converted into json format for easy understanding. The microcontroller will take this processed data .The microcontroller is connected to the transmitter and it then transmits this information through Rf transmitter. The transmitter will send the information to the receiver placed on the boat. Fig. 2 represents the pin configuration of shore module which is stimulated by using fritzing software.

- **Sea module**

Fig. 3 Block diagram of sea module

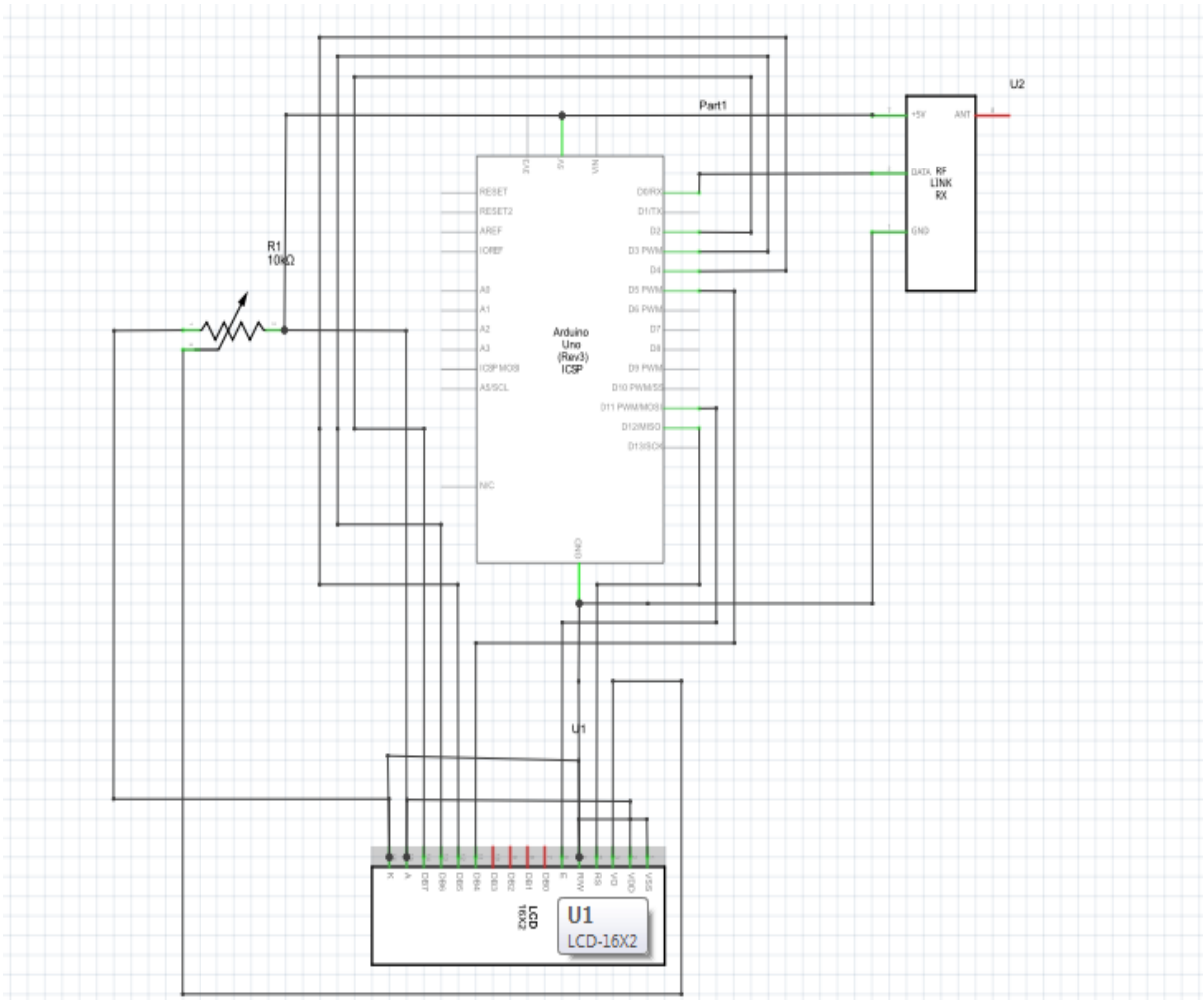

Fig. 4 Sea module pin diagram

Fig. 3 represents the sea module, it is the Receiving part and it is placed on the boat. This part consists of components like microcontroller (arduino UNO), receiver (434MHz) & LCD display (16*2).The microcontroller is connected to the receiver & LCD display. The receiver will receive the information which is transmitted from the shore or main port, and then it will be displayed in the LCD. The information displayed on LCD will be based on weather condition. Through this, fishermen will get to know about the weather condition in that particular area where they are going for fishing. Fig. 4 represents the pin configuration of shore module which is stimulated by using fritzing software.

B. Software Design

The python will fetch the information of weather of a particular area through internet. The microcontroller will transmit this information. This part is present in the shore module. The information transmitted through transmitter will be received by the receiver present in the sea module. Then that information will be displayed in LCD display. Fig. 5 represents the flow chart of shore and sea module.

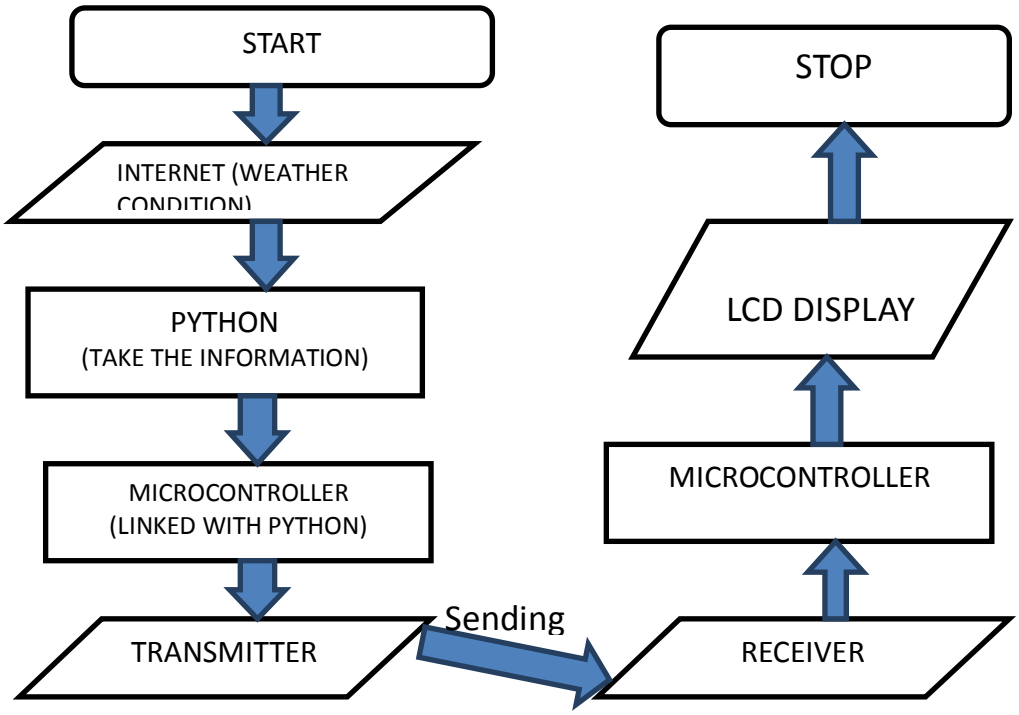

Fig. 5: Flow chart of shore and sea module

III. EXPERIMENTATION AND RESULTS

STEP 1: Open API Key through 'Open Weather Map API'. As shown in fig. 6.

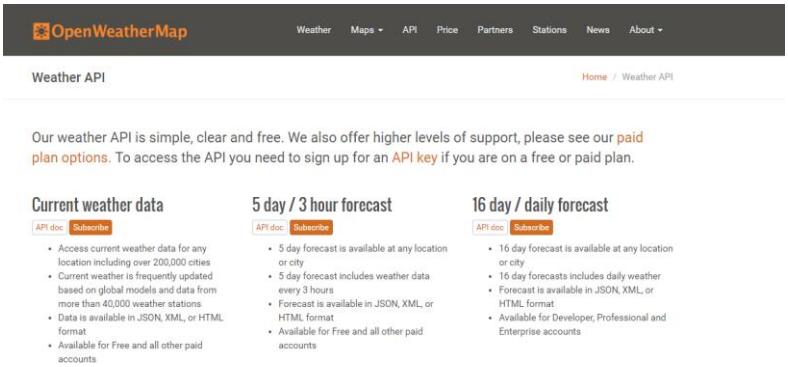

Fig. 6 API Account

STEP 2: Using python programming language in such a way that it fetch the information from the internet. As shown in fig. 7.

```
import json
import urllib2
import serial
import time
ser = serial.Serial("COM3",9600)
while True:
    my_url='http://api.openweathermap.org/data/2.5/forecast/city?id=1263780&APPID=fab185f10aba8c12dc77a49703aebdce'
    request = urllib2.Request(my_url)
    response = urllib2.urlopen(request)
    data_by_site = response.read()
    f = open('j_data.json','w')
    f.write(data_by_site)
    f.close()
    f = open('j_data.json')
    data = json.load(f)
    arp = float(data['list'][0] ['main']['temp_max'])
    val = float(data['list'][0]['wind']['speed'])
    spd = float(data['list'][0]['main']['sea_level'])
    pun = float(data['list'][0] ['main']['humidity'])
    time.sleep(5)
    ser.write('wind.speed:')
    ser.write(str(val))
    ser.write('00000')
    time.sleep(5)
    ser.write('sea_level:')
    ser.write(str(spd))
    ser.write('00000000')
    time.sleep(5)
    ser.write('tem:')
    ser.write(str(arp))
    ser.write('00000000')
    time.sleep(5)
    ser.write('hum:')
    ser.write(str(pun))
    ser.write('00000000000')
```

Fig.7 Python Programme In Notepad++

STEP 3: Through programming, python is linked to Microcontroller(arduino). As shown in fig. 8.

```
import json
import urllib2
import serial
import time
ser = serial.Serial("COM3",9600)
```

Fig. 8 Linking with Microcontroller(arduino)

STEP 4: Python programme runs in laptop. As shown in fig. 9.

```
Microsoft Windows [Version 6.1.7601]
Copyright (c) 2009 Microsoft Corporation.  All rights reserved.

C:\Users\user>cd desktop

C:\Users\user\Desktop>cd gggg

C:\Users\user\Desktop\gggg>python wind.py
_
```

Fig. 9 Running Python Programme

STEP 6: Microcontroller(arduino) connected to a RF module transmitter is connected to the laptop in which python programme is running. As shown in fig. 10.

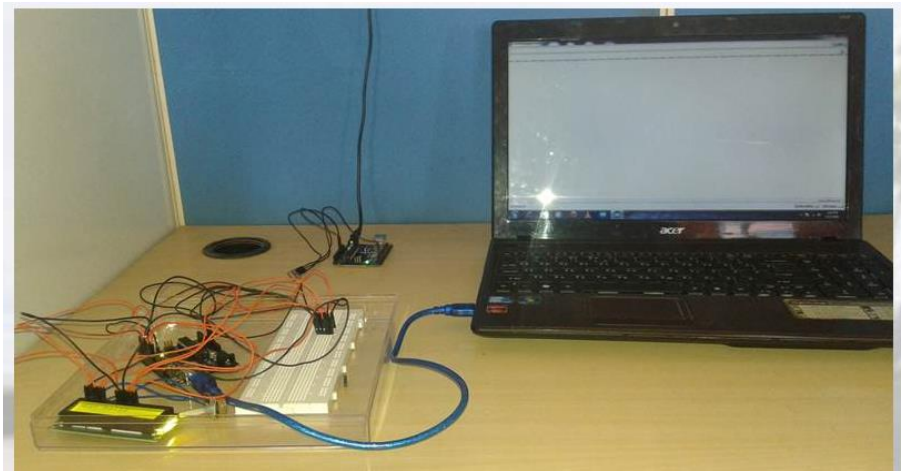

Fig. 10 Entire Setup of Sea & Shore Module

STEP 8: Laptop with Microcontroller(arduino) and transmitter is palced in Shore. As shown in fig. 11.

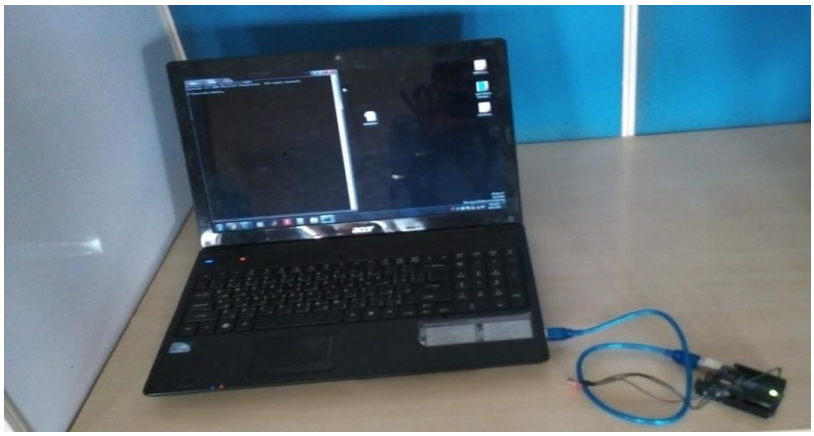

Fig. 11 Shore Module

STEP 9: In the Sea module a RF module receiver with microcontroller(arduino) and LCD display is placed. As shown in fig. 12.

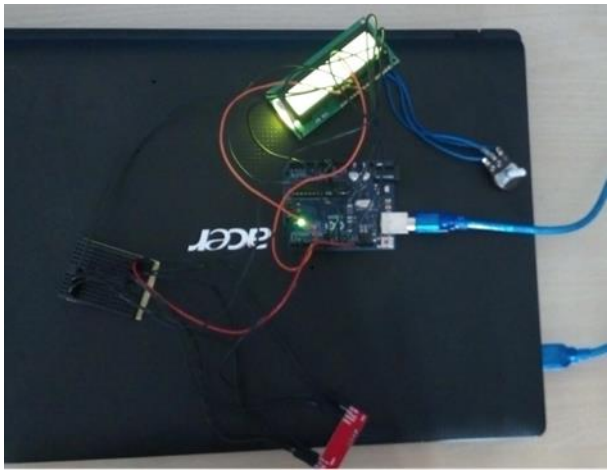

Fig. 12 Setup of Sea Module

STEP 10: The receiver placed in sea receives the information transmitted and weather information such as sea level, wind speed, temperature & humidity is displayed in LCD display. As shown in fig. 13.

Fig. 13 Result Displaying in LCD Display of Sea-level ,Wind Speed ,Humidity ,Temperature

Conclusions

This paper has two parts, the sea module and shore module .The shore module is the transmitting part and sea module is the receiving part. The project concentrates mainly on fishermen safety . Nature's condition cannot be predicted every time and it is not necessary that every prediction should be true. So we are providing the fishermen a help through the electronic components hardware and software to know the information about the weather condition so that they can go fearlessly for fishing with a hope of returning back.

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