



International Journal of Innovative Research in Computer and Communication Engineering

(A High Impact Factor, Monthly, Peer Reviewed Journal)

Website: www.ijirccce.com

Vol. 8, Issue 2, February 2020

A Smart Boat for Safe Travel

Rose Annies Tadepalli¹, P.V.V.N.D.P. Sunil², Prameela Jonnalagadda³, Dattha Pandu Sai Ram Pinjala⁴,
Hari Kiran Miriyala⁵

U.G. Student, Department of Electronics and Communication Engineering, Sri Vasavi Institute of Engineering &
Technology, Nandamuru, Pedana Mandal, Andhra Pradesh, India^{1,3,4,5}

Assistant Professor, Department of Electronics and Communication Engineering, Sri Vasavi Institute of Engineering &
Technology, Nandamuru, Pedana Mandal, Andhra Pradesh, India²

ABSTRACT: In India, traveling by sea is one of the modes of transport. During the past few years, we came across several boat accidents. Investigations have revealed the causes for the accidents to be the atmospheric conditions in the sailing area, the condition of the boat and crossing the speed limit. If we could know the condition of the boat, the atmospheric conditions in the sailing area and the health of the helmsman(the boat driver), we can avoid the boat accidents as far as we can. This paper describes our project entitled A Smart Boat for Safe Travel which helps us to prevent boat accidents. It includes the idea of monitoring the atmospheric temperature and humidity and also warns us by sending the precise location of the boat if it undergoes an extreme tilt due to large tidal waves. A warning message would be sent by Raspberry Pi through the GSM module which is included in the system. Along with this, the system lets us know the pulse rate and the body temperature of the helmsman through an Android/iOS App so that preventive measures could be taken to avoid the accident.

KEYWORDS: GSM Module; Helmsman; Android/iOS App; Tilt; Raspberry Pi

I. INTRODUCTION

The atmospheric conditions like temperature and humidity in the sailing area can be continuously monitored on an Android/iOS App. When the boat undergoes an extreme tilt due to the waves, an alert message can be sent to the registered mobile number so that preventive measures can be taken. Along with this, the health condition of the helmsman can also be monitored such that it would be possible to avoid boat accidents occurred due to sudden damage in the health of the helmsman. In the project, we are using Raspberry Pi which invokes the GSM module to send corresponding information through an SMS to the registered mobile number. Also, Tilt Sensor is used to know if the boat suffers an extreme tilt. A temperature/ humidity sensor is used to know the atmospheric temperature and the atmospheric humidity in the area in which the vessel is sailing. Pulse Sensor is used to know the rate of the heartbeat of the helmsman and a separate temperature sensor is used to know the body temperature of the helmsman.

II. LITERATURE SURVEY

The existing system lets us know if the boat is about to cross the Nation's Border. It continuously monitors the precise location of the boat using GPS Module. It compares the location with the predefined measures of latitude and longitude to know if the boat is going to cross the border. If it does, an alert message will be sent to the helmsman and also to the boat owner.

III. PROPOSED METHODOLOGY AND DISCUSSION

By using the GSM module along with the GPS, we can warn the boat owner if the boat is sailing in unfavorable conditions. Also, if the health of the helmsman degrades, an alert message can be sent to the registered mobile number.

International Journal of Innovative Research in Computer and Communication Engineering

(A High Impact Factor, Monthly, Peer Reviewed Journal)

Website: www.ijircce.com

Vol. 8, Issue 2, February 2020

Thereby we can prevent boat accidents as far as we can. If any passenger falls ill, we can get notified of it.

III A. Block Diagram

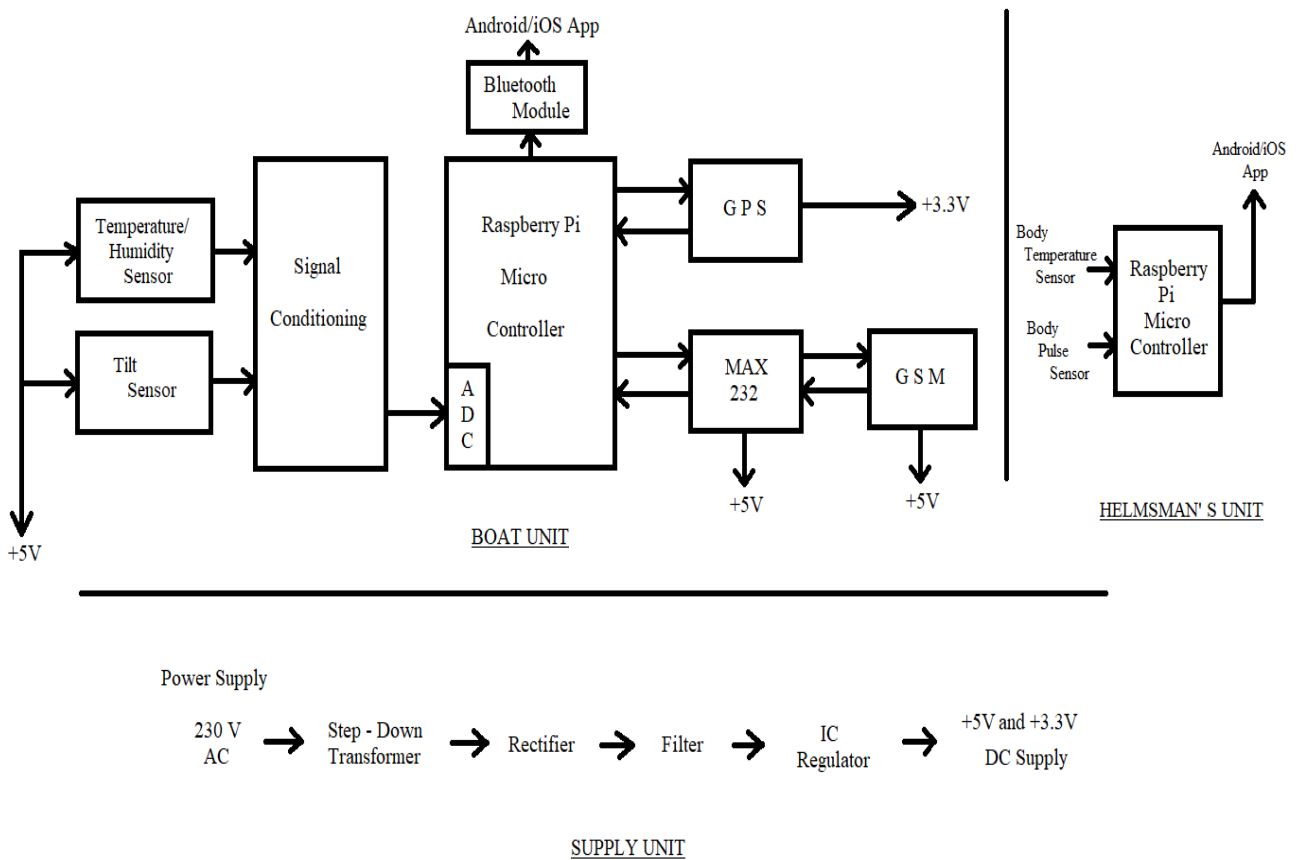


Fig. 1. Block Diagram of the Project

International Journal of Innovative Research in Computer and Communication Engineering

(A High Impact Factor, Monthly, Peer Reviewed Journal)

Website: www.ijircce.com

Vol. 8, Issue 2, February 2020

III B. Flowchart of the System

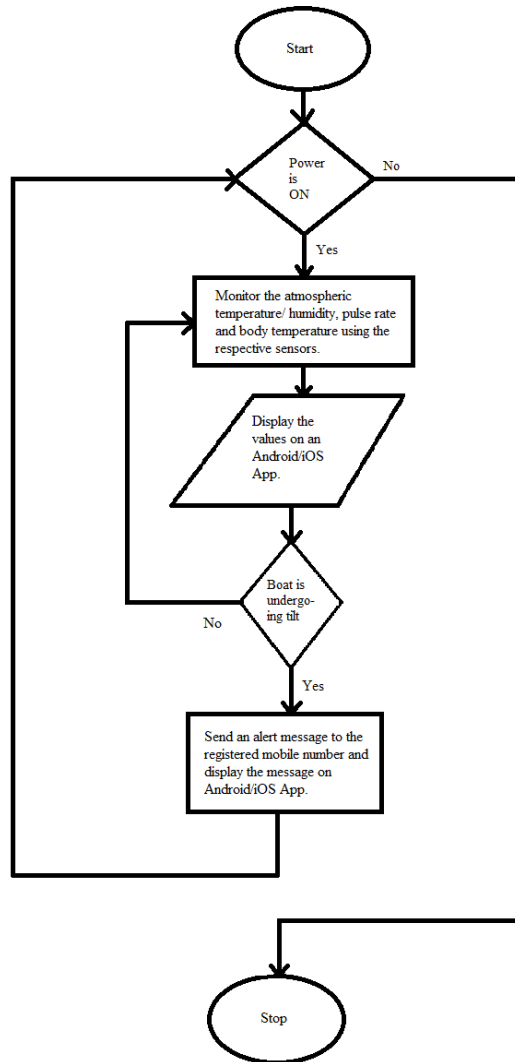


Fig. 2. Flowchart of the Project

III C: Overview of the Project

The sensors used in the project are Temperature/ Humidity Sensor (DHT11), Heart Rate/ Pulse Sensor, Body Temperature Sensor (LM35), Tilt Sensor (MPU6050). These sensors are interfaced with Raspberry Pi. It cannot read analog inputs and hence an ADC (AD574A) is used in between the sensors and Raspberry Pi as the sensors produce analog outputs. The alert message will be sent by the raspberry Pi through the GSM Module. The message includes the precise location of the boat. This location will be given by the GPS module.

International Journal of Innovative Research in Computer and Communication Engineering

(A High Impact Factor, Monthly, Peer Reviewed Journal)

Website: www.ijircce.com

Vol. 8, Issue 2, February 2020

III. C. 1: *MPU6050 Tilt Sensor*

MPU6050 sensor module is an integrated 6-axis Motion tracking device. It has a 3-axis Gyroscope, 3-axis Accelerometer and a Digital Motion Processor, all in a single IC. A microcontroller can communicate with this module using I2C communication protocol. This module reads the tilting of the boat and informs us through the GSM Module.



Fig. 3. Tilt Sensor

III. C. 2: *GSM SIM900A Module*

GSM/GPRS SIM900A Modem, works on frequencies 900/ 1800 MHz. The Modem comes with RS232 interface, which allows you connect PC as well as microcontroller with RS232 Chip(MAX232). The baud rate is configurable from 9600-115200 through AT command. Whenever the boat tilts, an alert message can be sent to the registered mobile number using this modem.



Fig. 4. GSM SIM900A Module

III. C. 3: *DHT11 Relative Humidity/ Temperature Sensor*

DHT11 sensor reads the atmospheric temperature and humidity in the sailing area. We can continuously know the atmospheric conditions on the Android/iOS App.



Fig. 5. DHT11 Sensor

International Journal of Innovative Research in Computer and Communication Engineering

(A High Impact Factor, Monthly, Peer Reviewed Journal)

Website: www.ijircce.com

Vol. 8, Issue 2, February 2020

III. C. 4: *Pulse Sensor*

Pulse Sensor is a well-designed plug-and-play heart rate sensor. It helps to easily incorporate live heart-rate data into the project. The sensor clips onto a fingertip or earlobe. The Raspberry Pi pulse sensor cannot be read out digitally, thus we need an analog-to-digital converter. Such an ADC makes it possible to read out analog signals on the Raspberry Pi. So we are using an ADC named AD574A along with this Pulse Sensor.

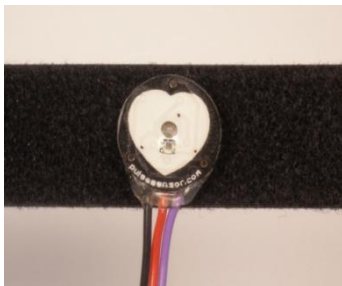


Fig. 6a. Front View of the Sensor

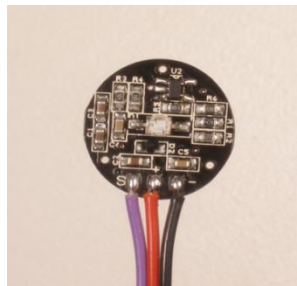


Fig. 6b. Back View of the Sensor

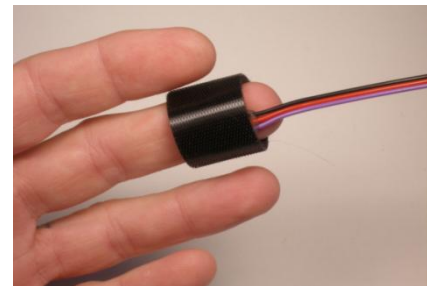


Fig. 6c. Sensor attached to the Finger

III. C. 5: *LM35 Temperature Sensor*

To read the body temperature of the helmsman, we need a sensor. Here we are going to use LM35 Temperature Sensor. Temperature is usually measured in “Centigrade” or “Fahrenheit”. “LM35” sensor provides output in degree Centigrade.

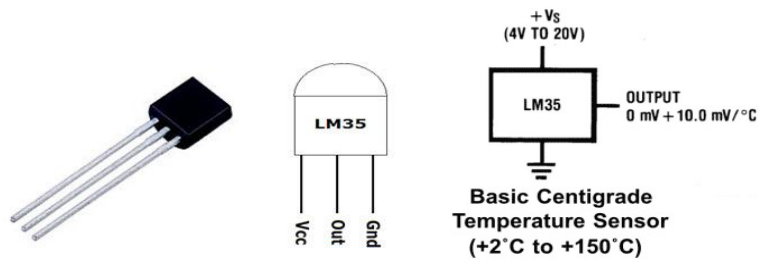


Fig. 7. LM35 Temperature Sensor

III. C. 6: *GPS Module*

The GPS Module allows us to know the location of the boat when the boat undergoes an extreme tilt. This module comes with an external antenna.



Fig. 8. GPS Module

International Journal of Innovative Research in Computer and Communication Engineering

(A High Impact Factor, Monthly, Peer Reviewed Journal)

Website: www.ijircce.com

Vol. 8, Issue 2, February 2020

IV. EXPERIMENTAL RESULTS

The Android/iOS App that is developed to continuously monitor the atmospheric conditions, the tilting of the boat and the health of the helmsman is shown in Fig. 1. The final view of the proposed project is shown in Fig. 2. Whenever the boat undergoes an extreme tilt, the Android/iOS App shows a notifications that the 'Boat is Tilting'. Fig. 3 shows the message sent to the registered mobile number along with the boat's location.

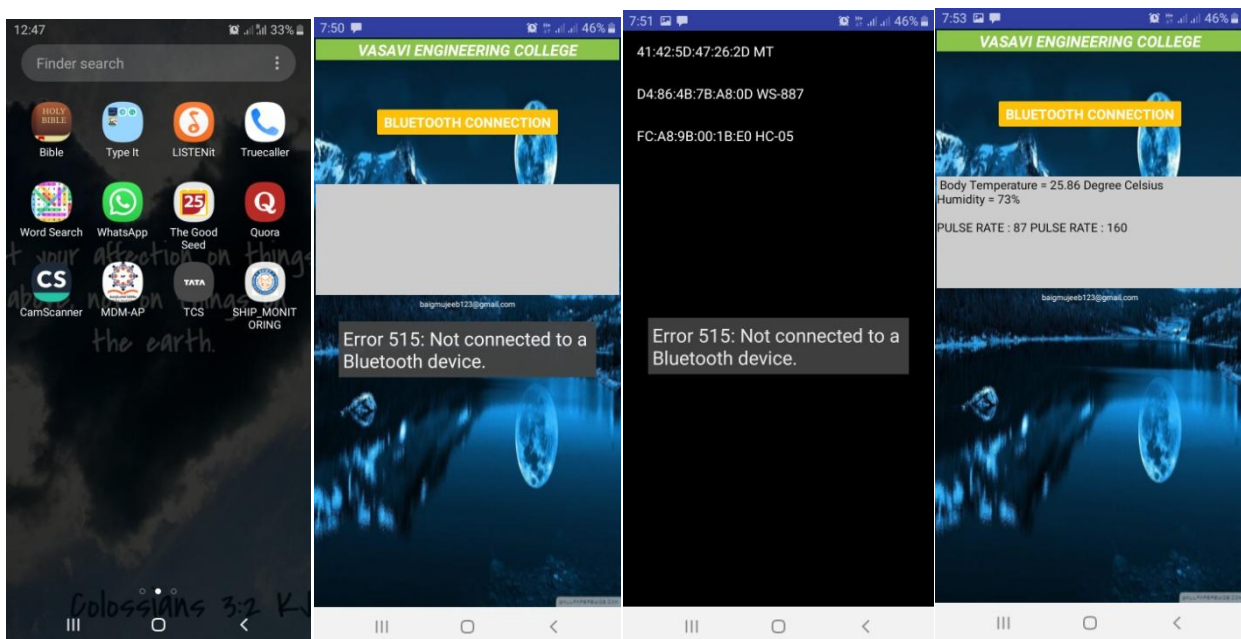


Fig. 9. Running the Android/iOS App

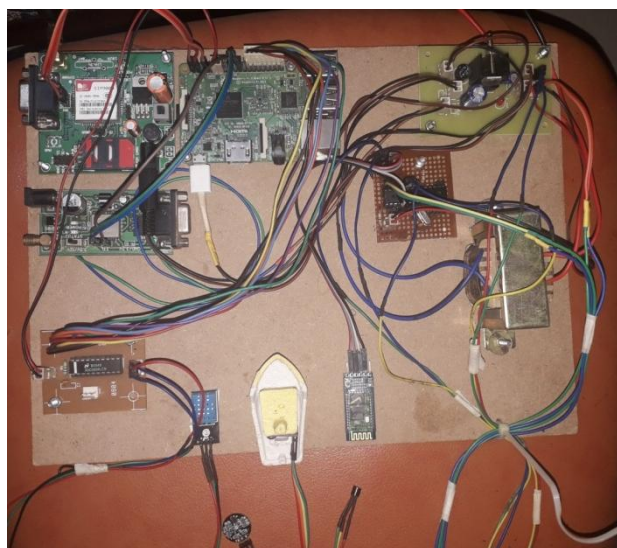


Fig. 10. Final View of the Proposed Project

International Journal of Innovative Research in Computer and Communication Engineering

(A High Impact Factor, Monthly, Peer Reviewed Journal)

Website: www.ijirccce.com

Vol. 8, Issue 2, February 2020

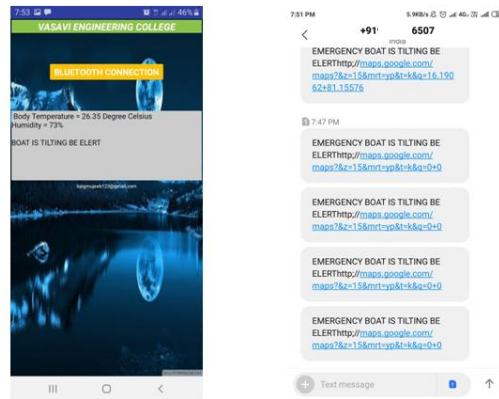


Fig. 11. Notification on the App and Alert Message sent

V. CONCLUSION

The Project takes the main causes for any boat accident to occurs and helps to avoid them from happening. It helps to monitor the atmospheric conditions in the sailing area, the health of the helmsman and the location of the boat if the boat undergoes extreme tilting due to large tidal waves. The modules used in our project can be connected to communication satellites so that real time monitoring of every sailing boat can be achieved. If our project were implemented national wide then definitely we could see a radical decrease in boat accidents.

REFERENCES

1. Jim Isaac , the paper titled as “Advanced border alert system using GPS and with intelligent Engine control unit “International Journal of Electrical and Computing Engineering (IJECE) Vol. 1, Issue. 4, June 2015.
2. S.Kiruthika, N.Rajasekaran the paper titled as” A Wireless mode of protected defense mechanism to mariners using GSM technology ”International Journal of Emerging Technology and Innovative Engineering Volume I, Issue 5, May 2015 (ISSN: 2394 – 6598).
3. G.Sivagnanam , A.J.Midhun, N.Krishna, G.Maria Samuel Reuben A.Anguraj5 “Coast guard alert and rescue system for international maritime line crossing of fisherman” “ at International Journal of Innovative Research in Advanced Engineering (IJIRAE) ISSN: 2349-2163 Issue 2, Volume (February 2015).
4. Naveen Kumar M, Ranjith R, paper titled as” Border alert and smart tracking system with alarm using DGPS and GSM” International Journal of Emerging Technology in Computer Science & Electronics (IJETCSE) ISSN: 0976- 1353 Volume 8 Issue 1 – April 2014.
5. K. Suresh Kumar, “Design of low cost maritime boundary identification device using GPS System” International Journal of Engineering Science and Technology Vol. 2(9), 2010, 4665- 4672.-2010.
6. Martin C. Brown, “The Complete Reference Python”, published by McGraw Hill Education on 20 March 2018.
7. R. Nageswara Rao, “Core Python Programming”, published by Dreamtech Press on 1 Jan 2018.

BIOGRAPHY



Rose Anni Tadepalli is pursuing B. Tech in the faculty of Electronics and Communication Engineering from Sri Vasavi Institute of Engineering and Technology, Nandamuru, Pedana Mandal, Krishna District, Andhra Pradesh, India. Her area of research is Embedded Systems.



ISSN(Online): 2320-9801
ISSN (Print): 2320-9798

International Journal of Innovative Research in Computer and Communication Engineering

(A High Impact Factor, Monthly, Peer Reviewed Journal)

Website: www.ijircce.com

Vol. 8, Issue 2, February 2020



P. V. V. N. D. P. Sunil is currently working as Assistant Professor in Sri Vasavi Institute of Engineering and Technology. He has 12 years of working experience in Teaching and Embedded design projects. He received his B. Tech degree from Acharya Nagarjuna University and M. Tech degree from Jawaharlal Nehru Technological University, Hyderabad. He is a member of IETE, IE, ISTE and IAENG. He published twelve research papers in various International Journals. His research areas include Embedded System Design and VLSI Design.



Prameela Jonnalagadda is pursuing B. Tech in the faculty of Electronics and Communication Engineering from Sri Vasavi Institute of Engineering and Technology, Nandamuru, Pedana Mandal, Krishna District, Andhra Pradesh, India. Her area of research is Embedded Systems.



Datta Pandu Sai Ram Pinjala is pursuing B. Tech in the faculty of Electronics and Communication Engineering from Sri Vasavi Institute of Engineering and Technology, Nandamuru, Pedana Mandal, Krishna District, Andhra Pradesh, India. His area of research is Embedded Systems.



Hari Kiran Miriyala is pursuing B. Tech in the faculty of Electronics and Communication Engineering from Sri Vasavi Institute of Engineering and Technology, Nandamuru, Pedana Mandal, Krishna District, Andhra Pradesh, India. His area of research is Embedded Systems.