A Smart Catamaran Cruise

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Abstract: **The marine with its under water exploration plays a vital role in understanding environmental changes.The asymmetrical planning of catamarans are increasingly used in moderate to very high speed applications due to some tempting qualities such as less wetted surface and better seakepping behavior.Furthermore,catamarans has the ability of the employed numerical method in estimation of the sea convectional boundary limits in The peninsula island and the coastal countries. Today's existing systems are data buoy which provides interference mechanisms, much use of fossil fuel and survey ships which are highly cost inefficient huge and heavier.To overcome the existing system drawback and to provide multi-function we are proposing smart catamaran cruise which is a combination power by using diesel engine,lithium batteries and sail in investigated this is mainly focused on stability analysis ,safety measurements of fisherman and to maintain its function as a fishing vessels. In this paper we are developing a smart catamaran cruise which consumes less power, cost effective,feasible and has various applications in hydrological research.**

Keywords:- Global Positioning System(GPS),Global System For Mobile communication(GSM), Unmanned Surface Vehicle(USV),Wave Adaptive Modular Vessel(WAM-V).

I. INTRODUCTION :

Ocean observation,Marine research and navigational exploration have their advancement ,future vision in the technology for the upgraded computer vissionery techniques. The methods on unmanned sailing boat,which enables it to sail fully autonomously,navigate safely and perform long term mission.understanding key hydrological processes and properties is critical in sustaining ecological variations since then the need for smart catamaran emerged in one designed challenges faced by navel architects in accutrate predication,hydrodynamic charactricts of vessel ,propulsion and sea keeping even though a inconsiderable amount of research has been carried out in this area their remains a degree of uncertainty in the marine research. A well balanced design of a catamaran-type craft will therefore be concerned with an optimal compromise between the motion,power supply and structural weight consideration.this consideration would primarily depends on the principle design criteria such as cruise and top seeds,utility function required maneuver ability constraints,propulsive efficiency.

Considering all the drawbacks of existing system we are proposing a Smart Catamaran cruise,which has the muti-functionalities such as detecting the boundary limits of the standard sea conventions where if it is crossed the fishermen life would be endangered,it would provide the fishermen with all necessary climatic and weather changes,helps them to navigate in the accurate direction,it is been provided with the hand shaking application where in if the fishermen encounters any kind of threat or danger he should shake his handset with certain baud rate then immediately the naval control room will receive the message,video capturing,voice announcement and location tracking with help of gsm and gps is also provided where exact location can be traced out with the help of latitude and longitude points received by naval control.the proposed model performs the complex tasks of sailing boat for fishing.this system offers major advantage compared to existing sailing boats.the proposed system will require minimal electric power to adjust all its control in future the solar panels can also be used instead of battery.

The main prospective of this project is to design a smart catamaran for fishermen safety and gain stability over marine uncertainty.research which will provide complete video footage when fishermen is in threat,location tracking and manual control in case of emergency.

II.LITERATURE SURVEY:

*1. "Power flow Management Design for an Electric Propulsion system of a hybrid catamaran***"** This paper deals with power flow management of a hybrid electric catamaran. The boat,users a mix of electric energy, generation,storage and electric propulsion drives. This work provides a automatic model of all parts with frames electric drive system. The drawback of this paper was the battery couldn't provide sufficient energy, because they are discharged or the boat needs to navigate at higher speed,an auxiliary diesel generator is used for on board electric power generation and for recharging the battery.[1]

2. "A risk Constrained Control Approach for Adaptive Cruise Control ."

This paper investigates the incorporation of a risk metric based on time to collision for Adaptive Cruise control applications on multi-lane motorways.However this paper provides a variety of definition of risk for automated driving also introduces risk in terms of probability of collision multiplied by it severity.[2]

3. ***"Partial Air Cushion Supported Catamaran Concept Design."***

"This paper talks about specialized craft used to transport battle tanks,military vehicles and troops from a principal platform at sea to shore.The drawback of this paper was the operations involved is most difficult military maneuvers and most complex combination of naval firepower projection and logistics.[3]

4. **"*Design of Ship Motion Regulators for foil Catamarans in Irregular Sea Waves."***

"This paper a design technique of ship motion regulators for foil catamaran is introduced.Main idea is that

the design technique is how ship obtains the robustness of the control system with respect to ship motion.The main drawback is that the time domain equations of motion make complications and difficulties in the control system design.[4]

5. ***"An application of optimal preview control in terrain following system."***

"This is an optimal preview method applied to the design to the terrain following controller for cruise missile.In this method, tracking errors and control increments are both considered in the quadratic cost function. The drawback was that a preview feed forward compensation that feeds forward future commands and future disturbance is produced with an optimal preview servo system.[5]

6. "Design of a Fuel Cell powered Catamaran Type Unmanned Surface Vehicle"

This paper is the study to verify the applicability of fuel cells for powering surface vessels by developing a small catamaran type unmanned surface vehicle powered by hydrogen fuel cell. The propulsion of an electrical motor using a fuel cell is much higher than that off internal conversion engines which became major disadvantage.

7. "Autonomous Navigation of Catamaran Surface Vessel"

This paper motivation focuses on investigation of position and way point controllers in demand for wave adaptive modular vessel. This paper deals with development of GPS based position control system. For WAM-V able to navigate between way points. The major disadvantage of this paper is these methods require precise mathematical models of dynamic behavior of the system.

8. ***"A Survey on Applications and Challenges of Underwater Wireless Sensor Node"***

This paper gives the detailed survey on various applications and research challenges of Underwater sensor node,wireless sensor node, terrestrial wireless sensor node. UWSN is widely growing field due to its varied range of applications in management, control and surveillance in selected portions of deep oceans. They also discussed various applications and challenges of UWSN.[8]

9. "A Smart Robotic vehicle To Survey The Ocean"

The main objective of this paper is to design and develop a smart robotic vehicle for oceanographic research which will provide video footage of ocean, detects metals under ocean,oceanographic data collection,pollution monitoring,off shore exploration,disaster prevention like Tsunami and Earthquakes.It also does collision avoidance,remote island and regions that are sparsely populated could be supplied using smart robotic vehicle ,surveillance of the borders is done. The drawback of this paper is that smart robotic vehicle can't travel faster due to wind opposition and other external factors and there was no power backup.[9]

10. "A Survey on applications and research challenges of Catamaran Cruise"

In this paper we have discussed various applications and research challenges of catamaran cruise. To make catamaran cruise smart and robust it is necessary to design a system which will provide security and information to the fishermen instantly about the boarder line in coastal areas to save fishermen life.[10]

III. PROPOSED SYSTEM:

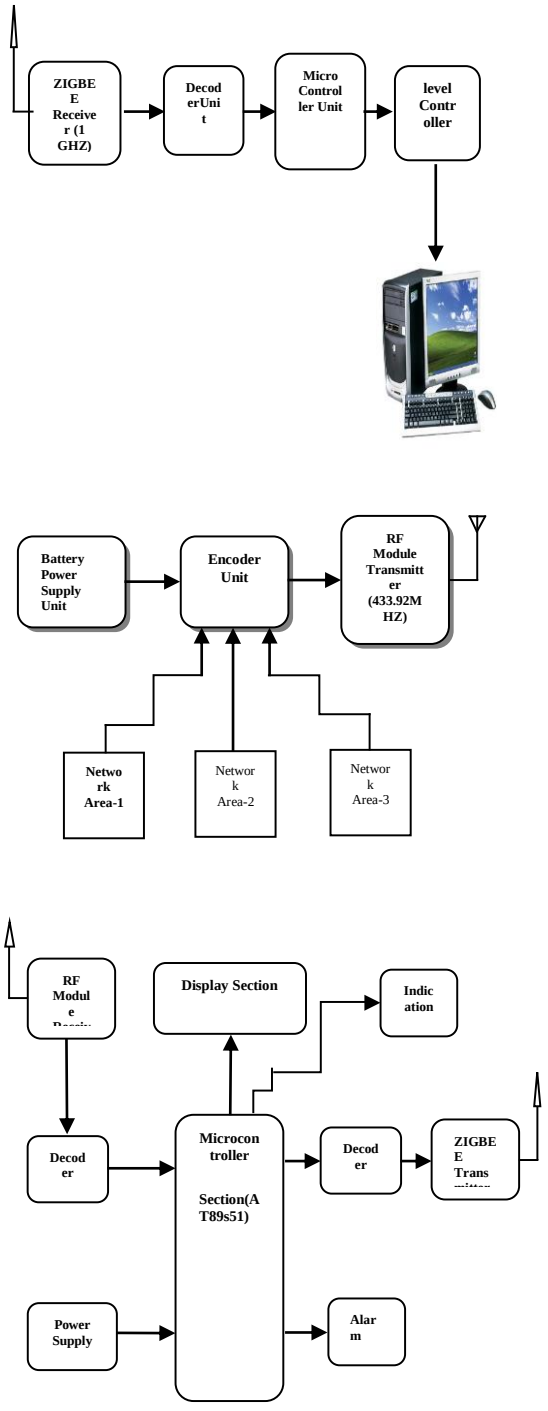
The proposed system explains about the convectional laws of the sea border limitations, also provides the safety to the fishermen, It explores interpretation of video footage's,photo capture,location tracking and updating. Also a hand shaking application in an android handset is given. Climatic and weather changes is updated. It is very feasible and cost efficient.

All the paper deals with large vessels and ships not much systems are in the favor of small boats. In our system we mainly prioritize the life of innocent fishermen and small boat with equipped embedded wireless system.

FIG 1: Figure shows the complete boat section along with the warning and the alarm unit.

FIG 2: Figure shows the naval control section along with RF module.

IV. BLOCK DIAGRAM :



V.WORKING:

We mainly deal with RF modules for the wireless communication, Zig bee for short distance communication, floating sensor(in real time), indication unit and display unit, Micro controller 8051, decoder and encoder device and power supply.

The controller unit will be kept in the boat section, has the boat travels in the sea and reaches the boundary limits the sensors placed on the water will send the message to the naval control room and to the fishermen . This message would be displayed on the indication unit and also voice announcement could be given if necessary. If the boat crosses the foreign boundaries then the alarm would be activated (such as buzzer would be used) .

If there is any weather and climatic changes , that would also be updated to the fishermen. In case of any emergency to the fishermen he would be provided with an android handset with handshake application in which we can get automatic video footage's , photos and exact location would be sent with the accurate latitude and longitude points. All these would be received if the request for the above mentioned activities to be done.

VI. ADVANTAGES:

*.In Detection of Home boundaries, international boundaries, foreign boundaries.

*.Information and warnings for fisherman's

*. Information of Weather and climate changes

*. Location Tracing using GPS points.

VII. DISADVANTAGES

*Underwater battery backup will be major issue.
*Network coverage will be a problem for long distance traveling.
*floating sensor drifts for every 15days which must be checked often.

VIII.APPLICATIONS

A.Identifying boundaries:Home,Foreign and International boundary

The Sea convection has certain boundary limits, each countries limitation will be divided into 12 nautical miles which is equal to 23.33kms this standard must be maintained by all the naval sea convection's. If the fisherman suppose crosses these boundary limits there ship would be seized and fisherman will be behind the bars.Therefore proposed system is useful in identifying and informing the fisherman about the boundary limits.

B. Smart environment: climatic and weather forecasting

The smart embedded sensor technology can be used in order to monitor and transmit critical parameters of the environment. In any work environment an enterprise based application can be the fact that it is commonly called smart environment. Common attributes of environment are humidity,temperature,pressure etc. If there is a sudden change in the climate the fishermen who has reached the brim of the sea can be informed. The smart technology can also be useful in water conservation,where droughts are very frequent.

C. Smart Unit : IOT, Hand shaking application for android cell.

This model can be extended over a city for better load balancing,integrate large computation with small embedded device. Smart grid and smart metering technology can also be implemented. An Hand shaking IOT application is installed on android phone, set certain baud rate example

4000 bd. Once the mobile is shaked with the given baud rate emergency message will be passed to the guardian and naval control room through the application of IOT.

D. Sensing : Health Monitoring

There can be various types of sensors based devices which can be used for monitoring ,tracking,Sensing etc. The tracked object can be globally or locally placed anywhere on the networks. The RF id chips enabled to track the vital health parameters. If there are any unusual activity the alarm or alert will be sent to the near by local assistant home.

In case of higher abnormalities near by efficient hospitals can be alerted. Thus, Hospitalization cost,time can be effectively reduced. This is also an advantage which comes under Smart health monitoring with the IOT. locally, globally and in any place, any time and over any network.

IX.CONCLUSION AND FUTURE SCOPE:

Hence the proposed project provides all necessary safety measurements to the fishermen, update them with climatic changes also prevents them by crossing the foreign boundaries and also it is very feasible.

In this paper we introduce a successful working prototype module of an catamaran designed for ocean geographic research and safety of fishermen. It tracks the movement with the help of wireless module attached through the RF pro wireless sensor network.

Future development is required to demonstrate the feasiblity of this smart catamaran in open sea and helpful for oceanographers and scientist along with common man(fishermen), also countries financial growth would not be affected. Better camera can be used with high resolution and pixels. The long lasting batteries can be used instead of using power supplies.

X.ACKNOWLEDGEMENT:

This work was supported by ks institute of technology, under the guidance of Mrs.Sahana salagare Asst.prof Department of ECE,Bengaluru,India.

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