International Journal of Science and Research (IJSR)
ISSN: 2319-7064
SJIF (2022): 7.942

Developing Software to Track Endangered Marine Species

D. I. De Silva[1], M. V. N. Godapitiya[2], R M I Rathnayake[3]

[1]Faculty of Computing, Sri Lanka Institute of Information Technology, Malabe, Sri Lanka
Email: *dilshan.i[at]sliit.lk*

[2]Faculty of Computing, Sri Lanka Institute of Information Technology, Malabe, Sri Lanka
Email: *virajini.g[at]sliit.lk*

[3]Department of Software Engineering, Sri Lanka Institute of Information Technology, Malabe, Sri Lanka
Email: *it21060144[at]my.sliit.lk*

Abstract: ***In this project "Life below water," going to develop a web application to track endangered species living around the Sri Lankan Ocean. Going to collect information on endangered marine species with the help of fishermen fishing in the deep sea. After collecting the details, decide to create a web application to track these kinds of species after successfully developing our web application, the main aim was to give it to the required authorities like the Sri Lanka tourism board/fishing cooperation and finally to the other countries who are interested in this.***

Keywords: web application, life below water, Sri Lankan Ocean, Sri Lanka, hope, web, species, application, who, track, Sri, endangered, water, tourism.

1. Introductıon

As third-year undergraduates at the Sri Lanka Institute of Information Technology, for our 3rd year, have a module called IT Project Management. Under the LIC Dr. Dilshan De Silva's supervision had to choose a topic "Life below Sea" and related to that topic decided to create a web application to track endangered marine species around Our country. For this purpose, to gather more information went to meet Prof Ms. Inoka Karunaratne. Head of the Zoology Department and she introduced me to Ms. Chaturika Munasinghe Lecture at the University of Peradeniya in the Department of Zoology. I took an appointment and personally went to meet her, and we had a short discussion about the related topic her advice was to give a fisherman a sheet to collect the name list of endangered marine species when they are going fishery.

Ms. Chaturika said endangered species are widely found in Manner, Jaffna, and Colombo like the places near the sea and it's better to give the sheet to nearly five fishermen and collect details. Before going there, she said must get the institute's permission if possible. She also said the fishermen may describe the species in their own words and we must convert them to their scientific names. According to the red list, we have recognized the critically endangered marine species around Sri Lanka. When talking about the Ecological importance of saving endangered species if they have been lost it affects their echo system. As humans, we need a healthy echo system to cleanse our nature and environment and hope to give it to the required authorities that are interested like a board of tourism / environmental foundations, etc. Here have divided our function into four parts user, animal, location, boat, and trip, and given those functions to four of the members involved in this group activity. Considering today's fast-moving world, this web application might be very productive for researchers and the common people involved in fishing or those who are interested in this topic. When considering school children and university undergraduates related to zoological studies, this application would also help them gain much valuable information for their studies.

2. Literature Review

This research paper publishes has created an augmented reality mobile application about endangered marine species. This is the only research article that Has been found as one that created an app regarding this project. The owner of this article researchers is from the Philippines. [1] System Architecture For connecting them to the web browser as indicated a user must use his/her device mostly the mobile application. The architecture of the system has been divided into two parts, the user side, and the database side.

Marine mammals are a species in danger. There are four distinct orders of marine mammals: cetaceans, sirenians, pinnipeds, and marine fissiped. A suborder of cetaceans is the dolphins. The creation of a dolphin watcher expert system will assist the expert or their research helper in determining the species of dolphins that are present in Malaysia. PROLOG is used as the platform and the console is used as the interface to create this expert system (ES). Rules that analyze the circumstances and decide on the outcome can be linked using ES. It became a knowledge-based system since the rules were created using expert knowledge. The creation of the ES and both inference engines that were employed were briefly detailed in this publication. [2]

Carry out the dugong biological survey (DBS), Mekong enormous catfish tracking project (MCTP), and Southeast Asia sea urtle associative study (SEASTAR2000) as part of the Global COE Program (2007-2012) and the 21st Century

Center of Excellence (COE) Program (2002-2007). All of the project's species are severely threatened and must be protected. They are included in CITES Appendix I of the Convention on International Trade in Endangered Species. While the implementation of the species' security is an important issue in Thailand and the surrounding ASEAN says, very little is known about the species. The ecology of the endangered species will be clarified by utilizing field informatics with bio-logging, including satellite telemetry, ultrasonic telemetry, GPS, and advanced data loggers. [3]

Examined is the effect of removing a structure on threatened and protected species. Explosive and nonexplosive methods of removing structures are covered, along with the precautions that should be taken to lessen their effects. [4]

Four years after the Exxon Valdez tanker threw 42 million liters of crude oil into Prince William Sound (PWS), a population crash of Pacific herring was found. Strong evidence that the herring elimination began shortly after the oil tragedy has just recently been brought to light. The Exxon Valdez Oil Spill Trustee Council (EVOS TC), which oversees restoration efforts, recognizes the importance of the herring stock's condition considering this new data. Over the past seven years, scientists at the Prince William Sound Science Center have discovered that there is a significant correlation between herring abundance and Steller sea lion numbers foraging in PWS. Furthermore, the findings suggest that the collapse of the PWS herring population has also impacted endangered western trout species. [5]

Scientific research, site suitability evaluations, seafloor mapping, and the discovery of natural and economic resource reserves all frequently require the use of seismic reflection equipment. According to increasing data from strandings and behavioral studies, high-power, low-frequency sonar systems can produce noise levels that influence marine mammals. 111. There are currently several governmental regulation measures in place to reduce the adverse impacts of anthropogenic activities on marine animals, particularly those connected to noise. These rules were created to implement the statutory requirements set out in the US Marine Mammal Protection Act (MMPA) 121, the US Endangered Species Act (ESA) 131, and the US National Environmental Policy Act (NEPA) 141. We will experiment to analyze the acoustic signatures of two extensively utilized mid-frequency seismic systems under a realistic survey in late September 2006.[6]

A list of the 32 species and subspecies, as well as their ranges and levels of conservation, of the Acipenseriformes, is provided. Most sturgeon species and subspecies are vulnerable or endangered in at least some of their ecosystems. Many are on the verge of extinction. As the population of the globe rises, the threat to sturgeons will also increase. Scientists from several nations now face the pressing issue of protecting sturgeons and renewing their stock across their range. The resources provided here will help resolve this challenging but crucial issue. The issues about Acipenseridae are also explored, including the research of resource categorization and biological conservation. [7]

measures proportionately more than is customary. This measurement and others are deliberate, using specifications that anticipate your paper as one part of the entire proceedings, and not as an independent document. Please do not revise any of the current designations. A potent method for understanding the ecology of the species in danger will be field informatics with bio-logging, including satellite telemetry, ultrasonic telemetry, GPS, and advanced data loggers. [8]

To protect marine creatures from anthropogenic noise, the Marine Mammal Protection Act and the Endangered Species Act were enacted, and NOAA requires entities to estimate how many members of each species may be affected by the auditory event. [9]

Have collaborated on summer aerial surveys, sea turtle telemetry studies, opportunistic whale sightings data gathering, and a ship traffic characterization study in coastal mid-Atlantic waters. In addition, we respond to live and dead strandings of cetacean and pinniped species when there is no density or tagging data in the area but where we have common documentation of occurrence in the stranding record. By integrating these data into a unified spatial analysis, we may better understand human and wildlife use of places, and development plans, and find possible conflicts. Our tagging and sighting initiatives may assist us to learn how creatures use their natural surroundings. We included a maximum of one location data point per day from five distinct days in the tagging data. [10]

3. Methodology

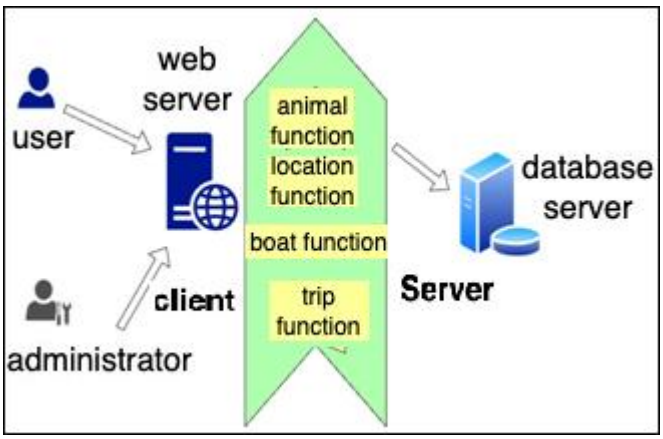

Figure 1: System Architecture

The plan is to give a sheet of paper to each fisherman who does fishing at the deep sea to note down the information about the endangered marine species that we found in the deep sea. Hope to collect from at least five fishermen around the Sri Lankan Ocean like Manner, Jaffna, Colombo, and Galle, analyze each piece of information, and give it to the required authorities like the Sri Lanka tourist board and if satisfied like to introduce it to the other countries too.

The main purpose is to develop a web application regarding the project using MERN Stack. MERN stands for MongoDB, Express, React, and Node, combining the four key technologies that make up the stack. Gong to use

MongoDB — document database. Express(.js) — Node.js web framework. React(.js) — a client-side JavaScript framework to build up the project.
Mongo dB and node js are the back end and react works as the front end.

Web application called by a name as endangered marine species tracker.

There are four functions available.
1) Function Animal
2) Function Boat
3) Function Location
4) Function Trip.

Each function includes crud operations. That is Read data, write data, update data, and delete data. CRUD stands for create, read, update, and delete.

4. Proposed System

In this app, find where these fishers are located around the seaside of Sri Lanka and note down the location. Everything is done by the fisherman. Fishermen are a bit aggressive people, so must be patient while working with them. Must give a tip for their satisfaction. So, the application interfaces will be as follows.

Going to develop an endangered species application tracker like the one below. "This is the fish brain application tracker". These photos were taken from the website. This web application, going to develop the same. There will be a location tracker and when an endangered fish is identified it is noted down by the app using the location details. This application might be useful to those who wish to use the sea area for their carrier purpose, educational purposes, and foreign visitors to protect themself from dangerous creatures. If this has a marketplace wish to introduce it to other countries as well and get the patent. This will be a good invention and a lifesaver too.

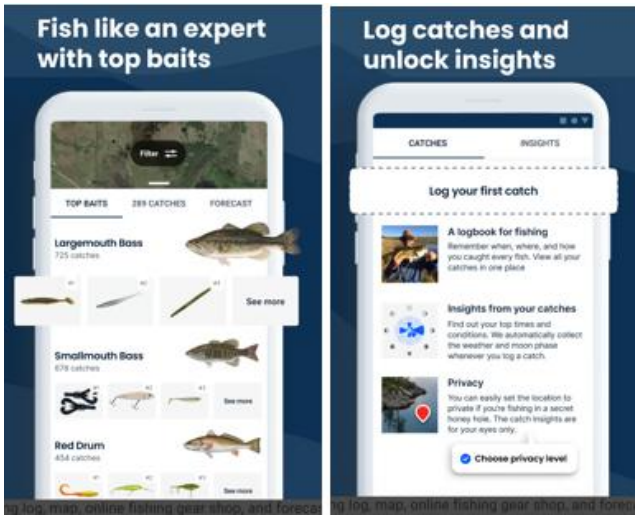

Figure 2: Screen Shots of "Fish Brain Application Tracker".

5. Conclusion

Have to mention that what is the importance of writing this research article. Sri Lanka is surrounded by sea and more foreigners come to visit the beauty of the country. Among them, there may be researchers coming from other countries. The fisherman who is doing fishery is also at life risk as well as the tourists. Therefore, we thought it would be a definite advantage to create a web app for their safety. By searching on websites and everywhere we so mostly still anyone haven't developed a similar application to our proposed task. Some apps were very similar to our app, but their purpose was not finding the endangered species. They aimed to find the different varieties of fishers living around each area. Therefore, we can conclude by saying that our aim of building this app became fruitful to most people like students, researchers, fishermen, and those interested in this topic. It would be a greatpleasure to involve in this work.

References

[1] M. Y. Mina *et al.*, ") LVK EH ZLWK \ RX $ Q $ XJPHQWHG 5HDOLW \ 0RELOH An Augmented Reality Mobile $ SSOLFDWLRQ $ ERXW (QGDQJHUHG 0DULQH 6SHFLHV Application AboutEndangeredMarine Species," pp. 20–24, 2022.
[2] N. R. Mohamad, N. Daut, L. Barukang, and S. A. Jaaman, "Development of an expert system for identifying dolphin's species in Malaysian fisheries using PROLOG," *Proc. - Int. Symp. Inf. Technol. 2008, ITSim*, vol. 1, pp. 6–11, 2008, doi: 10.1109/ITSIM.2008.4631558.
[3] N. Arai, "Field informatics for co-existence between human beings and endangered species: Sea turtles Mekong giant catfish and dugongs," *Proc. - Int.Conf. Informatics Educ. Res. Knowledge-Circulating Soc. ICKS 2008*, pp. 61–66, 2008, doi: 10.1109/ICKS.2008.17.
[4] R. T. Bennett, "Endangered species and marine mammal protection during offshore structure removals in the Gulf of Mexico," vol. 3, no. 1986, pp. 1083–1086, 1988, doi: 10.1109/oceans.1988.794944.
[5] R. E. Thorne, "When endangered species collide: Ecosystem restoration in Prince William Sound,

Alaska," *Ocean. 2007 - Eur.*, pp. 1–4, 2007, doi: 10.1109/oceanse.2007.4302264.

[6] A. M. Gontzl, L. T. Hatch, D. Wiley, and E. Remillard, "Shallow-Water Introducing into the Much Noise are we Introducing into the Ocean?" *IEEE J. Ocean. Eng.*, pp. 1–5, 2006.

[7] B. Sciences, "ISINGHUA SCIENCE AND TECHNOLOGY Species, Distributions and Conservation of," vol. 7, no. 4, pp. 416–420, 2002.

[8] L. Rothschild, "Proposed rules on endangered species and clean water: The impacts on project development," *IEEE Cem. Ind. Tech. Conf.*, vol. 2015-June, pp. 1–5, 2015, doi: 10.1109/CITCON.2015.7122598.

[9] A. Fernandez, R. Ayllon, C. Ludwig, and J. D. Gusman, "Design of an improved model for marine species movement," *2017 Syst. Inf. Eng. Des. Symp. SIEDS 2017*, pp. 56–61, 2017, doi: 10.1109/SIEDS.2017.7937753.

[10] S. D. A. Goonatilake *et al.*, *The National Red List Sri Lanka: Assessment of the Threat Status of The National Red List of Sri Lanka: Assessment of the Threat Status of the Freshwater Fishes of Sri Lanka*, no. February. 2020.