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IMPROVISATION IN UNDERWATER COMMUNICATION FOR DISASTER MANAGEMENT

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Abstract

Underwater communication is a technique of sending and receiving messages below water. There are several ways of employing such communication but the most common is by using hydrophones. Underwater communication is difficult due to factors such as multi-path propagation, time variations of the channel, small available bandwidth and strong signal attenuation, especially over long ranges. Compared to terrestrial communication, underwater communication has low data rates because it uses acoustic waves instead of electromagnetic waves. Underwater communications play an important role in marine activities such as environmental monitoring, underwater exploration, and scientific data collection.

Keywords: *Underwater communication, hydrophones, acoustic waves ,environmental monitoring, underwater exploration.*

INTRODUCTION

At the beginning of the 20th century some ships communicated by underwater bells as well as using the system for navigation. Submarine signals were at the time competitive with the primitive Maritime radio navigation service. The later Fessenden oscillator allowed communication with submarines. Despite the seminal developments, underwater wireless sensor networks (UWSNs) have the potential to empower humanitarian applications on the oceans. UWSNs have the ability to sense locations in the underwater environment where human beings cannot see, process data locally, and transmit them via underwater wireless communication. UWSNs can benefit humanitarian needs, such as mitigate disasters, relief in global warming, and provide access to scientific data.

THEORY

The growing need for underwater observation and subsea monitoring systems has stimulated considerable interest in advancing the enabling technologies of underwater wireless communication and underwater sensor networks. This communication technology is expected to play an important role in investigating climate change, in monitoring biological, biogeochemical, evolutionary, and ecological changes in the sea, ocean, and lake environments, and in helping to control and maintain oil production facilities and harbors using unmanned underwater vehicles (UUVs), submarines, ships, buoys, and divers. However, the present technology of underwater acoustic communication cannot provide the high data rate required to investigate and monitor these environments and facilities. Optical wireless communication has been proposed as the best alternative to meet this challenge.

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Experimental

Various types of wireless networks have emerged like Ad hoc networks have emerged as one of the reliable communication technology, which can deal with the situations during any disaster. Key aspect used is communication between people suffering and rescue team members to save lives. In this case, situations of conditions like flood or tsunami etc. have been considered.

In underwater situations, sensor nodes [7, 8, 9, 10] are deployed, these sensor nodes have a lifetime suitable for communication and are also able to charge using solar light or other mediums. Sensor nodes are stable deployed randomly. Sensor nodes are used to trace any signals, these signals can send to next level suing mobile nodes. The mobile nodes can act as routers as well. These nodes take the data to gateway nodes and these nodes take data to the base station. Transmission speed is approx. 50 kilobits per second (kbps), packet size mostly is 1024 bytes. This data is handled using satellite communication by telecommunication agencies. Comparison based performance (CBR) is adopted as it is used for any type of data for which end-systems require a predictable response time and amount of bandwidth. Simulation has been done for assessing real-life situations. In case of disaster response, many models have been highlighted. Some most widely used are synthetic, map-based, and trace-based mobility models. The most used can be identified as synthetic mobility model. Their creation is mostly done using Generator, something like Bonn Motion . In this type of model, the case area, i.e. disaster area can be categorized into three parts. One will be designated as an incident site, the other two are casualty and transport. Communication methods built on physical communication infrastructure used to have several limitations. Wireless communication networks have limited range and signal strengths and energy also plays a crucial role in the overall working of the network as well as infrastructure. The ad hoc solution still has been considered as a major solution in rescue operations. It seems that in future whenever some undue disaster happens, the deployment of ad hoc networks [15, 16] can be a solution.

RESULT

- It promotes the use of renewable resources.
- Helps to control the disaster management.
- Improves the communication by different wireless networks.

DISCUSSION

This research paper presents a brief summary on underwater communication, how wireless networks can solve the problems regarding disaster management and also enhance underwater communication. The research paper also describes the experiments carried out by some wireless networks like Ad hoc and how it can be beneficial.

CONCLUSION

An analysis has been done starting with the underwater problem of data depletion to general disastrous situations. A general solution has been proposed. This will take care of situations that come under the category of disaster and sudden loss of signal or communication. It has been observed in the study that proper antenna insertions are a vital matter. At times it actually can change the scenario a lot. It was observed that a gain in signal strength of more than 70% can be

achieved. This process can be adopted at a mass scale in case of disasters and lives can be saved. The result shows that the improvement is there for the simulation carried out with the scenario set for the test. The underwater communication can also be tried as well. The results were carried for the stability of the network and the energy used by the nodes. The energy used is not much even in the disastrous situation although the security aspects were not tested, although that may not be very important in the disaster situation. The most important is the connectivity to be established and it will perform well in the disaster. So, at last we can conclude that with experiments conducted, that can be implemented on large scale and should help the present as well as future generations.

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