# A NOVEL DESIGN ON UNDERWATER COMMUNICATION USING AFISH ALGORITHM

S.A.Kalaiselvan[*1], P.Udaya Kumar[2], Dr. P. Santosh Kumar Patra[3], Teena Joseph[4]
[*1,2,3]Professor, Department of Computer Science and Engineering, St.Martin's Engineering College, Telanagana, India,
[4]Associate Professor, Department of Computer Science and Engineering, Mar Baselios Christian College of Engineering and Technology, Kerala, India.
Corresponding Author Email: kalaiselvanresearch@gmail.com

**Abstract:**

Now a days there is drastic growth in underwater communication for submarines and also in commercial systems. The challenging communication in underwater is severe attenuation, multipath effect and limited power, also complicated for long distance communications. In this observe an efficient protocol and algorithm is mandatory for the data communication with route discovery. In underwater sensor the continuous communication is required between the sensor nodes because sometimes it may affect due to the natural disaster, so the data loss may happen in the communication. In this paper a novel design for underwater communication is proposed by using the Artificial Fish Algorithm (AFISH) with Handshake protocol. The proposed model is evaluated in a particular distance by deploying the sensor nodes and route constructed between the source and destination. It is clear that the data communication has been done with less delay and loss.

**Keyword**: *AFISH, Acoustic Signal, Sensor Nodes, Natural Disaster, Severe Attenuation*.

## Background Study:

Numerous ideas and algorithms are suggested for the energy efficient communication in underwater communication. [1] The communication in underwater an efficient Optimized Energy Efficient Routing Protocol and Artificial Fish Swarm Optimization algorithm is proposed for finding the shortest past in underwater sensor network. The performance evaluation of the Fish Movement is monitored for the fisheries catchment in underwater by deploying the underwater sensor nodes[2]. In this underwater communication routing is the important role for the communication to find the shortest path by using the efficient protocol[3]. An efficient information transmission physical and fundamentals engineering implementations proposed and reviewed in [4]. The low cost modem also required for the underwater communication if the

distance is more and many sensors are deployed [5]. An investigation on handshake based MAC and random acess based MAC in [6]. Handshake is the protocol which used to construct the route based on the reply from the adjacent node.

There are several types of modes of operations are there, in this underwater sensor network communication half duplex is for constricting the route after the construction full duplex play the role of data communication as proved in [7]. The reuse of handshake protocol in underwater communication is more efficient for route construction[8]. The communication session is established by exchanging the request (RTS), Clear to Send (CTS) in handshake but it is a challenging due to long propagation [9]. While designing the novel approach we have to consider these problems particularly for long distance and also it is based on the bandwidth used for the communication. In [10-12] earth oceans occupy 71% area more than the land area. Social development and human survival are important by means of the ocean development. In this scenario there is a drastic development in wireless sensor network and underwater acoustic network which have low cost communication. In existing many applications are implemented for marine, with this reference an artificial fish algorithm is proposed to enable the data communication in underwater.

**Proposed Approach:**

In ocean particular area has been taken for the communication, the area should be in proper breadth, width in order to deploy the sensor nodes. There is a sensor called underwater sensor which can work under the acoustic signal. In underwater only acoustic signal is possible for communication by means of sound vibration.

**Figure 1**. Sensor Deployment in Underwater

**Figure 2**. Senor injected Fish

In this proposed design the artificial fish is injected with the sensor which sense the underwater sensor. In above figure it shows the single sensor node deployment in underwater in a particular area for data transmission. Like this deploy the sensor and these sensors will sense our sensor which we injected in the fish. The fish is injected with sensor device and deploy it in the selected area. Generally fishes are search the food in a group so the injected fish also swim with the group to search the food. Some fishes may travel in different paths it may be a long distance and worst

route. So the sensor injected fish travel through the sensor and sensor sense the fish and send the information [13] that which sensor id is travelled through which sensor.


**Figure 3**. Fish with JSATS Tag

The well configured node is called Base station in the above the sea to gather information how many times our sensor injected fish is passed through the sensor. Finally the frequently used path is assumed as the shortest path. Figure 3 shows the JSATS (Juvenile Salmon Acoustic Telemetry System ) [14] Tag which injected in the fish. It is initiated in 2001 and it is a acoustic transmitters and receiving systems to remotely track fish in one, two, or three dimensions with sub-meter accuracy.

**Results and Discussions:**

Sensor injected fish is monitored and the shortest route is constructed with energy efficiency. The artificial fish is the sensor injected fish which sensed by the underwater sensors as shown in the figure 3. So it is clear route construction and energy efficiency is proved with this experiment also it is out performs for the shortest route in underwater communication. The below result shows the number of routes construction.

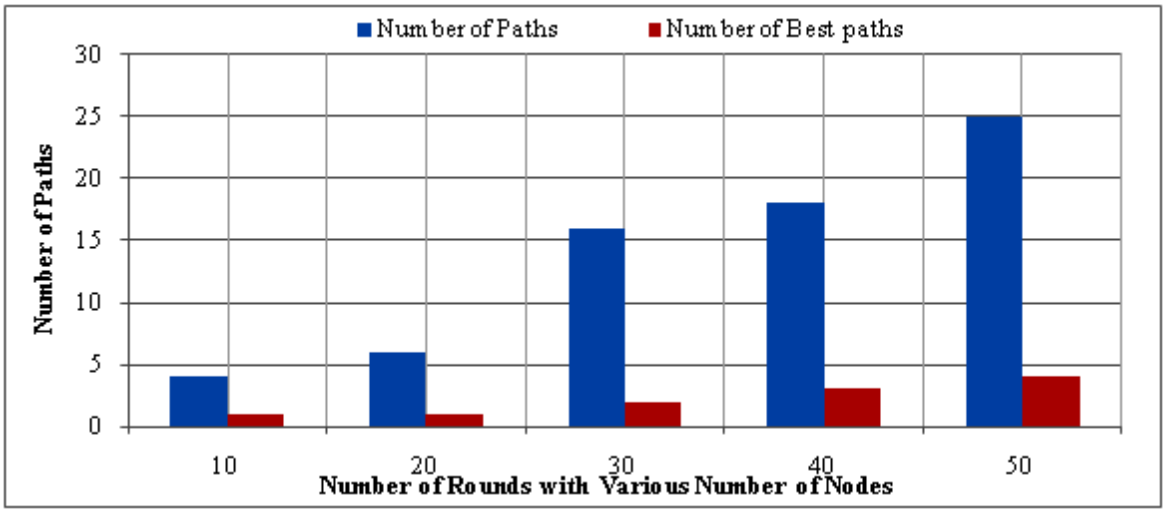


**Figure 4.** Best Paths with number of Nodes

In above result that shows the number of paths which can travel from source to destination. But the shortest path is important for the route discovery because the every sensors are equipped with limited battery backup. If the sensor is consuming more energy then the battery going to be drain and if one node fails means then the alternate route should be chosen by handshake protocol. So in this proposed the route discovery is by the artificial fish algorithm and if any of the sensor is fails due to battery then handshake protocol has been used. This handshake protocol is to send the hello signal to all the adjacent nodes then all available nodes are replied with their time delay, according to that the route is constructed which node is the next node. This scenario is used at the time to route failure which is constructed by the Artificial Fish algorithm.

**Conclusion:**

In recent researches many researchers are did their researches in underwater communication. In this paper the novel design is proposed for the communication in the underwater communication. It is clear from the result that it provides the best path between the source and destination with high throughput. Also in the proposed approach the alternate method also proposed for the sensor failure due to the battery backup. In further study long distance may tested for the communication, because the route and the environment may change due to the natural disaster.

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