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A NEW WAY TO CHOOSE THE CLUSTER HEAD IN A WIRELESS ACOUSTIC SENSOR NETWORK

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ABSTRACT:

Underwater sound networks are very important for keeping an eye on pollution, finding disasters and sending out early alerts, collecting research data from sites at the ocean floor, and keeping an eye on things from below. Underwater networks are still hard to set up because of things like difficult conditions, high costs, high failure rates, and severe loss. With the way underground network traffic protocols are set up now, saving energy is a big deal. Most of the energy-efficient methods made for wireless networking on land can't be used underground.In underwater sound sensor networks, clustering is a good way to cut down on energy use and transmission delay. It is also important to achieve scale when there are a lot of mobile nodes that move around a lot. Choosing the right cluster head is important for making the network last longer. So, in this study, the promethee method is used to choose the cluster head successfully, and different factors are used to look at how well the network works.

INTRODUCTION:

Earth is mostly water, with water covering 66% of its surface.Underwater communications is an area that is growing quickly thanks to quick advances in technology. It has many uses in both business and military water-based systems. The need for radio messaging underwater exists in applications such as:

- Remote control in the seaward oil industry
- Pollution observing in natural environmental systems
- Collection of information and scientific data from ocean bottom
- Disaster detection and early cautioning
- National security and defense (interruption recognition and underwaterreconnaissance)

Thus, the research of Underwater Wireless Communication has became the most critical job in the

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investigation of seas and other oceanic conditions. Conversely with terrestrial wireless radio communications, the communication channels in underwater wireless networks can be influenced by

- Noise
- Limited bandwidth
- Limited power resources
- Harsh underwater ambient conditions.

As a result, the underwater channel often exhibits severe attenuation, frequency dispersion, multipath effects and constrained bandwidth which turn the underwater channel into a standout amongst the most intricate and harsh wireless channel in nature.

UNDERWATERSENSOR NETWORKS:

Underwater sensing networks are an area of ocean study that is growing very quickly. In comparison to wireless contact on land, radio frequency (RF) messages behave differently when they are underwater. In the water, the path is very fluid, and how it moves changes depending on the depth of the water. The means of transmission is sometimes cloudy, and the water is mostly salty. These extreme features cause the high frequency RF waves to lose a lot of their power.In order to use low frequency Electro-Magnetic (EM) waves for transmission, you need a big receiver, which is not possible underwater. So, we need an Underwater Wireless Communication (UWC) method that works at low frequencies and can weaken signals enough to be useful. The above needs were met by sound method.

In this way, Underwater Acoustic Sensor Networks (UASN) make it possible for the usual UWC to happen.Underwater sensor nodes are in charge of sending correct data that has been felt. But because the world beneath is so complicated, getting the data from the sensors to the sink node on the ocean floor quickly and reliably is a very hard study problem.A lot of different route methods have been suggested for terrestrial wireless sensing networks (TWSNs). An energy-efficient routing algorithm is a key part of data transfer and real-world uses in underwater wireless sensor networks (UWSN).But because UWSN has unique features like a dynamic structure, a narrow bandwidth, high latency, and fast energy usage, it is hard to make routing protocols for it.In UWSN, sensor nodes usually move around with the movement of the ocean. As a result, the set route lines need to be updated and maintained on a regular basis, which uses a lot of energy. But everyone knows that all sensor nodes have a

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limited amount of energy, which makes it hard to create route methods for UWSN that use less energy.

CLUSTER BASED ROUTING PROTOCOL:

The Cluster Based Routing Protocol (CBRP) is a hierarchical protocol that is needed for sensor network apps that use a lot of devices. There will be a lot of network overcrowding and data crashes if all the nodes start talking to each other and sending data over the network. This will use up all the network's limited energy.

These problems will be fixed by node grouping. Nodes in a grouped network can be split up into several small groups, which are called clusters. One person is chosen to be the cluster head (CH) for each cluster, and there are a number of partner nodes in each cluster.The member computers send their information to the cluster head. This person is in charge of the cluster and sends the data to a central base station (BS) either directly or through other cluster heads.

ADVANTAGES:

- Clustering creates a hierarchical WSN which facilitates efficient utilization of limited energy of member nodes and consequently it extends network lifetime.
- Clustering structure decreases routing control overhead.
- It improves network stability.

LOW ENERGY ADAPTIVE CLUSTERING HIERARCHY (LEACH):

LEACH is a way for a Wireless Sensor Network to route data. The LEACH algorithm is made up of three steps. The first step is to set up groups and make sure that they can talk to each other. In this way, the LEACH protocol method includes setting up groups and sending data securely. In order to choose cluster heads, LEACH uses the equal chance method, which picks cluster heads at random in a circle and gives all of the network's energy to each node equally.

As a result, the LEACH program cuts down on energy use and makes the network last longer. LEACH's executive process happens in cycles. During each cycle, groups are set up and data is sent. A cycle is also known as a "round." The length of a stable data transfer term is much longer than the time needed for setup so that energy is saved.

The exact steps are as follows: When groups are first set up, each node will randomly generate a number between 0 and 1, whether it's 0 or 1. This round, the node will be a cluster head

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if the random number is less than the barrier T(n).

ADVANTAGE:

- LEACH protocol carries out data fusion during data transmission, which reduces the redundant data and conserves the energy.
- LEACH protocol adopts the mechanism of MAC layer based on CDMA, effectively avoiding signal interference when transmitting data between clusters; while in the cluster, this protocol adopts the mechanism of MAC layer based on TDMA to avoid information conflict sent by nodes, making nodes to sleep when they are not in their own time gaps, so as to save energy.
- whole network will evenly distribute on each node

DISADVANTAGE:

- The selection of cluster heads is probability in LEACH protocol, and it didn't take the remaining energy of a node into account. If a node with low energy is selected to be a cluster head, this will result in that collected data couldn't be sent out.
- With the time running, the value of T(n) will increase and the probability of the number generated by the nodes will increase too, so that more and more nodes tobe cluster heads.

PROPOSED IDEA:

PROMETHEE ALGORITHM:

The cluster head uses more power than the other nodes. This means that the cluster head changes a lot, which breaks many paths. It is very important to choose the right cluster head.To get around this problem, the PROMETHEE method is used to choose the cluster head.PROMETHEE, which stands for "Preference ranking organization method for enrichment evaluation," has been written about and used to solve the problem of choosing the head of a cluster.In the area of making decisions based on more than one

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trait, PROMETHEE, which was created by Brans et al., is a well-known outranking method. It compares each option against each other pair-wise along each criterion to make a full list of the options, ranked from best to worst.Comparing how much each node wants to be a cluster head is what the PROMETHEE method is based on.

The knowledge for cluster head election based on the following three descriptors:

- Distance of a node to the cluster centroid
- Its remaining battery capacity and
- Its degree of mobility.

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