A Deep Learning-based Multi-Path Routing Protocol for Improving Security using Encryption in Underwater Wireless Sensor Networks

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Abstract:
Underwater Wireless Sensor Networks (UWSN) is an interesting topic today in both scientific research and commercial applications. Major challenges of UASN design constraints are unreliable network lifetime and low battery power of underwater sensor nodes. In addition, sensor nodes may generate sensitive data that needs to be hidden. Therefore, encryption ciphers maintain security by encrypting the data before sending it. However, encryption methods require more computation and energy, and network lifetime is reduced. A key issue in this research area is that due to the complexity of underwater environments and slow transmission rates, inefficient architectures for multi-path variable data transmission are a security measure combined with encryption to prevent overate attacks with high delay tolerance. To overcome these issues, in this work proposed the method Multi-path Routing Protocol (MRP) based on Spectral Social Spider optimization (SSSO) feature selection. Initially, collected the sensor network dataset from standard repository using for classification to avoid the delay and improving the transmission using best features. The first step is to remove redundant data for each cluster head by applying a pre-processing step that uses data redundancy elimination techniques to reduce unbalanced data and missing values. Second-stage feature selection is based on the maximum weightage features using maximum threshold limits based on Spectral Social Spider optimization(SSSO). SSSO algorithm for analysis relay method for dependable packet delivery. After feature selection

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to sending and receiving the data based on the features using Improved Data Encryption Standard (I-DES) by analysing the cipher text to identify the encryption algorithm, focused cryptanalysis methods can be used. Before classification evaluating the features metrics based on Softmax Neuron Classifier (SNC) using for estimating the features weights validation. The final classification stage using Recurs...

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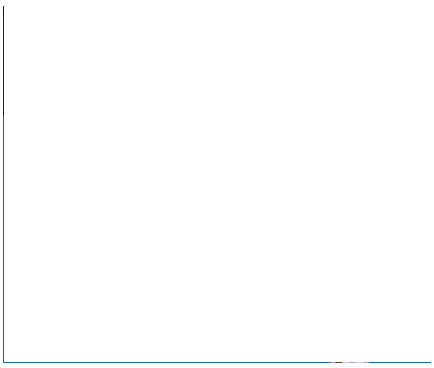
Contents

Underwater Wireless Sensor Networks (UWSN) have been attracting a lot of attention recently. UWSN have many uses in both civil and military contexts, including disaster detection, coastal surveillance, and military defence. Because underwater environments have severe radio wave attenuation, acoustic wave communication is thought to be the best long-distance communication technique for UWSN. First, lengthy end-to-end delays are a result of slow propagation speeds. In the water, sound signals move at a speed of about 1500 m/s, five orders of magnitude slower than radio signals. To make matters worse, water depth, temperature, and salinity all affect the speed of propagation. The delivery of network packets and schedules for synchronisation are severely hampered by this delay uncertainty. Second, severe multipath fading, Doppler spreading, a lack of spectrum resources, and high spatiotemporal uncertainty are all characteristics of underwater tracks. All of these elements increase error rates, making it more difficult for UWSNs to implement reliable packet switching.



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