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Review on Underwater Networks using Deep Learning

G. Prathyusha[1], G. Vamsi Krishna[2], G. Mohanlal[3], G. Hari Krishna Reddy[4], G. Jyothsna[5]
GMR Institute of Technology, Rajam, Andhra Pradesh, India
20341A0568@gmrit.edu.in[1], 20341A0566@gmrit.edu.in[2], 20341A0567@gmrit.edu.in[3]
20341A0569@gmrit.edu.in[4], 20341A0570@gmrit.edu.in[5]

Abstract: *The development of effective underwater communication systems has become more crucial since, the recent increase in the number of submarine operations. Acoustic is related to a sound or sense of hearing. Underwater Acoustic sensor networks are used to transmit the signals over long distances from the instrument which is placed under the water to the control unit on the seashore. Acoustic signals are used to predict the climatic changes based on the waves produced in the sea/ocean. Different underwater acoustics network models have been tried using mathematical equations and approximations under certain assumptions to enhance the design and development of underwater communication systems by gaining a better understanding of the underwater acoustic channel. For a good and accurate model to design deep learning algorithms are used. Deep learning is a subset of machine learning, which is essentially a neural network with three or more layers. The purpose of the router, whether real or virtual, is to accept, examine and transfer packets of data between computer networks. In this work, deep learning methods such as "Deep Neural Network (DNN)" and "Long Short Term Memory (LSTM)" and some methods like SUN,VBF,DF are used to model the acoustic channel*

Keywords: Underwater Acoustic Channel, Deep Neural Network, Long Short Term Memory, acoustic signal.

REFERENCES

[1]. Huang, L., Zhang, Q., Tan, W., Wang, Y., Zhang, L., He, C., & Tian, Z. (2020). Adaptive modulation and coding in underwater acoustic communications: a machine learning perspective. EURASIP Journal on Wireless Communications and Networking, *2020*(1), 1-25.

[2]. Goutham, V., & Harigovindan, V. P. (2021). Full-duplex cooperative relaying with NOMA for the performance enhancement of underwater acoustic sensor networks. Engineering Science and Technology, an International Journal, 24(6), 1396-1407.

[3]. Hemavathy, N., & Indumathi, P. (2021). Deep learning-based hybrid dynamic biased track (DL-HDBT) routing for under water acoustic sensor networks, Journal of Ambient Intelligence and Humanized Computing, *12*(1), 1211- 1225.

[4]. Sun, N., Wang, X., Han, G., Peng, Y., & Jiang, J. (2021). Collision-free and low delay MAC protocol based on multi-level quorum system in underwater wireless sensor networks. Computer Communications, 173, 56-69.

[5]. Mishachandar, B., & Vairamuthu, S. (2021). An underwater cognitive acoustic network strategy for efficient spectrum utilization. *Applied Acoustics*, *175*, 107861.

[6]. Khan, Z. A., Karim, O. A., Abbas, S., Javaid, N., Zikria, Y. B., & Tariq, U. (2021). Q-learning based energy-efficient and void avoidance routing protocol for underwater acoustic sensor networks. *Computer Networks*, *197*, 108309.

[7]. Roy, A., & Sarma, N. (2021). A synchronous duty-cycled reservation based MAC protocol for underwater wirelesssensor networks. *Digital Communications and Networks*, *7*(3), 385-398.

[8]. Toky, A., Singh, R. P., & Das, S. (2020). Localization schemes for underwater acoustic sensor networks-a review. *Computer Science Review*, *37*, 100241.

[9]. Li, C., Xu, Y., Xu, C., An, Z., Diao, B., & Li, X. (2015). DTMAC: A delay tolerant MAC protocol for underwater wirelesssensor networks. *IEEE Sensors Journal*, *16*(11), 4137-4146.

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[10]. Chen, Y., Tang, Y., Liu, J., Zhang, X., & Xu, X. (2021). Optimizing the number of relays for energy efficient multi-hop covert underwater acoustic cooperative networks. Applied Acoustics, *177*, 107911.

[11]. Bharamagoudra, M. R., Manvi, S. S., & Gonen, B. (2017). Event driven energy depth and channel aware routing for underwater acoustic sensor networks: Agent oriented clustering based approach. *Computers & Electrical Engineering*, *58*, 1-19.

[12]. Han, G., Shen, S., Song, H., Yang, T., & Zhang, W. (2018). A stratification-based data collection scheme in underwater acoustic sensor networks. *IEEE Transactions on Vehicular Technology*, *67*(11), 10671-10682.

[13]. Zhang, W., Han, G., Wang, X., Guizani, M., Fan, K., & Shu, L. (2020). A node location algorithm based on node movement prediction in underwater acoustic sensor networks. *IEEE Transactions on Vehicular Technology*, *69*(3), 3166-3178.

[14]. Zhang, W., Wang, X., Han, G., Peng, Y., Guizani, M., & Sun, J. (2021). A load-adaptive fair access protocol for MAC in underwater acoustic sensor networks. *Journal of Network and Computer Applications*, *173*, 102867

[15]. Li, S., Qu, W., Liu, C., Qiu, T., & Zhao, Z. (2019). Survey on high reliability wireless communication for underwatersensor networks. *Journal of Network and Computer Applications*, *148*, 102446.

[16]. Su, R., Gong, Z., Zhang, D., Li, C., Chen, Y., & Venkatesan, R. (2021). An adaptive asynchronous wake-up scheme for underwater acoustic sensor networks using deep reinforcement learning. *IEEE Transactions on Vehicular Technology*, *70*(2), 1851-1865.

[17]. Jie Chen, Chang Liu, Jiawu Xie, Jie An, Nan Huang, "Time-Frequency Mask Aware Bi-directional LSTM: A Deep Learning Approach for Underwater Acoustic Signal Separation", University of Electronic Science and Technology of China, 2022.

[18]. Petroni et al., "Hybrid Space-Frequency Access for Underwater Acoustic Networks," in IEEE Access, vol. 10, pp. 23885-23901, 2022**.**

[19]. Jiang, S. (2018). On securing underwater acoustic networks: A survey. *IEEE Communications Surveys & Tutorials*, *21*(1), 729-752**.**

[20]. Cerqueira, L. S., Vieira, A. B., Vieira, L. F., Vieira, M. A., & Nacif, J. A. (2021). A cooperative protocol for pervasiveunderwater acoustic networks. *Wireless Networks*, *27*(3), 1941-1963.