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APPLICATION OF ARTIFICIAL NEURAL NETWORKS TO ESTIMATE THE DIRECTION OF SIGNAL ARRIVAL IN AN UNDERWATER ENVIRONMENT

V.V. Bobrov, N.S. Smadych, A.Yu. Rodionov, D.V. Zinchenko

The article discusses approaches to solving the problem of spatial localization of sound sources in the underwater environment, as one of the fundamental challenges of modern hydroacoustics. Limitations of classical algorithms for estimating signal direction (Direction of Arrival) in passive monitoring, underwater navigation, and environmental control systems are analyzed. More efficient methods of direction finding using modern architectures of artificial neural networks are considered. A method for obtaining a set of synthetic data for deep learning of neural networks of various architectures using a computer simulation of a hydroacoustic communication channel in the BELLHOP programs presented. The results of modeling a linear array of hydrophones are presented and the data obtained are analyzed. In conclusion, approaches to improving the resolution and efficiency of the considered method are proposed.

Keywords: neural networks, artificial intelligence, deep learning, linear antenna arrays, simulation, hydroacoustics

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Information about the authors

BOBROV Vladislav Vitalievich, Master's degree, Associate Professor
Place of work: Far Eastern Federal University, Polytechnic Institute, Department of Electronics, Telecommunications, and Instrumentation
Work address: 690922, Vladivostok, Russian Island, Ajax village, 10
Research interests: digital communications and navigation, digital signal processing
E-mail: bobrov_vv@dvfu.ru

SMADYCH Nikita Sergeevich, Master's degree
Place of work: Far Eastern Federal University, Polytechnic Institute, Department of Electronics, Telecommunications, and Instrumentation
Work address: 690922, Vladivostok, Russian Island, Ajax village, 10
Research interests: machine learning, communications and navigation, digital signal processing
Email: smadych.ns@dvfu.ru

RODIONOV Alexandr Yurievich, Head of the laboratory, Doctor of Technical Sciences
Name of institution: IMTP FEB RAS
Work address: Russia, 690091, Vladivostok, st. Sukhanova, 5a
Research interests: digital communication and navigation, digital signal processing
E-mail: deodar1618@yandex.ru
ORCID: 0000-0003-2931-900X

ZINCHENKO Dmitry Vladimirovich, Master's degree
Place of work: Far Eastern Federal University, Polytechnic Institute, Department of Electronics, Telecommunications, and Instrumentation
Work address: 690922, Vladivostok, Russian Island, Ajax village, 10
Research interests: robotics, digital communication, and signal processing
Email: zinchenko.dv@dvfu.ru