

论文

结合遗传算法的LVQ神经网络在声学底质分类中的应用

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摘要 学习向量量化 (Learning Vector Quantization, LVQ) 神经网络在声学底质分类中具有广泛应用. 常用的LVQ神经网络存在神经元未被充分利用以及算法对初值敏感的问题, 影响底质分类精度. 本文提出采用遗传算法 (Genetic Algorithms, GA) 优化神经网络的初始值, 将GA与LVQ神经网络结合起来, 迅速得到最佳的神经网络初始权值向量, 实现对海底基岩、砾石、砂、细砂以及泥等底质类型的快速、准确识别. 将其应用于青岛胶州湾海区底质分类识别研究中, 通过与标准的LVQ神经网络的分类结果进行比较表明, 该方法在分类速度以及精度上都有了较大提高.

关键词 [学习向量量化](#) [遗传算法](#) [多波束测深系统](#) [底质分类](#)

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**Application of LVQ neural network combined with the genetic algorithm in acoustic seafloor classification**

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**Abstract** The Learning Vector Quantization (LVQ) neural network approach has been widely used in acoustic seafloor classification. However, one of the major weak points of LVQ is its sensitivity to the initialization, affecting the seafloor classification accuracy. In this paper, Genetic Algorithm (GA) is used to optimize the initial values of LVQ. The GA\_based LVQ can rapidly provide the most optimized initial reference vectors and accurately identify many types of seafloor, such as rock, gravel, sand, fine sand and mud in survey areas. The proposed new approach has been applied to seafloor classification using Multibeam Echo Sounder (MBES) backscatter data in Jiaozhou Bay near Qingdao City of China. Comparing the evolving LVQ with the standard LVQ, the experiment results indicate that the approach of GA\_based LVQ has improved the seafloor classification speed and accuracy.

**Key words** [Learning Vector Quantization \(LVQ\)](#); [Genetic Algorithm \(GA\)](#); [Multibeam echo sounder](#); [Seafloor classification](#)

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