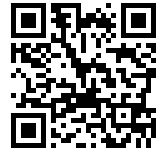


# 神经网络结构搜索在脑数据分析领域的研究进展\*

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**摘要:** 神经网络结构搜索(neural architecture search, NAS)是自动化机器学习的重要组成部分, 已被广泛应用于多个领域, 包括计算机视觉、语音识别等, 能够针对特定数据、场景、任务寻找最优的深层神经网络结构。将 NAS 引入至脑数据分析领域, 能够在图像分割、特征提取、辅助诊断等多个应用领域大幅度提升性能, 展现低能耗自动化机器学习的优势。基于 NAS 进行脑数据分析是当前的研究热点之一, 同时也具有一定挑战。目前, 在此领域, 国内外可供参考的综述性文献较少。对近年来国内外相关文献进行了细致地调研分析, 从算法模型、研究任务、实验数据等不同方面对 NAS 在脑数据分析领域的研究现状进行了综述。同时, 也对能够支撑 NAS 训练的脑数据集进行了系统性总结, 并对 NAS 在脑数据分析中存在的挑战和未来的研究方向进行了分析和展望。

**关键词:** 神经网络结构搜索; 脑数据分析; 神经网络; 深度学习

**中图法分类号:** TP18

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## Survey on Neural Architecture Search for Brain Data Analysis

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**Abstract:** Neural architecture search (NAS) is an important part of automated machine learning, which has been widely used in multiple fields, including computer vision, speech recognition, etc. NAS can search the optimal deep neural network structures for specific data, scenarios, and tasks. In recent years, NAS has been increasingly applied to brain data analysis, significantly improving the performance in multiple application fields, such as brain image segment, feature extraction, brain disease auxiliary diagnosis, etc. Such researches have demonstrated the advantages of low-energy automated machine learning in the field of brain data analysis. NAS-based brain data analysis is one of the current research hotspots, and it still has certain challenges. At present, there are few review literatures available for reference in this field worldwide. This study conducts a detailed survey and analysis of relevant literature from different perspectives, including search frameworks, search space, search strategies, research tasks, and experimental data. At the same time, a systematic summary of brain data sets is also provided that can be used for NAS training. In addition, challenges and future research directions of NAS are prospected in brain data analysis.

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