

图形、图像、模式识别

回声状态网络及其在图像边缘检测中的应用

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摘要 循环神经网络(RNN, 也称反馈神经网络)是一种重要的人工神经网络, 与前馈神经网络相比具有更好的学习能力和更快的收敛速度, 但其隐层结构的设计一直是个难点问题。回声状态网络(ESN)有效地解决了上述问题, 相比于以前的循环神经网络, 其具有结构独特、稳定性好、学习过程简单快捷等特点。介绍了回声状态网络及其学习方法, 将其用于图像的边缘检测中, 取得了良好的效果。

关键词 [回声状态网络](#) [边界检测](#) [统计向量](#)

分类号

Echo state networks and its application on image edge detection

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Abstract

Recurrent Neural Networks (RNN) is a kind of important artificial neural networks with better ability for learning and rate of convergence in comparison with forward neural networks, however, the design of the structure of the hidden-layer is a difficult problem all the time. Echo State Networks has no such problems with special construction, good stability, short-cut learning process. Application of ESN to the edge detection of images has been introduced after the presentation of the structure and method of learning of ESN, resulting well.

Key words [Echo State Networks \(ESN\)](#) [edge detection](#) [statistical vector](#)

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