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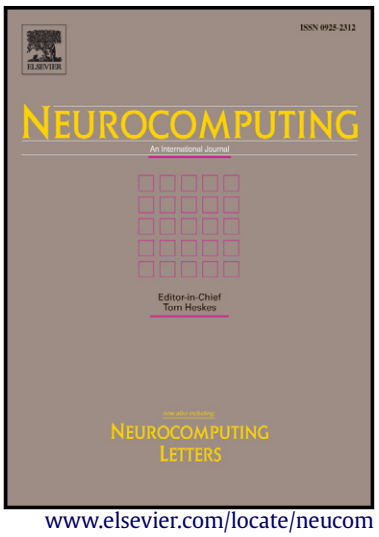


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# Regularized Extreme Learning Machine for Multi-view Semi-supervised Action Recognition

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**Abstract**

In this paper, three novel classification algorithms aiming at (semi-)supervised action classification are proposed. Inspired by the effectiveness of discriminant subspace learning techniques and the fast and efficient Extreme Learning Machine (ELM) algorithm for Single-hidden Layer Feedforward Neural networks training, the ELM algorithm is extended by incorporating discrimination criteria in its optimization process, in order to enhance its classification performance. The proposed Discriminant ELM algorithm is extended, by incorporating proper regularization in its optimization process, in order to exploit information appearing in both labeled and unlabeled action instances. An iterative optimization scheme is proposed in order to address multi-view action classification. The proposed classification algorithms are evaluated on three publicly available action recognition databases providing state-of-the-art performance in all the cases.

*Keywords:* Extreme Learning Machine, Semi-supervised Learning, Multi-view Learning

## 1. Introduction

Human action recognition from videos is receiving increasing attention, due to its importance in a wide range of applications, like intelligent visual surveillance, human-computer interaction and content-based video annotation/retrieval, to name a few. However, it is a challenging problem, because of the complexity of human actions. The dynamic human body motion patterns can produce an extremely large number of visual representations, due to the large number of the



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