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Human action recognition using genetic algorithms and convolutional neural networks

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Abstract

In this paper, an approach for human action recognition using genetic algorithms (GA) and deep convolutional neural networks (CNN) is proposed. We demonstrate that initializing the weights of a convolutional neural network (CNN) classifier based on solutions generated by genetic algorithms (GA) minimizes the classification error. A gradient descent algorithm is used to train the CNN classifiers (to find a local minimum) during fitness evaluations of GA chromosomes. The global search capabilities of genetic algorithms and the local search ability of gradient descent algorithm are exploited to find a solution that is closer to global-optimum. We show that combining the evidences of classifiers generated using genetic algorithms helps to improve the performance. We demonstrate the efficacy of the proposed classification system for human action recognition on UCF50 dataset.

Keywords: Convolutional Neural Network (CNN), Genetic algorithms (GA), human action recognition, action bank features

1. Introduction

Inspired by biological neural networks, artificial neural networks were proposed for function approximation. Shortly after their introduction, the failure of

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