

FAST COMPUTATIONAL APPROACH TO THE LEVENBERG-MARQUARDT ALGORITHM FOR TRAINING FEEDFORWARD NEURAL NETWORKS

Jarosław Biłski^{1,*}, Jacek Smoląg¹, Bartosz Kowalczyk¹,
Konrad Grzanek², Ivan Izonin³

¹*Department of Computational Intelligence, Częstochowa University of Technology,
al. Armii Krajowej 36, 42-200 Częstochowa, Poland*

²*Institute of Information Technologies, University of Social Sciences,
ul. Sienkiewicza 9, 90-113 Łódź, Poland*

³*Department of Artificial Intelligence, Lviv Polytechnic National University
Lviv, 79905, Ukraine*

*E-mail: jaroslaw.bilski@pcc.pl

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Abstract

This paper presents a parallel approach to the Levenberg-Marquardt algorithm (LM). The use of the Levenberg-Marquardt algorithm to train neural networks is associated with significant computational complexity, and thus computation time. As a result, when the neural network has a big number of weights, the algorithm becomes practically ineffective. This article presents a new parallel approach to the computations in Levenberg-Marquardt neural network learning algorithm. The proposed solution is based on vector instructions to effectively reduce the high computational time of this algorithm. The new approach was tested on several examples involving the problems of classification and function approximation, and next it was compared with a classical computational method. The article presents in detail the idea of parallel neural network computations and shows the obtained acceleration for different problems.

Keywords: feed-forward neural network, neural network learning algorithm, Levenberg-Marquardt algorithm, QR decomposition, Givens rotation.

1 Introduction

Currently, artificial intelligence (AI) is widely used both in science research and in industry. Among the issues of artificial intelligence, neural networks (NN) deserve special attention. Continuously many researchers pub-

lish a lot of scientific papers about artificial intelligence [1, 2], especially about neural networks e.g. [3, 4, 5, 6, 7, 8, 9, 10, 11]. There are more and more advanced AI solutions and methods that are willingly used in industry and various products. Important areas of neural networks applications are health care and

Training Feedforward Networks With The Marquardt Algorithm

Huangqi Zhang



Training Feedforward Networks With The Marquardt Algorithm:

Reviewing **Training Feedforward Networks With The Marquardt Algorithm**: Unlocking the Spellbinding Force of Linguistics

In a fast-paced world fueled by information and interconnectivity, the spellbinding force of linguistics has acquired newfound prominence. Its capacity to evoke emotions, stimulate contemplation, and stimulate metamorphosis is actually astonishing. Within the pages of "**Training Feedforward Networks With The Marquardt Algorithm**," an enthralling opus penned by a very acclaimed wordsmith, readers set about an immersive expedition to unravel the intricate significance of language and its indelible imprint on our lives. Throughout this assessment, we shall delve to the book is central motifs, appraise its distinctive narrative style, and gauge its overarching influence on the minds of its readers.

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