A Hybrid Convolutionary Neural Network and Low-rank Tensor Learning Algorithm for Tensor-on-Tensor Regression

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Abstract

The problem of predicting a set of tensorial outputs based on inputs of tensor form has been receiving increasing attention in recent years. This problem arises in various areas of mathematical, statistical and computational sciences, and generalizes the case of the widely used scalar-on-scalar regression methods. In this paper, we develop a tensor-on-tensor re gression framework using a hybrid of convolutionary neural networks and low-rank tensor learning algorithms. Our proposed framework integrates several promising approaches which have been developed previously to tackle this problem and extends their domain of applica tions. In particular, we demonstrate the advantage of this framework in comparison with traditional methods through an example of predicting the third-order tensors which arises within the procedures required for performing the time-homogeneous top-K ranking algo rithm. Computational results are further provided which pertain to analysis of the U.S. stock market during the time period from January 1990 to December 2019

Biography

Affan Shoukat received the Engineer degree in Computer Science in 2002 and the Ph.D degree in 2010. She is currently Assistant Professor at Higher Institute of Computer Science and Telecom of Hammam Sousse (ISITCOM), University of Sousse, Tunisia. She is a senior Researcher at MARS Laboratory (ISITCOM –Tunisia). Her research interests include Artificial Intelligence, Cyber Security, Big Data Analysis, Cloud Computing and Distributed Systems. She served as reviewer for many international conferences and journals. She has many publications; 3 book chapters, 4 journal publications and more than 15 conference papers.

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