

1. AIMS AND SCOPE

Deep learning has gained significant attention within the computational intelligence community over the recent years. Its success has been mainly due to the increased capability of modern computers to collect, store and process large volumes of data. This has led to a substantial increase in the effectiveness and efficiency of data management. As a result, it has become possible to achieve high accuracy for some benchmark learning tasks such as object classification and image recognition within a short time frame. The most common implementation of deep learning has been through neural networks due to the ability of their layers to perform multiple functional composition as part of a multistage learning process.

In spite of the significant recent advances in deep learning discussed above, there are still some open problems and serious limitations. In particular, effectiveness is usually adversely affected when the data is not well defined due to inherent noise, uncertainty, ambiguity, vagueness and incompleteness. This has an adverse impact on efficiency due to the necessity to define the data better by means of additional collection, analysis and cleaning. The reduced effectiveness and efficiency undermines the ability of deep learning to address real life tasks that are safety critical or time critical. Besides this, deep learning has been used mainly in a passive manner for the purpose of observing the environment but it almost has not been used in an active manner for the purpose of changing the environment. Finally, deep learning models often have poor transparency which makes them difficult for understanding and interpretation by non-technical users.

The aim of this special issue is to address the problems and limitations discussed above with the help of deep fuzzy models. The latter have been around in different forms and under different names such as hierarchical fuzzy systems and fuzzy networks. These models are well suited for performing multiple functional composition at both crisp and linguistic level. Moreover, they have the potential of handling effectively and efficiently data that is not well defined due to the use of a fuzzy approach. Also, deep fuzzy models can be used in both passive and active manner with regard to the environment due to their generic structure. Finally, these models have a high level of transparency due to their rule base nature.

The special issue will feature the most recent developments in and the state-of-the-art of deep fuzzy models. The target audience includes both researchers from academia and practitioners from industry who are interested in the theory and applications of these models. Papers for the special issue are invited on but not limited to any of the topics listed below.

2. TOPICS COVERED

The topics include but are not limited to:

Theoretical methods	Application areas	Case studies
<ul style="list-style-type: none">• Hierarchical Fuzzy Systems• Fuzzy Networks• Chained Fuzzy Systems• Multilevel Fuzzy Systems• Multilayer Fuzzy Systems• Multistage Fuzzy Systems• Fuzzy Neuro Systems• Evolving Fuzzy Systems• Fuzzy Learning Systems	<ul style="list-style-type: none">• Object Classification• Image Recognition• Process Modelling• Process Simulation• Process Control• Fault Detection• Fault Diagnosis• Decision Making• Time Series Forecasting	<ul style="list-style-type: none">• Engineering• Finance• Transport• Robotics• Business• Environment• Healthcare• Security• Energy

3. SUBMISSION GUIDELINES

All authors should read 'Information for Authors' before submitting a manuscript <http://cis.ieee.org/ieee-transactions-on-fuzzy-systems.html>

Submissions should be through the IEEE TFS journal website <http://mc.manuscriptcentral.com/tfs-ieee>. Submissions should also be in the correct format <http://ieeauthorcenter.ieee.org/create-your-ieee-article/use-authoring-tools-and-ieee-article-templates/ieee-article-templates/templates-for-transactions/>

It is essential that your manuscript is identified as a Special Issue contribution:

- Ensure you choose 'Special Issue' when submitting.
- A cover letter must be included which includes the title '**Special Issue on Deep Fuzzy Models**'

4. IMPORTANT DATES

1 December 2018 – Submission Deadline

February 2019 – notification of the first round reviews

April 2019 – revised submissions due

July 2019 – final notice of acceptance/reject

(Dates in 2019 are for guidance only at this point).

5. GUEST EDITORS

Dr Alexander Gegov
University of Portsmouth, United Kingdom
Email: alexander.gegov@port.ac.uk

Prof Uzay Kaymak
Eindhoven University of Technology, Netherlands
Email: u.kaymak@ieee.org

Prof João M. C. Sousa
IDMEC, Instituto Superior Técnico, Universidade de Lisboa, Portugal
Email: jmsousa@tecnico.ulisboa.pt