Forecasting with Machine Learning Techniques

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Editorial

Forecasting with Machine Learning Techniques

Walayat Hussain [1,*], Asma Musabah Alkalbani [2] and Honghao Gao [3]

[1] School of Information, Systems and Modelling, Faculty of Engineering and IT, University of Technology Sydney, Ultimo, NSW 2007, Australia
[2] Department of Information Technology, University of Technology and Applied Sciences, CAS IBRI, Muscat 516, Oman; asmam.ibr@cas.edu.om
[3] School of Computer Engineering and Science, Shanghai University, Shanghai 200444, China; gaohonghao@shu.edu.cn
* Correspondence: walayat.hussain@uts.edu.au

The decision-maker is increasingly utilising machine learning (ML) techniques to find patterns in huge quantities of real-time data. The approaches enable the system to learn from the data to improve the analysis process and prediction accuracy without human interference [1]. The machine learning methods and algorithms include supervised, unsupervised, semi-supervised, and self-supervised methods that use intelligent strategies to find the target. The ML approaches can reveal different complex patterns defined by nonlinearity and some relationships that have difficulty discovering linear algorithms. The approaches are widely used to predict cloud services [2], health [3], energy [4], and many other real-world problems.

Many of the existing ML methods face challenges in managing high-order data sets used for different applications such as stock-market prediction, cloud QoS prediction, IoT sensors behaviour, and many others. Some of the latest research, such as [5] and [6], introduced the Induced Ordered Weighted Averaging Operator (IOWA) in the neural network structure that incorporates predictive intelligence in the process. The approaches accommodate the complex attitudinal behaviour of the decision-maker and handle the complexity of the problem.

In this Special Issue, we have selected five quality papers from the total number of eight submissions. A summary of these papers is outlined as follows:

In the paper *Attention-Based CNN-RNN Arabic Text Recognition from Natural Scene Images* by Butt et al. [7], the authors present a CNN-RNN model with an attention mechanism for Arabic image text recognition. The model takes an input image and generates feature sequences through a CNN. Sequences are then transferred to the bidirectional RNN with an attention mechanism to select relevant information from the feature sequences.

The authors proposed a new forecasting method based on copula function in the paper *A New Machine Learning Forecasting Algorithm Based on Bivariate Copula Functions* by Carrillo et al. [8]. In this work, the authors linked copulas with the machine learning approaches. The approach consists of an iterative algorithm in which a dependent variable is decomposed as a sum of error terms. Each of them is estimated, identifying the input variables that best "copulate" with it.

In the paper *Queue Length Forecasting in Complex Manufacturing Job Shops* by May et al. [4], the authors introduced an approach to retrospectively identify queue lengths based on transitional data. The study found that accurate queue length prediction is feasible by applying various techniques, which can enable further research and predictions.

In the paper *Fighting Deepfakes Using Body Language Analysis* by Yasrab et al. [9], the authors proposed a deepfake detection method using upper-body-language analysis. The approach used a many-to-one LSTM network that was designed and trained as a classification model for deepfake detection. The approaches were trained by varying the hyperparameters to build a final model with benchmark accuracy. The experimental results showed that upper body language could effectively detect deepfakes.

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In the paper *Trends in Using IoT with Machine Learning in Health Prediction System* by Aldahiri et al. [3], the authors present a comprehensive overview of existing ML approaches and their application in IoT medical data. The research identified different ML prediction algorithm shortcomings while dealing with the IoT dataset and recommended an optimal approach to predict critical healthcare data.

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