World Academy of Science, Engineering and Technology
International Journal of Mathematical and Computational Sciences
Vol:11, No:12, 2017

One-Step Time Series Predictions with Recurrent Neural Networks

Authors : Vaidehi Iyer, Konstantin Borozdin

Abstract : Time series prediction problems have many important practical applications, but are notoriously difficult for statistical modeling. Recently, machine learning methods have been attracted significant interest as a practical tool applied to a variety of problems, even though developments in this field tend to be semi-empirical. This paper explores application of Long Short Term Memory based Recurrent Neural Networks to the one-step prediction of time series for both trend and stochastic components. Two types of data are analyzed - daily stock prices, that are often considered to be a typical example of a random walk, - and weather patterns dominated by seasonal variations. Results from both analyses are compared, and reinforced learning framework is used to select more efficient between Recurrent Neural Networks and more traditional auto regression methods. It is shown that both methods are able to follow long-term trends and seasonal variations closely, but have difficulties with reproducing day-to-day variability. Future research directions and potential real world applications are briefly discussed.

Keywords : long short term memory, prediction methods, recurrent neural networks, reinforcement learning
Conference Title : ICSEM 2017 : International Conference on Statistics, Econometrics and Mathematics
Conference Location : San Diego, United States
Conference Dates : December 18-19, 2017