HERMES: Hybrid Error-corrector Model with inclusion of External Signals for nonstationary fashion time series

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Dear Editors,

Please find attached our manuscript "HERMES: Hybrid Error-corrector Model with inclusion of External Signals for nonstationary fashion time series", which we would like to submit for publication as a research article in your journal Elsevier International Journal of Forecasting.

The fashion industry has produced many complex time series with seasonalities, trends and influences. To date, it has never really been studied by the signal processing community because of the lack of relevant data. In this work, we aim at tackling this limitation, by translating the history of fashion trends to time series and proposing a new forecasting model able to accurately forecast them. First, by tracking thousands of fashion trends on social media with state-of-the-art computer vision approaches, we create a first fashion dataset gathering 10000 weekly fashion time series. As influence dynamics are the key of emerging trend detection, we associate with each time series an external weak signal representing behaviors of influencers. Secondly, to leverage such a complex and rich dataset, we propose a new hybrid forecasting model. Our approach combines per-time-series parametric models with seasonal components and a global recurrent neural network to include sporadic external signals. This hybrid model provides state-of-the-art results on the proposed fashion dataset, on the weekly time series of the M4 competition, and illustrates the benefit of the contribution of external weak signals.

We would like to emphasize that contrary to some recent new forecasting studies, the fashion dataset studied in this paper will be publicly provided[1] upon publication of this work.

We are looking forward to hearing from you.

Sincerely.

Etienne David.

[1] `http://files.heuritech.com/raw_files/f1_fashion_dataset.tar.xz`