

II INTERNATIONAL CONFERENCE
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«Metrological Support of Innovative Technologies» ICMSIT-II 2021

«Review of missing values procession methods in time series data»

D A Petrushevich



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Problem statement

- Missing values in time series are usually obtain with forecasts of trained models such as ARIMA functions
- If number of missed is too high or they are situated close to each other ARIMA models can't be built or their predictions have got too high dispersion
- Single missed values in such case and series of missed values should be handled during preparation phase before time series models are constructed



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Solution methods

- Linear regression, linear interpolation, cubic splines and autoregressive models (AR) have been tested
- Time series of U.S. dollars / Russian rubles exchange rates (beginning of 2020) is used as an example

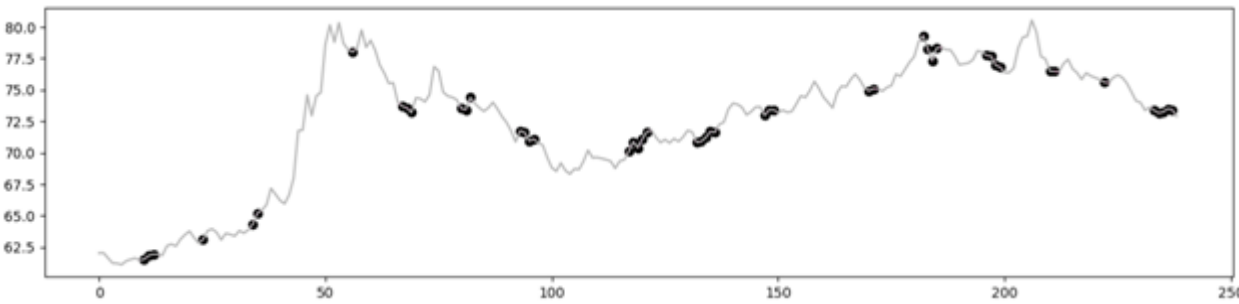


Figure 1. Source time series (black dots are values to remove)

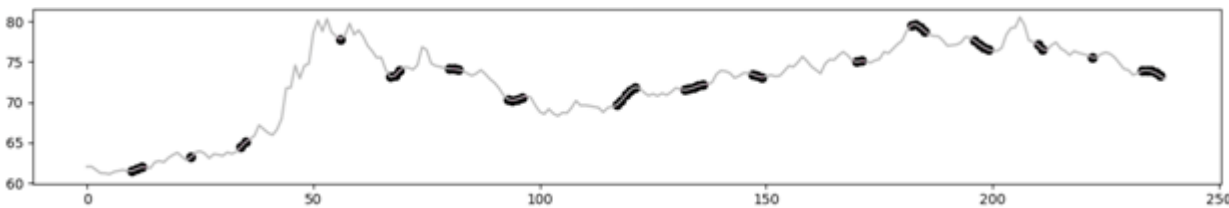


Figure 2. Series of missed values are handled with cubic splines

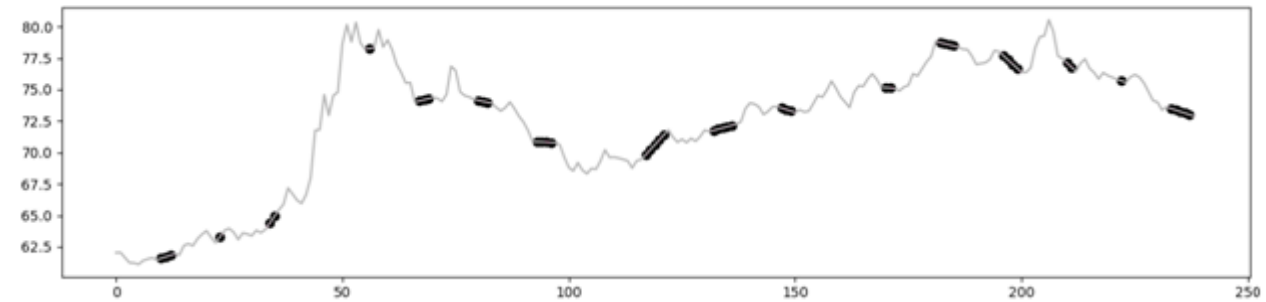


Figure 3. Series of missed values are handled with linear interpolation

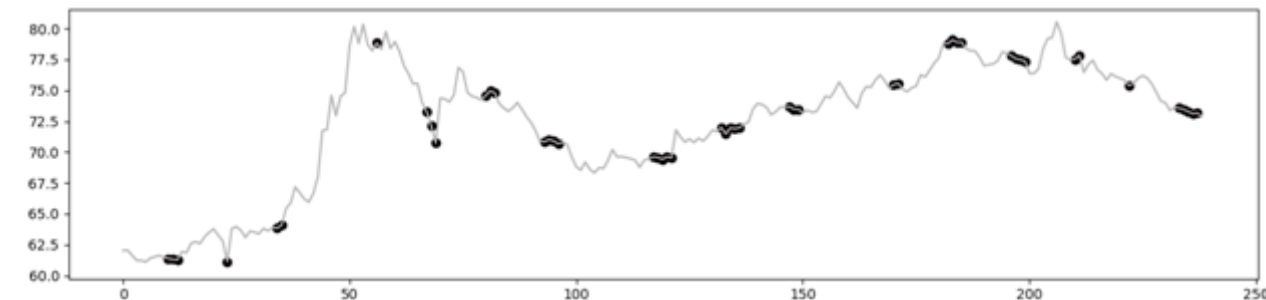


Figure 4. Series of missed values are handled with AR models

Conclusions

Results, implementation

- According to experiments the best methods to handle single misses are linear interpolation, cubic splines and “nearest neighbours” method (table 1 in the paper).
- The same is true in case of series of missing values procession: the best ways to deal with them is to implement linear regression or cubic splines (table 2 in the paper).
- Further investigation is going to observe case of high volatile time series and neural networks implementation.



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Contacts

D A Petrusevich

MIREA – Russian Technological University

E-mail: petrdenis@mail.ru

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