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Computing Innovation for Technology Entrepreneurship

Østfold University College

Economic Time Series Prediction

Scientific and Practical Research 2

Other related works interview

Ion-Cristian DÂRLĂ

Content

Works related to energy

- Studies done mostly in Asia (Indonesia and China)
- Hybrid models performed best(LSTM & CNN / ARIMA & ANN/ GRU & Bi-LSTM)
- Datasets:
  + Household Power Consumption Dataset
  + Ontario Demand Dataset
- Best results on these datasets: VACL (VAR-CNN-LSTM)

Works related to sales

- Studies done in Taiwan and USA
- Hybrid models performed best
- The markets are affected of seasonality, easier to predict
- Best results: RNN & ARIMA

Works related to trading

- Studies done on multiple stock markets: South Korea, China(SSE Composite Index), USA(Dow Jones Index), Japan(Nikkei 225 Index), India (CSE 300 Index), Australia (All Ordinary Index)
- Paper proposed one method, no compariosn or reasoning behind the choices
- Preffered algorithms: SVR, ARIMAX, SOFM-SVR (hybrid)

Conclusion

- predicting the future is an important asset
- no umbrella method
- the most important concern: getting robust and accurate data

Abbreviation dictionary

1. ANN – *Artificial Neural Network*
2. ARIMA - *Autoregressive Integrated Moving Average*
3. ARIMAX - *Autoregressive Integrated Moving Average with Explanatory Variable*
4. BI-LSTM - *Bilateral* Network L*ong Short-term Memory*
5. CNN - *Convolutional Neural Network*
6. CNN-LSTM - Convolutional Neural Network L*ong Short-term Memory*
7. DNN – *Dynamic Neural Network*
8. FNN – *Feedforwardm Neural Network*
9. GRU – *Gated Recurrent Unit model*SVR - *Support Vector Regression*
10. LSTM - Network L*ong Short-term Memory*
11. MAE - *Mean Absolute Error*
12. MICE - *Multiple Imputation by Chained Equations*
13. MIMO (strategy) – *Multiple Input, Multiple Output (strategy)*
14. MSE - *Mean Squared Error*
15. MV-ANN – *Multi-View Artificial Neural Network*
16. PPCA - *Probabilistic Principal Component Analysis*
17. RNN – *Recurrent Neural Network*
18. SOFM – *Self-organizing Feature Map*
19. SVR - *Support Vector Regression*
20. VAR - *Vector Autoregressive Models*
21. VAR-CNN-LSTM(VACL)
22. WNN - *Wavelet Neural Network*

References

1. (PDF) Inter Time Series Sales forecasting - researchgate. (n.d.). Retrieved June 2, 2022, from https://www.researchgate.net/publication/235761175_Inter_Time_Series_Sales_Forecasting

2. Kara, Y., Boyacioglu, M. A., & Baykan, Ö. K. (2010, October 31). Predicting direction of stock price index movement using artificial neural networks and support vector machines: The sample of the Istanbul Stock Exchange. Expert Systems with Applications. Retrieved June 2, 2022, from https://www.sciencedirect.com/science/article/abs/pii/S0957417410011711?via%3Dihub

3. Kim, K.-jae, & Han, I. (2000, July 10). Genetic algorithms approach to feature discretization in artificial neural networks for the prediction of stock price index. Expert Systems with Applications. Retrieved June 2, 2022, from https://www.sciencedirect.com/science/article/abs/pii/S0957417400000270?via%3Dihub

4. Lei, L. (2017, September 29). Wavelet neural network prediction method of stock price trend based on rough set attribute reduction. Applied Soft Computing. Retrieved June 2, 2022, from https://www.sciencedirect.com/science/article/abs/pii/S1568494617305689?via%3Dihub

5. Ni, L.-P., Ni, Z.-W., & Gao, Y.-Z. (2010, November 10). Stock trend prediction based on fractal feature selection and support vector machine. Expert Systems with Applications. Retrieved June 2, 2022, from https://www.sciencedirect.com/science/article/abs/pii/S0957417410012236?via%3Dihub

6. Piramuthu, S. (2011, January 13). Evaluating feature selection methods for learning in data mining applications. European Journal of Operational Research. Retrieved June 2, 2022, from https://www.sciencedirect.com/science/article/abs/pii/S0377221702009116?via%3Dihub

7. Sales prediction with parametrized time series analysis. (n.d.). Retrieved June 2, 2022, from https://www.researchgate.net/publication/236463111_Sales_Prediction_with_Parametrized_Time_Series_Analysis

8. Shapi, M. K. M., Ramli, N. A., & Awalin, L. J. (2020, December 9). Energy consumption prediction by using machine learning for smart building: Case study in Malaysia. Developments in the Built Environment. Retrieved June 2, 2022, from https://www.sciencedirect.com/science/article/pii/S266616592030034X

9. Shen, J., & Shafiq, M. O. (2020, August 28). Short-term stock market price trend prediction using a comprehensive deep learning system - journal of big data. SpringerOpen. Retrieved June 2, 2022, from https://journalofbigdata.springeropen.com/articles/10.1186/s40537-020-00333-6#Sec1

10. Sinha, A., Tayal, R., Vyas, A., Pandey, P., & Vyas, O. P. (1AD, January 1). Forecasting electricity load with hybrid scalable model based on stacked non linear residual approach. Frontiers. Retrieved June 2, 2022, from https://doi.org/10.3389/fenrg.2021.720406

11. Sirignano, J., & Cont, R. (2018, March 16). Universal features of Price Formation in financial markets: Perspectives from Deep Learning. SSRN. Retrieved June 2, 2022, from https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3141294

12. Stock market forecasting using Hidden Markov Model: A new approach. IEEE Xplore. (n.d.). Retrieved June 2, 2022, from https://ieeexplore.ieee.org/document/1578783

13. Wang, C.-C., Chien, C.-H., & Trappey, A. J. C. (2021, July 2). On the application of Arima and LSTM to predict order demand based on short lead time and on-time delivery requirements. MDPI. Retrieved June 2, 2022, from https://www.mdpi.com/2227-9717/9/7/1157/htm

14. Yang, D., Guo, J.-e, Li, J., Wang, S., & Sun, S. (1AD, January 1). Knowledge mapping in electricity demand forecasting: A scientometric insight. Frontiers. Retrieved June

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