

Dictionary Methods for Time Series Classification and Regression

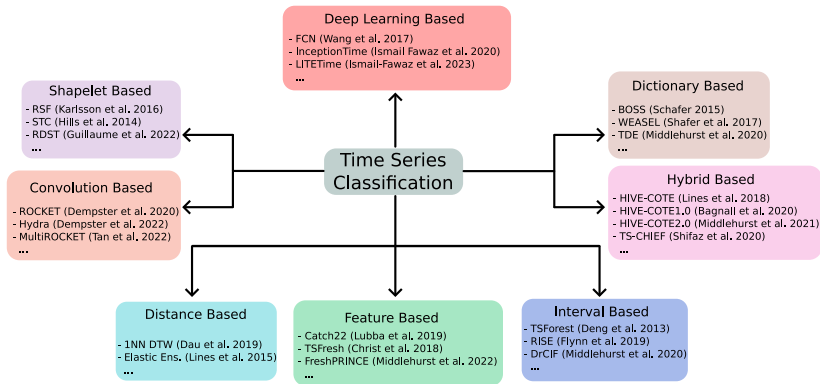
A Hands-on Introduction to Time Series Classification and Regression

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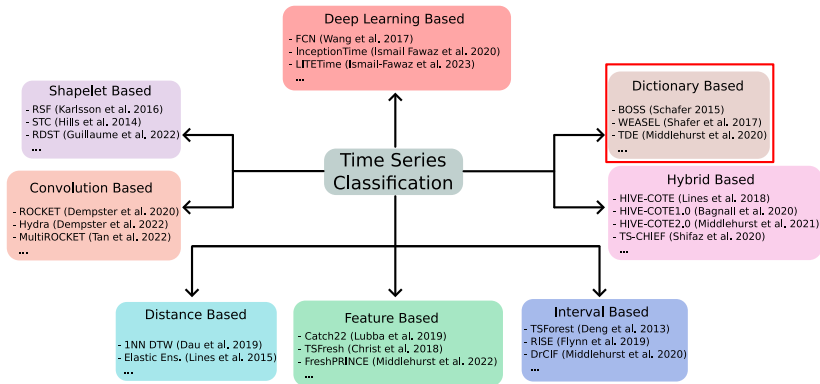
ACM SIGKDD International Conference on Knowledge Discovery and Data Mining 2024

Taxonomy of methods



Middlehurst, M., Schäfer, P., & Bagnall, A. (2024). Bake off redux: a review and experimental evaluation of recent time series classification algorithms. *Data Mining and Knowledge Discovery*, 1-74.

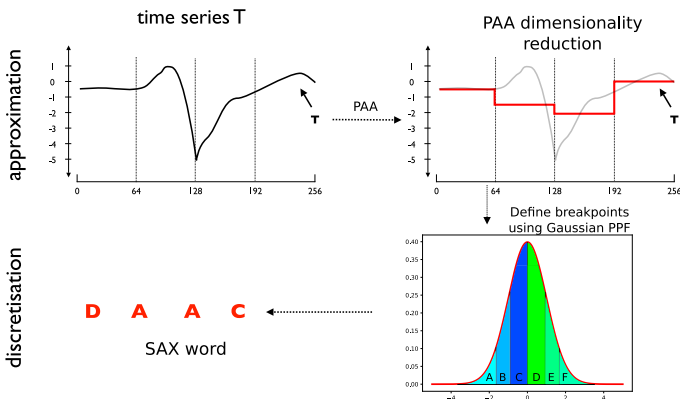
Taxonomy of methods



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Dictionary Methods: Symbols Approximation

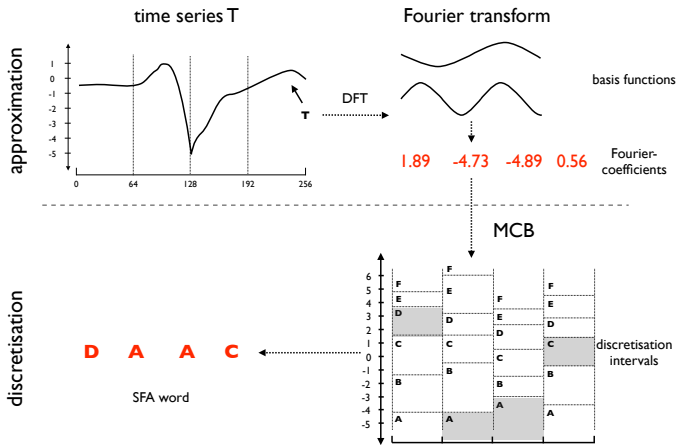
SAX: Symbolic Aggregate approXimation



Lin, Jessica, et al. "Experiencing SAX: a novel symbolic representation of time series." *Data Mining and knowledge discovery* 15 (2007): 107-144.

Dictionary Methods: Symbols Approximation

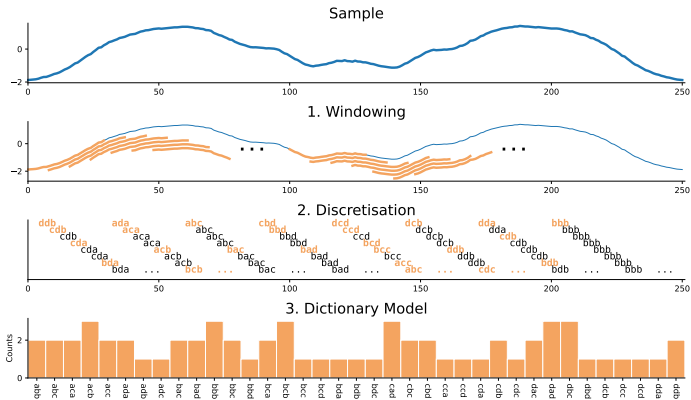
SFA: Symbolic Fourier Approximation



📖 Schäfer, Patrick, and Mikael Höggqvist. "SFA: a symbolic fourier approximation and index for similarity search in high dimensional datasets." *Proceedings of the 15th international conference on extending database technology*. 2012. 

Dictionary Methods

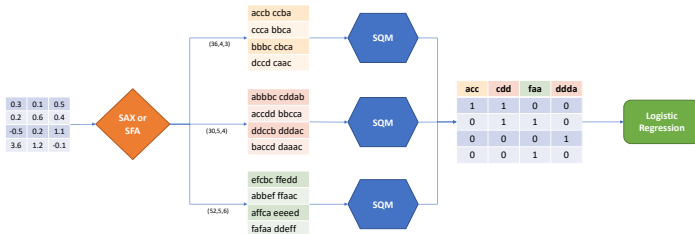
The BOSS



Schäfer, Patrick. "The BOSS is concerned with time series classification in the presence of noise." *Data Mining and Knowledge Discovery* 29 (2015): 1505-1530..

Dictionary Methods

Multiple Representations Sequence Miner (MrSQM)

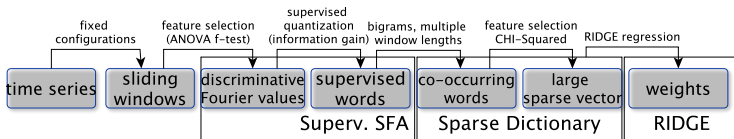


- Nguyen, Thach Le, and Georgiana Ifrim. "Fast time series classification with random symbolic subsequences." *Advanced Analytics and Learning on Temporal Data: 7th ECML PKDD Workshop, AALTD 2022*
- Nguyen, Thach Le, and Georgiana Ifrim. "MrSQM: Fast time series classification with symbolic representations." *arXiv preprint arXiv:2109.01036* (2021).

Dictionary Methods

WEASELv1.0 and WEASELv2.0

WEASEL 1.0

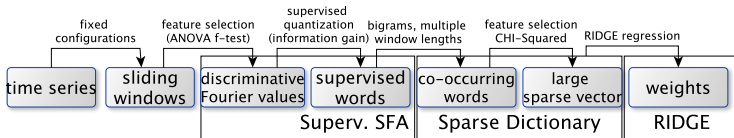


- Schäfer, Patrick, and Ulf Leser. "Fast and accurate time series classification with weasel." *Proceedings of the 2017 ACM on Conference on Information and Knowledge Management*. 2017.
- Schäfer, Patrick, and Ulf Leser. "WEASEL 2.0: a random dilated dictionary transform for fast, accurate and memory constrained time series classification." *Machine Learning* 112.12 (2023): 4763-4788.

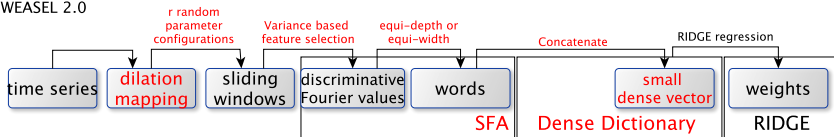
Dictionary Methods

WEASELv1.0 and WEASELv2.0

WEASEL 1.0



WEASEL 2.0



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- Schäfer, Patrick, and Ulf Leser. "WEASEL 2.0: a random dilated dictionary transform for fast, accurate and memory constrained time series classification." *Machine Learning* 112.12 (2023): 4763-4788.

Lets code!

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<https://github.com/aeon-toolkit/aeon-tutorials/tree/main/KDD-2024/Slides/Part6dictionary.pdf>

[https:](https://github.com/aeon-toolkit/aeon-tutorials/tree/main/KDD-2024/Notebooks/part6_dictionary_based.ipynb)

[//github.com/aeon-toolkit/aeon-tutorials/tree/main/KDD-2024/Notebooks/part6_dictionary_based.ipynb](https://github.com/aeon-toolkit/aeon-tutorials/tree/main/KDD-2024/Notebooks/part6_dictionary_based.ipynb)

<https://msd-irimas.github.io/pages/dl4tsc/>