Towards Context Aware Food Sales Prediction

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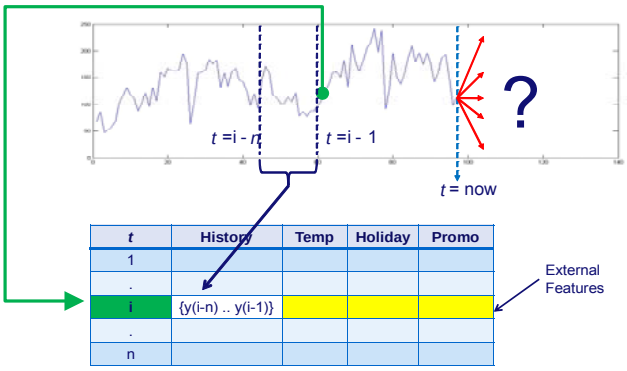
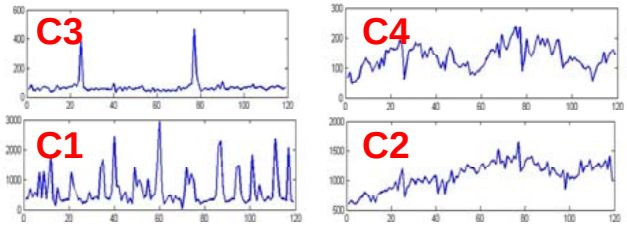
Food Sales Prediction



Challenges

- Shortness of data streams
- Noise
- Concept drift

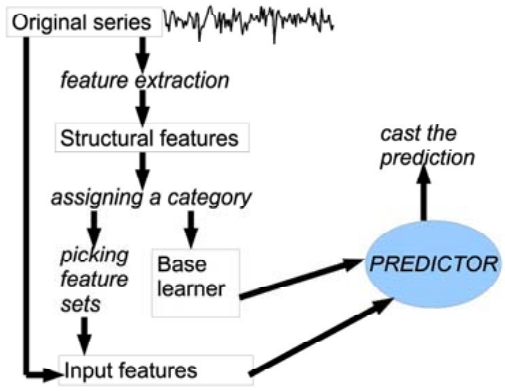


	Moving Average	F1 (Regression)	F2(Regression + Calendar)	F3(Regression + Calendar+ Seasons)
C1	1.00	1.47	1.74	1.78
C2	1.00	0.85	1.01	1.03
C3	1.00	0.97	0.85	0.94
C4	1.04	1.00	0.98	0.91

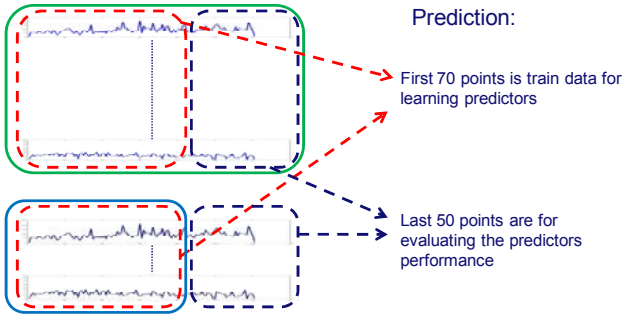
Context Aware Prediction

Learn whether it is possible to learn from time series:

- Bottom up: learn mapping from structural features to predictors
- Top down: cluster time series according to structural prototypes



Experimental Design



Results

For the train set it possible to predict the best predictor for a given time series. Results for the test set are worse:

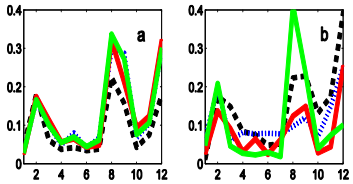
Average accuracy for found cluster in train data

		Moving Average	F1	F2	F3
chaotic	C1	1.01	1.43	1.68	1.71
flat	C2	1	**0.89**	0.97	1
occasional	C3	1	1	**0.94**	0.97
seasonal	C4	1	0.98	0.95	**0.91**

Average accuracy for found cluster in test data

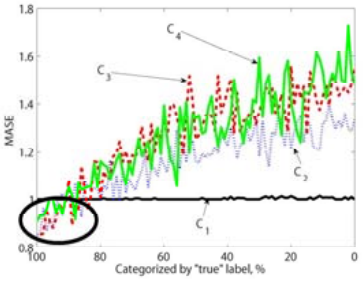
		Moving Average	F1	F2	F3
chaotic	C1	1	1.37	1.57	1.65
flat	C2	1	**1.41**	1.63	1.60
occasional	C3	1	1.62	**1.84**	1.85
seasonal	C4	1	1.17	1.26	**1.28**

In the test set the data is even shorter.
The structural features are not distinctive enough (see Figure).



Implications for business:

- It is hard to beat simple methods
- The clustering of time dependent sequences is hard
- Prediction should be utility-driven



References:

I. Žliobaitė, J. Bakker, and M. Pechenizkiy, "Towards context aware food sales prediction," in *DDDM'09, Workshops Proceedings of the 9th IEEE International Conference on Data Mining (ICDM 2009)*, IEEE Computer Society, 2009.

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