

PARAMETER SELECTION FOR PRICE PREDICTION AND SOM VISUALIZATION

Mieko Tanaka-Yamawaki

Department of Information and Knowledge Engineering, Tottori University
101-4 Koyamacho-Minami, Tottori 680-8552, Japan
mieko@ike.tottori-u.ac.jp

The mechanism of price formation is a fascinating challenge. We approach this problem by investigating the real tick-wise price time series data provided by foreign exchange markets and stock markets. Although financial time series are usually assumed to be the random walk, there are plenty of evidences to support the idea that the tick-wise financial data show distinct deviations from the random walk, such as fat-tail, volatility clustering etc., sometimes called as “stylized facts”. We try to read the some patterns in such high frequency financial data by using our automatic price generator that computes the best prediction by reading the data tick by tick. Our first task on this line of thought is to identify the set of effective variables suitable for studying the problem. We first applied this generator to determine the best combination of technical indicators out of ten popular indicators in an adaptive manner. We obtained reasonably good predictions on the direction of move of the price in the near future, e.g., at 10 ticks ahead of the predicting time for foreign exchange rates, as well as stock prices in a wide variety of business types over several years [1].

Next, we ask for the origin of those indicators. The indicators we used in the above analysis were various kinds of moving-averages that essentially carry the information of the past prices, and the price generator’s task was to classify various patterns of the current price and the past prices. As the next step, we introduce two dimensionless dynamical indicators constructed from the local values of derivatives and the second derivatives of the price times-series [2]. By running the price generator for those new parameters, we obtained 1-2% better performance in predicting the price direction at 10 ticks ahead of the predicting time. We then use the self-organized map to visualize the classification of the times series pieces.

Keywords

price prediction generator, pattern classification, dynamical parameters, tick-wise price, SOM

References

- [1] M. Tanaka-Yamawaki and S. Tokuoka, “Adaptive Use of Technical Indicators for the Prediction of Intra-day Stock Prices”, *Physica A* 383, p.125-133, 2007.
- [2] J.V. Andersen, S. Gluzman and D. Sornette, “Fundamental Framework for Technical Analysis”, *European Physical Journal B* 14, p. 579-601, 1999.