



Predicting Auction Prices



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Research Question

Predicting the final price of auctions while considering the uncertainties and dynamics happening during auctions.

- Dynamic of current auction
- Dynamic of other auction at the current time

Relevant Literature

- Wang, S., Jank, W., and Shmueli, G. (2012). Explaining and Forecasting Online Auction Prices and Their Dynamics Using Functional Data Analysis. *Journal of Business & Economic Statistics*, 26: 144-160.
- Li, X., Liu, L., Wu, L., and Zhang, Z. (2005). Predicting the final prices of online auction items. *Expert Systems with Applications*, 31: 542-550.
- Schapire, R., Stone, P., McAllester, D., and Csirik, J.A. (2002). Machine Learning: Proceedings of the Nineteenth International Conference, 2002.

Ebay Auctions

- Seller Attributes
- Auction Item Attributes
- Historical exchange data
- Ongoing auction data.

Publicly available data: can be extracted using specially designed data collection program.

Sotheby's Wine Auctions

- Estimated Prices
- Lot Sold (Final Price)
- Wine details
- Cannot model auction dynamics

Publicly available data on Sotheby's past auctions.

Conditional Density Estimation

A supervised learning problem in which the goal is to estimate the entire distribution of a real-valued label given a description of current conditions typically in the form of a feature vector.

Functional Forecasting Model

Estimate an auction's price velocity and acceleration, and develop a dynamic functional forecasting model.

Continuous Price Prediction

Use regression and training data to learn regression coefficients, and multivariate regression should be used.

Discrete Price Prediction

The back-propagation (BP) neural network, a feed-forward multi-layer network based on back-propagation algorithm developed by D. E. Rumelhart and J. L. McClelland in 1986, has become one of the most widely used ANNs in practice.

Assumptions

The discrete price prediction is more favorable than the continuous price prediction.

While dynamics during an auction is hard to capture, ebay auction datasets could enable relatively accurate predictions.