Warwick MathSys MSc Project Proposal

Title: Identifying Illegal Trading & Market Manipulation using Machine Learning

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Project Description

Over recent years there has been a number of high profile cases of illegal trading and market manipulation. In the UK, Navinder Singh Sarao dubbed the 'Hound of Hounslow', used a method known as 'spoofing' to illegally generate tens of millions of dollars. This is a method by which traders enter 'fake' trades to give a false impression of the market and drive it in their direction. They then buy (sell) the shares at a lower (higher) price and profit from the difference. Other forms of illegal trading include layering, front-running and insider trading.

It has so far been very difficult to identify and prosecute offenders due to the sheer volume of trades and the complexity of the criminal activities. We would like to develop new methods that can not only identify these forms of illegal trading, both within and across assets, but also identify other forms of market manipulation hitherto unclassified.

Using a simulated dataset of trading activity - where some traders have additional future information – we would like to compare the ability of different machine learning techniques to identify these patterns. Possible techniques include Genetic Programmes [3], Neural Networks [2, 3] and Gaussian Processes [1] for time series pattern replication and SOM [2, 3] or SVM [3] for classification.

This research has important implications for the financial industry and could in the future be developed into a commercial product. We would also be interested in extending this project for PhD research.

References

1) Rasmussen & Williams, 'Gaussian Processes for Machine Learning', 2006
2) Bishop, 'Pattern Recognition and Machine Learning', 2006, Springer
3) Englebrecht, 'Computational Intelligence Second Edition', 2007, Wiley