



stock markets for improving forecasts

^aSwarnava Mitra, ^bJoaquin Ordieres Mere

^{a,b} Universidad Politécnica de Madrid, Department of Industrial Engineering, Business Administration and Statistics (swarnava.mitra@upm.es)



Abstract This thesis attempts to explore the possibility to model human behavior and how it guides financial markets. According to Behavioral Finance theory the stock market ecosystem is influenced by the decision making of the individuals trading in it. The traders are heterogeneous in nature, with each group having their own belief and expectation. This thesis tries to answer the question Can human behavior and its responses to macroeconomic events be modelled and used as an indicator to predict price directions? To answer the former question, the research has delved deep into exploring human behavior guiding financial markets. Different exogenous variables representing stock broker behavior has been explored. These variables are derived from market data of local markets like the Madrid Stock Exchange, and also from micro blogging sites and website visit statistics. A local market microstructure is guided mostly by its local players and macroeconomic events. Where as more global stock markets are more guided by global macroeconomic events. This research constructs exogenous variables which effect the small stock exchanges and bigger stock exchanges alike. In this research different data set are constructed from web search volumes, sentiment scores of Twitter posts to page visit statistics of Wikipedia articles. The exogenous time series constructed is then used as a predictor variable for different supervised and unsupervised machine learning algorithms for future price predictions. In this research different categories of machine learning algorithm were used from simple tree based ensemble learning models to SVM (support vector machine) and kernel based models to more complex Deep Learning algorithms. The implication of the research is that it will help financial managers and traders use these correlations with social sentiment indexes to predict financial markets with certain accuracies. It will also provide them with early warnings of market downturns risk and indication of crisis.

Keywords: Social Media Analytics, Stock Market Prediction, Machine Learning

