



MSFE ILLINOIS

MASTER OF SCIENCE IN FINANCIAL ENGINEERING

2016 PRACTICUM PROJECT COMPETITION

Each semester, teams of students from the financial engineering master's program work with industry partners (sponsors) to solve crucial business problems. In addition to their written reports, these student teams do a presentation to an outside panel of judges that include technical and nontechnical peers. The top three teams earn monetary prizes that are made possible by the program and by the generous donations of MSFE program alumni.



FIRST PLACE – \$1,500

Title: Market Data Feed Analysis

Team: Mark Bright, Vikram Kumar, Goud Idiga, Qi Liu, Yikang Luo, Zuodi Na, Adarsh Shetty

Company Sponsor: CME Group

Abstract: Electronic limit order markets are the dominant market structure for trading financial securities. Recent advancements in technology; computerization (algorithmic and high-frequency trading), low-latency technology (colocation service, microwave transmission) have changed the order-book dynamics. The time-stamp is now at the nanosecond level. In a limit order market, orders submitted at about the same time are subject to seemingly random latencies and will be queued accordingly. Due to the processing time required there is a lag in the order flow. This processing lag introduces queuing for these messages because of which the timestamps we observe is not an accurate representation of the information flow. If this is not taken into account for modeling low latency predictions especially by high frequency traders the model may provide inaccurate predictions. This project lays foundation for modeling queuing uncertainty by analyzing inter-arrival times of different order messages and provides different models for prediction with its limitations.



SECOND PLACE – \$1,000

Title: Utilizing Quantitative Methods for Anti-Money Laundering (AML)

Team: Utsav Adhikari, Shenyuan Chen, Deepa Sathaye, Xiaoyue Sun, Zhan Zhang

Company Sponsor: BMO Harris Bank

Abstract: The goal of the BMO Practicum was to build working knowledge on the current methodologies used by banks to detect money laundering activities in both customer and credit card transaction data as well as use statistical learning to build a predictive model. Because of recent regulations, failure from banks to meet current anti-money laundering detection guidelines results in severe punishments as well as socioeconomic and global security repercussions. Overall, the group developed three risk rules to create a risk model utilizing BigQuery and Python as well as created a predictive models using logistic regression and random forest classifiers to classify high risk customers based upon data provided.



THIRD PLACE – \$500

Title: Forecast Stock Volatility: A Mixed-Frequency Covariance Estimation Model Approach

Team: Yu He, Chuxuan Jin, Pavan Kumar Nadiminti, Shuang Tao, Chen Yan, Yizhi Zhu

Company Sponsor: Wedbush

Abstract: Asset Covariances are an important component of portfolio selection and managing risk. Since covariance's evolve in time we need a procedure to accurately estimate dynamically evolving nature of asset co-movements. The liquidity of the asset data used is an important factor in reliability of the covariance forecasts. Thus a high frequency approach would circumvent this problem but would end up incurring the curse of dimensionality. A novel approach would be to take the best of both the worlds by considering a mixed frequency factor model, using highly liquid ETFs as factors. This approach has the benefit of efficient usage of available data while simultaneously avoiding the pitfalls of biases introduced by market microstructure and asynchronicity.



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Other 2016 Practicum Projects:

Title: Estimating Real Change in Expenditure Through Retirement

Team: Jingheng Jia, Ang Li, Zhao Li, Suraj Monga, Sijing Xiang, Jiaying Xu

Company Sponsor: Ash Brokerage

Description: Examination and updating the “spending curve” post-retirement

Title: Predicting Mortgage Defaults for Loan Portfolios

Team: Abhinav Iyer, Annie Tao, Liyang Wang, Peng Xu, Dongliang Yi

Company Sponsor: Axis Re

Description: Using logistic regression and random forests to predict default rates on mortgage portfolios

Title: Portfolio Credit Risk Rating

Team: Fangyuan Guo, Lei Guo, Junqi Liao, Mingwei Lyu, Wenqi Zhao

Company Sponsor: University of Illinois Investment Office

Description: Designing a credit-monitoring procedure to provide alerts to senior managers of UIUC’s investment portfolio

Title: Machine Learning for Price Movement Prediction

Team: Shuyue Fu, Shengdong Liu, Jian Lyu, Xinyu Peng, Jichen Wu, Heran Zhang

Company Sponsor: CME

Description: Machine learning for price prediction – using CME SPY data stream – neural nets and decision trees

Title: Application of Social Sentiment Factors in ETF Design

Team: Quoc Dung Cao, Yikang Luo, Lu Qiu, Rajput Tanmay, Miao Zhou

Company Sponsor: Social Market Analytics

Description: A prior group had designed a sentiment enhanced DTF using SMA data. The object here was to see if trading costs could be reduced without performance reduction

Title: Performance Analysis of the CBOE S&P 500 Buy Write Index

Team: Balakumaran Kailasam, Dhruvik Patel, Bolong Zhang, Minsi Zhang

Company Sponsor: SpiderRock Advisors/Geneva Advisors

Description: Comparing and contrasting the efficiency and return profile of a call-writing overlay strategy-BMX-with straight equity investments – particularly for retirees

Title: Forecasting Stock Trading Volume

Team: Chiyang Li, Jacob Markley, Duo Wu, Zhu Yang

Company Sponsor: Social Market Analytics

Description: Predicting volume profiles for intra-day execution, possibility of block trades; seeing whether sentiment indicators help improve prediction

Title: Measure News Impact and Trade Fluctuations on Stock Price

Team: Hongyi LI, Qianqian Sun, Xiaoyue Sun, Zixuan Song, Tianyi Zhang

Company Sponsor: Professor Sowers

Description: Seeing if a Hakes Effect is detectable using SPY

Title: Asset Allocation

Team: Maggie Wen Liu, Kevin Wang, Jacob Wong, Li Xu

Company Sponsor: Ash Brokerage

Description: Examining the trade-off between assets and income targets in retiree’s portfolio. The place of annuities following Wade Pffau’s paper.