Explanation of Trading Company Performance

Sebastien Donadio
Master of Science in Analytics Program, University of Chicago Graham School

Background

- Trading firms make money with their trading strategy performance
- Absolute gain not sufficient for assessing a good/bad trading day
- Goal of this research: Explaining the source of the trading strategy performance

Definition

- Trading Strategy Performance: Measured by the Profit and Loss (P&L)

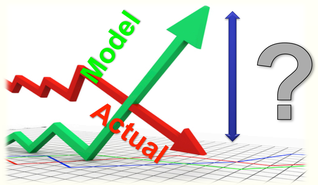
Research Objective

- Detect Profit & Loss anomaly
- Explain the cause of a P&L Loss

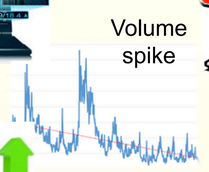
Limitations

- This method is limited to trading strategy starting and ending with no inventory

Problem Statement



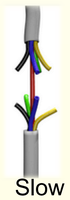
Tick-to-Trade
Order too slow



Volume spike

Software is too slow

Rejection Rate



Slow Network

Exchange relationship

Configuration

Federal Reserve Announcement

Risk blocked trades

Relation

P&L = f(news, latency, volume)

Method

1. Build a model captable to find P&L anomalies using different source of data
2. Find P&L anomalies using 3 types of variables (news, latency, volume)
3. Find P&L problem by finding variables who have no anomalies

News

- News cause important market movements (they can be positive or negative)
- Macro news: Fed announcement, Rating change of a country
- Micro news: Specific to a given company (earnings, ratings,…)

Financial News Website

Sentiment/Web Scraping Technology

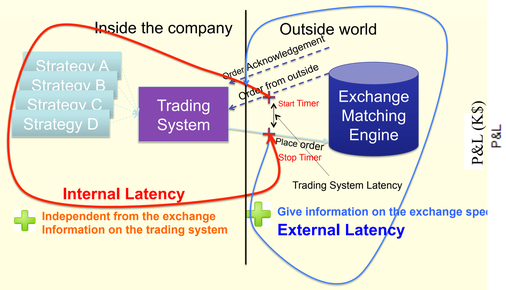
Date	Place		
2017-04-04	US	454	233
2017-04-04	ASIA	44	34
2017-04-04	EU	122	112

Multicas… Streamin…

Date	Symbol		
2017-04-04	MSFT	1	6
2017-04-04	AMZ	2	4
2017-04-04	AAPL	7	0

Latency

- Two critical latencies: Internal and External
- High latency significantly damages trading



Volume

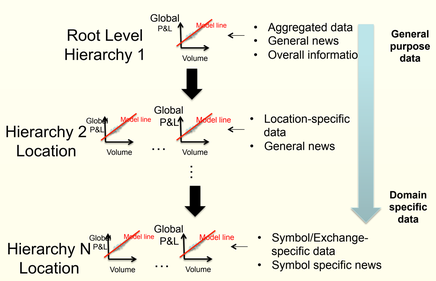
- More volume ➔ More trading opportunities

Future work

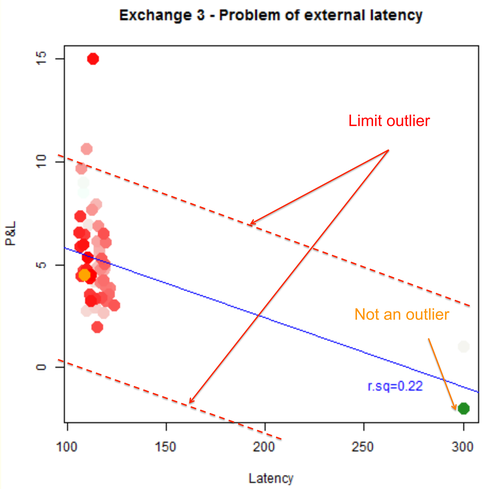
- More independent variables
- Real-time System
- Different anomaly models

Hierarchical Model

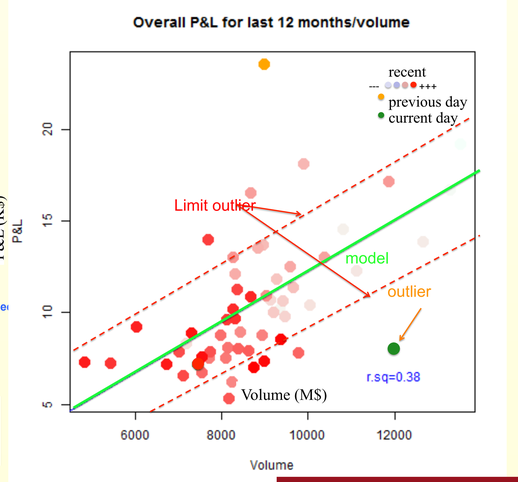
- Detecting P&L anomalies requires different level of details from Explaining P&L drawdown causes
- A different hierarchy for different level of data



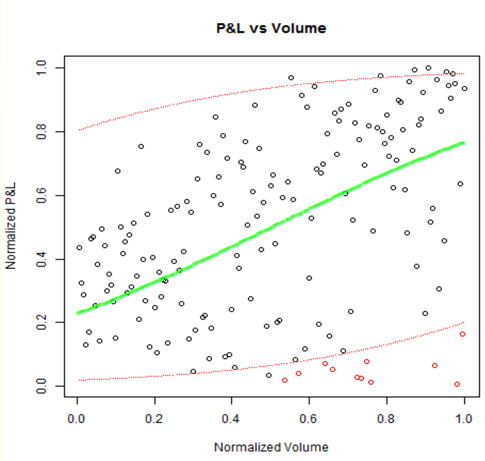
Cause of a problem



Anomaly Detection



Anomaly Detection using Frank Copula



Overall Results

	Reference	
Prediction	0	1
0	128	0
1	11	31

Accuracy : 93%