Aalto University
School of Science

SEB

MS-E2177 Seminar on Case Studies in Operations Research

Rogue Trading Control

Project Plan

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1 Background

Since the collapse in 1995 of Baring Bank, financial organizations have started to develop tools and processes to detect misbehaviors in trading. The reason for Baring Bank collapse was due to massive losses of £827 million by one individual trader named Nick Leeson (Ross 2018). The 28 year-old trader was responsible to arbitrage profit Nikkei 225 prices between Osaka and Singapore exchanges. He managed to be greatly successful until it was found out that he had been booking all loss-making transactions to his secred 88888 account. (SEB 2018).Since the financial crisis 2008-2009, banks have gone to great lengths in their bid to stamp out rogue trading, market manipulation and other employee misdoings. Massive investment banks such as JPMorgan and UBS have lost billions at the hands of rogue traders. (Noonan 2017).

The purpose of the given project is to develop a tool for detecting such outliers or anomalies in transactions that have been cancelled or amended by SEB's trading control. (SEB 2018). Rogue trading in this project is defined as trading which is operated outside of the established rules of a bank. (PwC 2008). Rogue trading can be divided into the four following events:

1. Transactions harming the bank by hiding losses or manipulating the profit and loss.
2. Transactions harming the client of the institution.
3. Transactions used to illegally hide losses to avoid tax payments.
4. Transactions used to hide the final beneficial owner of the money for the purpose of money laundering or/and financial crime. (SEB 2018).

Even if the banking industry is the most regulated industry in the world (Graaf & Kidd 2012), it is important to understand that rogue trading cannot be completely prevented but it can be managed in an acceptable manner by building preventive control systems and risk mitigation strategies (PwC 2008). The solution for the problem can be approached from multiple perspectives, such as psychological, cultural, or detection point of views. According to Graaf & Kidd (2012) common themes around the rogue trading have been: culture and governance, trading mandates and limits, control function culture & challenges, reconciliations / confirmations, risk management, management information, off market rates / day 1 P&L / amended transactions and segregation of

duties & IT security.

Corporate culture plays a great part in banks battle against rogue trading. The overall risk management strategy should not just cover operation and system control but also people. (PwC 2008). Particularly in large investment banks, unsustainable competitive environment has been said to put pressure on the traders to create profit and maintain their position. This has been argued to lead traders into unhealthy measures for enhancing the personal profit / loss account.

However, in this assignment we are going to focus on detection control, more closely cancel and amendments (C&A) control, which is one of the standards to detect rogue trading. Often trades are cancelled when both parties reach a mutual agreement and there has happened a common mistake. Moreover, the cancelled and amended trades can also reveal the early recognitions of suspicious trading patterns and rogue trading. The aim of the project is to create a tool to spot rogue trading with the help of C&A data. In addition, our attempt is to build a more comprehensive picture of the phenomenon and understand what leads traders to behave badly.

2 Objectives

The project has two objectives. The first one is to study the previous work done in the field of rogue trading prevention. The second one is to design, implement and validate a programmatic solution for categorizing suspicious transaction cancellations or amandments. This also includes a report of the results achieved with the solution as well as recommendations on how to proceed further.

The reason behind the first objective is to ensure that we get to know the current state of rogue trading. This may include studying the strategies and tactics possible, or already used in real case of rogue trading. Practices of detection and prevention should be sought and analyzed as well. After achieving the first objective we should have a decent ground to start working on a solution for this particular setting provided by the customer.

More precisely stating, the second objective is to implement an algorithm which is able to estimate the probability of illegal intention behind amended or cancelled transactions. The customer needs a process that can categorize the transactions by their suspiciousness i.e. behaviour that does not match with overall C&A data. For the algorithm to achieve a meaningful level of accuracy in detecting such outliers in data, we need a good understanding of some possible illegal trading scenarios. Only by knowing how an illegally acting trader would in general work when following such scenarios, we may try to formalize his/her actions as patterns and even more compact signs.

3 Tasks

The project is divided into 10 specific tasks.

1. **Doing background research.** The topic area and the topic itself is rather complicated. This is why quite a lot of time is allocated for background research.
2. **Planning the project with the customer.** Planning and deciding the scope of the project and what SEB and the team wants out of it.
3. **Writing the project plan.**
4. **Unifying the dataset and decreasing the dimensionality.** The quality of the data is not optimal, so some time has to be used in order to analyze the data properly.
5. **Studying the general (regular) behavior of traders.** This can be done by utilizing univariate and multivariate relations in the data.
6. **Writing the interim report.**
7. **Implementing and testing possible models.** If multiple models give the same kinds of results, the probability of them being right is higher.
8. **Verifying the functioning of implemented model candidates.**
9. **Analyzing the results.** The conclusions can be used to create recommendations for further development.
10. **Writing the final report.**

4 Schedule

The critical dates are listed in Table 1. Additionally, the project schedule and milestones is illustrated in the Gantt chart in Figure 1. The values on the horizontal axis of the chart illustrate the weeks that have passed until that point.

Event	Date
Company presentations	12.1.2018
First meeting with the customer	26.1.2018
Project plan ready	21.2.2018
Project plan presentations	23.2.2018
Interim report ready	21.3.2018
Interim report presentations	23.3.2018
Final report ready	9.5.2018
Final presentations	11.5.2018

Table 1: Critical events.

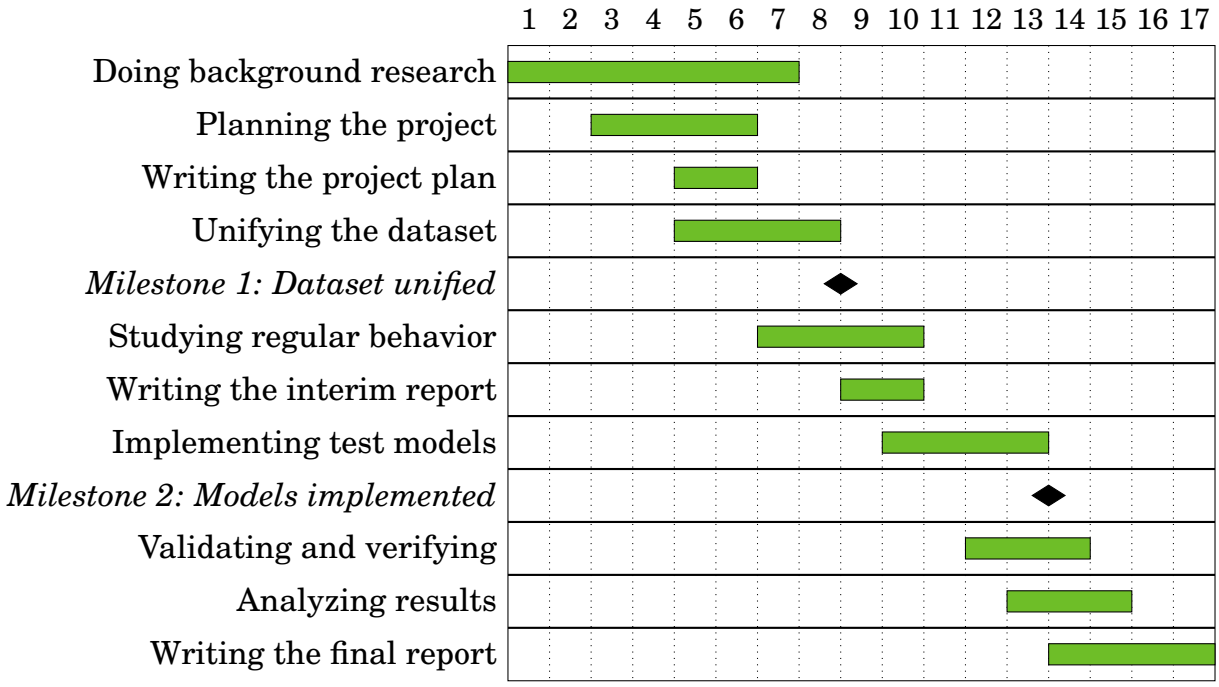

Figure 1: Gantt chart illustrating the schedule of the project.

5 Resources

Resources needed by the project are (excluding labor):

- Library access (internet, physical) with a sufficient coverage of material relevant for the project.
- Computing capabilities and internet access.
- Software for statistical analysis and possibly one for other mathematical work.

There are three primary information resources that will be used in the project:

- The dataset of cancelled and amended transactions provided by the customer.
- Any provided documentation of the procedures, policies and systems of the customer, followed or used, or otherwise relevant for understanding the data given in the dataset.
- All other relevant literature: journals, reports, legal etc.

The dataset is clearly in a central role as this defines the particular setting to which the solution is created. In other words, it will be the environment for designing and testing any algorithms.

6 Risks and challenges

The risks identified are in Table 2. None of the risks are seen as being threatening for the project and mitigation actions have been and will be taken to minimize their effects.

Risk	Probability	Effect	Mitigation actions
Communication inside the team failing	Low	The team not working efficiently, lowering the quality of the end product	Having regular meet-ups and being open about everything
Failing resource allocation	Low	Team members ending up doing extra work for no reason	Communicating openly and disclosing everyone's tasks clearly
Communication with customer failing	Low	Final product not being what the customer wanted	Arranging regular meetings and checkups with the customer
Losing the scope of the project	Medium	A lot of stress and extra work for the team	Deciding a detailed goal for the project in the beginning
Bad data quality causing more work than planned	Medium	Not being able to concentrate on what is important	Studying the data thoroughly at an early stage and not fixating on completely repairing it
Failing to produce anything conclusive	Low	Final product not being what the customer wanted	Thorough research into the topic and communication with experts

Table 2: The risks related to the project

In addition to the risks in Table 2, the complexity of the business and finance instruments might introduce some challenges for this project. Understanding whether the cancellation or amendment of a transaction is part of the bank's normal process or part of illegal activity requires a combination of several skills:

1. Pricing of financial instruments. How different parameters affect the price and risk profile of an instrument.

2. Trading processes and systems. Which parameters are agreed between the counterparties of the trade and which are set by the market.

3. Understanding the business motives behind trading activities. What is the clients motive for the transaction. How does the bank get compensated on the service provided.

These challenges can be overcome with thorough research into the topics and discussing them with experts.

References

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