



Aalto University
School of Science



MS-E2177 Seminar on Case Studies in
Operations Research

Rogue Trading Control

Interim Report

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1 Objectives and scope of the project

The objectives of this project have almost stayed the same. Our objectives are still to study the previous work done in the field of rogue trading prevention and find and implement a programmatic solution for finding and categorizing suspicious transaction cancellations and amendments.

However, the scope of the project has been refocused. As we have studied the subject further, we have realized how difficult it is to find rogue trading activity and how many different controls banks use to achieve this. Considering this project it is crucial to understand that the control we are developing here is just one of many. As a result, the solution is not as much "find a rogue trader" -oriented rather finding indicators of misbehavior from the data which could eventually reveal rogue traders.

2 Progress

Many actions have been taken to improve the consistency and readability of the data. The purpose of all this is to enable the analysis of the data, and make analyzing it more efficient. Examples of tasks the standardization included are:

- Sorting the dataset into coherent subsets.
- Finding the real world meanings behind the often obscure parameter names and factor levels.
- Standardizing values and value formats between the subsets.

Examination of the data started concurrently with the standardization efforts. This examination started from the subset of least ambiguous financial products and their parameters. In addition, while trying to get insight of the possible ways of going rogue, we have constantly been experimenting with programmatic solutions for classifying traders by their behavior.

The overall architecture of the programmatic solution is shown in Figure 1. In simplicity the solution will be built by developing, implementing, and finally tuning, a set of different classifiers. This is to rank the traders on a variety of criteria. Then using these ranks, the algorithm proceeds to assigning "flags" for the highest ranking traders of each classifier. All traders with one or more flags form a group of initially suspicious

outliers. These outlying traders can be further sorted by their flag count, to set the individuals into order of suspiciousness. A graphical explanation of the ranking is shown in Figure 2.

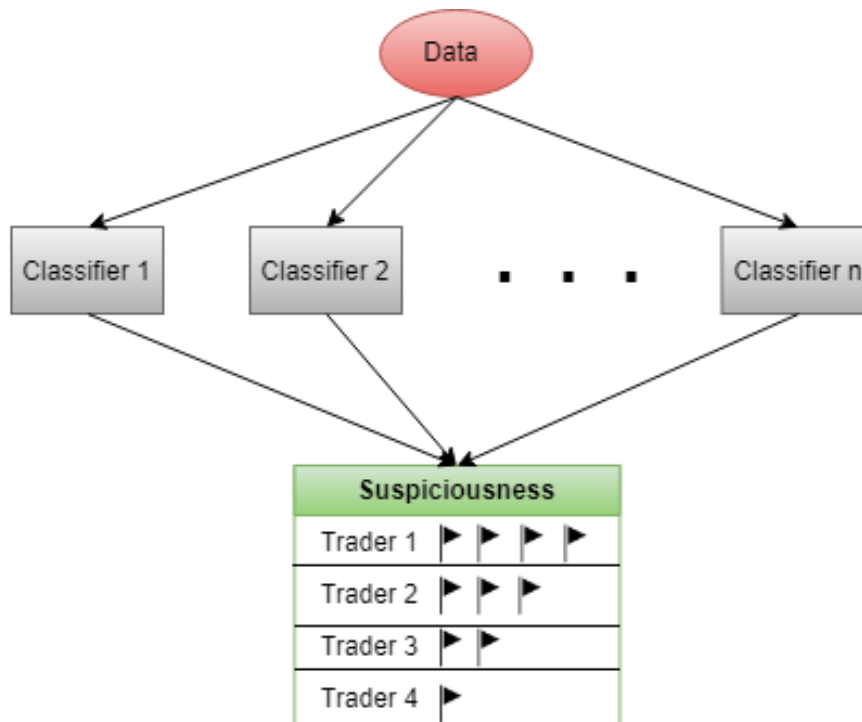


Figure 1: A flowchart of the basic functioning of the software

One of the classifier 'families' we have experimented with is comparing distributions in the time dimension. This classifier uses temporal information in the dataset to assess the 'normality' of a traders C&A behavior. The algorithm tests whether the distribution of a traders C&A actions on the weekdays is distributed similarly as the traders colleagues' in the local office, at that specific financial quarter. In other words, a goodness-of-fit is assessed with the use of the appropriate chi-squared distribution. Difference from the average C&A distribution may signify an abnormal trading behavior.

Similar classifiers of this 'family', ones that compare distributions, will be implemented on different aspects of the data. Classifiers working on a different basis are under study, to broaden the view on behavior patterns, and thereby hopefully capturing more comprehensively the truly abnormal actions.

Highest ranking 10 % of each classifier

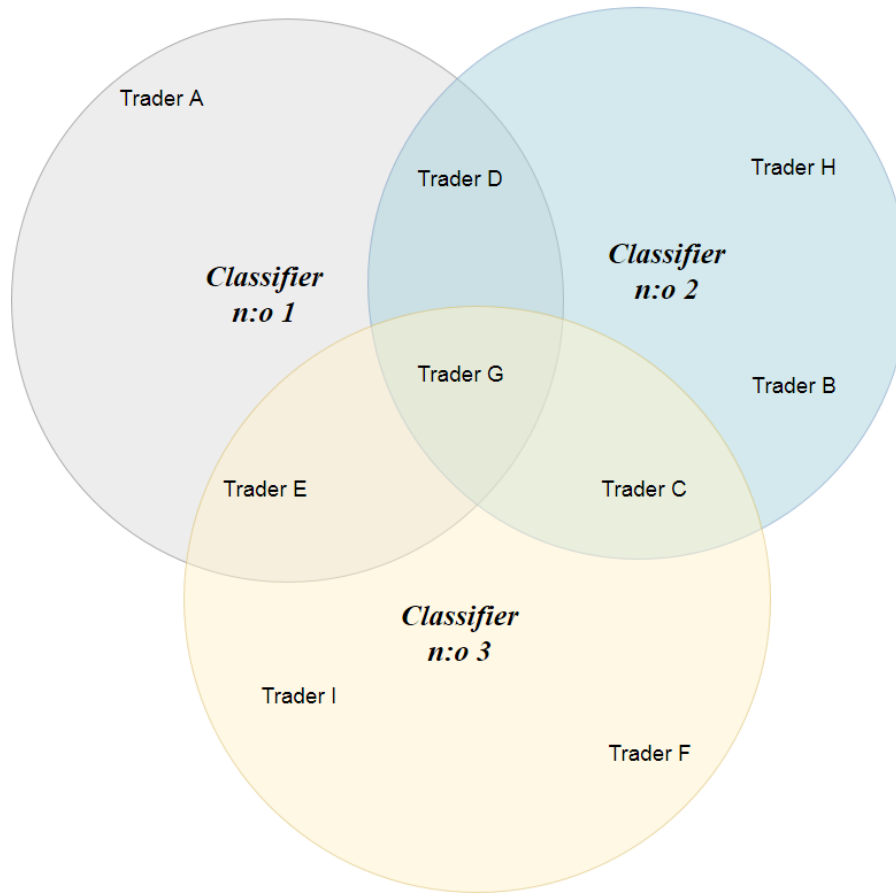


Figure 2: Highest ranking traders of each classifier presented in a Venn diagram. Multiple flags imply a trader occurring in top ranks for multiple classifiers.

3 Schedule

An updated project schedule is illustrated in the gantt chart in Figure 3.

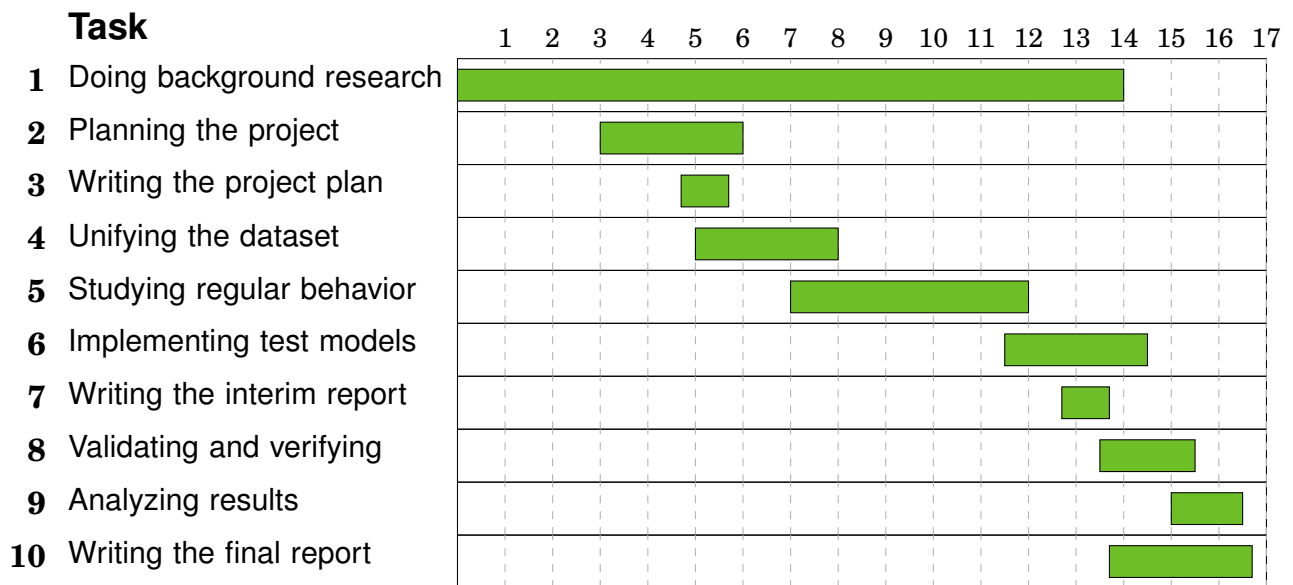


Figure 3: Gantt chart illustrating the schedule of the project.

The most notable changes are made on tasks 1,5,8 and 9. The time for doing background research has been extended due to difficulties in finding suitable theory for the developed model. Also, we are going to continue the discussion with the client to better understand the rogue trading phenomenon in context to our model. In addition, we have extended the phases of studying regular behaviour and validating and verifying the models. Overall, the slow development of process of suitable model has forced us to postpone the final analyses in the schedule.

4 Risks and challenges

There has been a couple changes to the original risk profile of this project. First, the probability of losing the scope of the project has lowered from medium to low, as there is now a clear plan for an implementation that is easy enough to follow and has clear limits.

Second, the risk of allocating our resources sub-optimally has risen from low to high. This is caused by the fact that the team members have a lot of other work besides this project and in addition to optimizing the resource allocation inside this project, the time of the team members has to be optimized over other projects as well. This also causes the probability of communication inside the team failing from low to medium. To mitigate the effects of these risks, we will use a stricter working schedule for the rest of the

project as well as assign specific tasks to each team member.

On top of these, the risk of bad data quality causing problems has lowered from medium to low. The data still has some issues but it is in a good enough condition for analyzing so the critical point for this risk has mostly passed. The updated risks can be found in Table 1.

Risk	Probability	Effect	Mitigation measures
Communication inside the team failing	Medium	The team not working efficiently, lowering the quality of the end product	Having regular meet-ups and being open about everything
Sub-optimal resource allocation	High	Team members ending up doing extra work for no reason	Communicating openly and specifying everyone's tasks clearly
Communication with customer failing	Low	End product not being what the customer wanted	Arranging regular meetings and checkups with the customer
Losing the scope of the project	Low	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	Low	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	End product not being what the customer wanted	Thorough research into the topic and communication with experts

Table 1: The risks related to the project

The challenges stated in the project plan still persist as the banking industry might be even more complex than we originally thought. A clear and ongoing communication with the experts is key in overcoming these challenges.