

Investment strategy modelling based on trades and orders

Studying mini-dollar behavior

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The average *daytrade* investor has the following questions:

- What is an **increasing** and a **decreasing** price series?
- What is the **best moment** to buy or sell shares?

How does the price of a share change?

The price of a share is described by the **offer and demand** law, buyers trades money for shares with sellers.

- Direct **selling trades** make the price decrease.
- Direct **buying trades** make the price increase.

Concepts (2)

Such dynamics is handled by the **offer book**, responsible to control the priority of buying and selling offers and to trade shares between orders in agreement. The image 1 illustrates it.

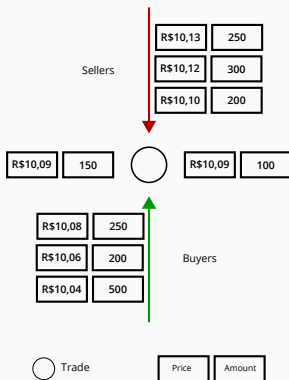


Figure 1: Share pricing process

In order to determine whether some price series is in a *increasing* or *decreasing* tendency, local **maximum** and local **minimum** peaks must be found.

An **increasing** series is located between a minimum and a maximum peaks respectively. A **decreasing** one is located between a maximum and a minimum peaks respectively

A real-time algorithm is capable of finding such **peaks** with a **delay** Δ .

Tendency modelling (2)

The image 2 shows the results of such algorithm.

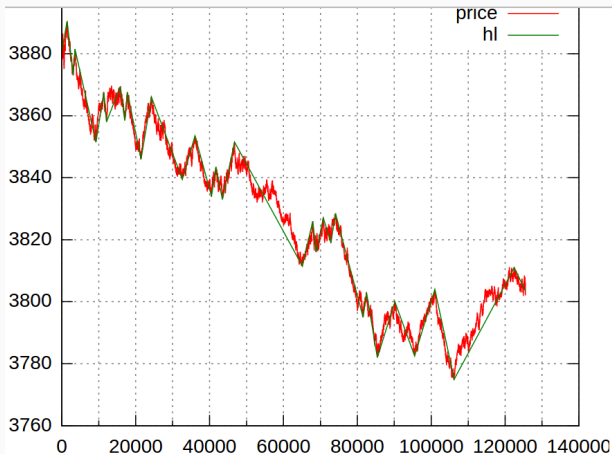


Figure 2: Peaks finding algorithm on mini-dollar price series

Mini-dollar price characterization

Studying only **daytrade** negotiations:

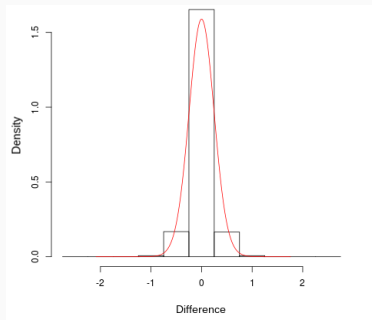


Figure 3: Histogram of the difference of price and *Laplace's* distribution fit

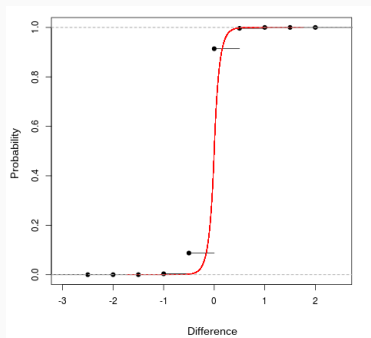


Figure 4: Empirical cumulative distribution and *Laplace's* cumulative fit

Studying the behavior of the offer-book, two features of relevant information were created and its behavior analyzed. They are described as it follows:

- **Reversion Volume:** Necessary amount of financial volume in order to confirm the current forming peak.
- **Recover Volume:** Necessary amount of financial volume in order to improve the current forming peak.

Features (2)

The image 5 shows how both features interact near a forming peak.

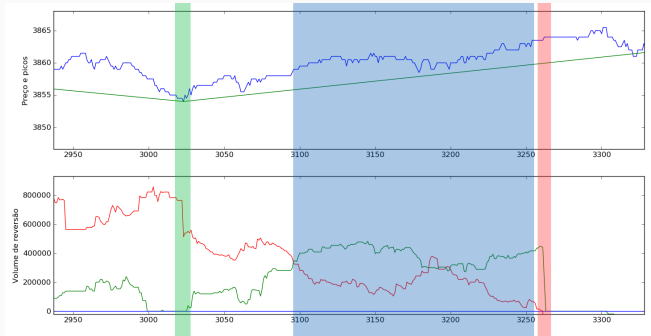


Figure 5: Interaction of reversion volume and recover volume

Using the given features calculated at every trade, a classifier was built using the *SVM* and the *Logistic Regression* algorithms. The table 1 shows the confusion matrix.

Table 1: Confusion Matrix

	<i>Support Vector Machine</i>		<i>Logistic Regression</i>	
	1	-1	1	-1
1	1199	169	1196	172
-1	189	1379	192	1376

Apparently the results of the classifiers were *good*, but the failing examples were the edge cases with great financial **impact**.

Improvements are **necessary** to solve such problem.

Financial evaluation of the strategies will be done as soon as the edge cases are well handled.

Thank-you

Any questions?

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