How do reviews shape our experience on Amazon?

Applied Data Analysis

ÉCOLE POLYTECHNIQUE FÉDÉRALE DE LAUSANNE

Hugo Moreau - Guillaume Raille - Simon Favre

Introduction

Based on our own experience we have noticed how importantly we are affected by products' reviews when we buy products online. It is hard on such platform to assess the quality of a product as we do not have physically access to it. Therefore, we are very often using other user's feedback to guide our choice. This is the perfect setup to see the appearance of a herding effect, because we blindly believe what others think of a particular product we might be quite influenced when we give our own point of view on a product. This project studies how subsequent reviews are influenced by the very first one.

Books 1'995'732

Reviews 18'005'724

Similar books ?

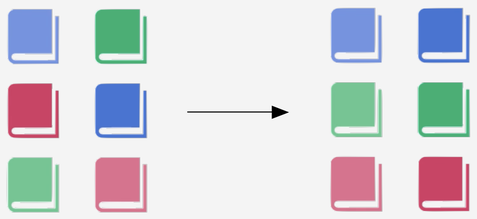
Detecting similar books

In order to match books based for example on their titles we would need to compare them pairwise and to check their similarity. This would requires **2 years of computation**

Locality Sensitive Hashing on titles

- Visualize it as a color depending on the titles
- 2 titles with the same color are likely to be similar
- Computation time takes 1 minute 30 s

14,524 groups of books that are possibly similar



Amazon API to get the authors

Goal: obtain more details concerning each book
- Clean the authors (accents, lower case).
- Apply relative Levenstein distance between each authors and compute the mean.
- Identical if lower than a threshold.

5,882 groups of books that are possibly similar

Strict on titles

Goal: final filter, get less false positives
- Normalization of titles (no symbols, lower case).
- Consider the set of words of each title.
- Identical if the symetric difference of such set is empty.

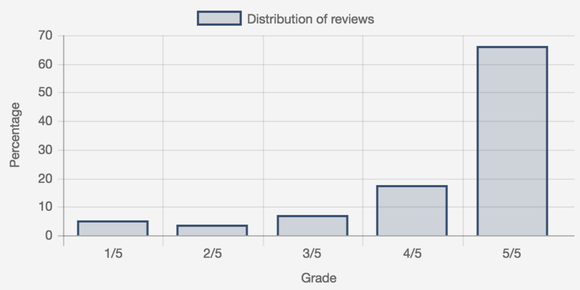
3,173 groups of books that are similars

Herding effect

«Herding effect»: how the difference in first rating of two similar books impacts respectively their following ratings.

Categorization

- classify each pair of similar books according to their first review.
- identify the most interesting pairs (High and Low first reviews (HL)).



Balancing the distribution, we set the categories:

{ High first review (H): 5/5
Medium first review (M): 4/5
Low first review (L): 1/5, 2/5, 3/5

Finally we obtained:

1695 books in (H) paired with books in (H)

768 books in (H) paired with books in (M)

737 books in (H) paired with books in (L)

An example

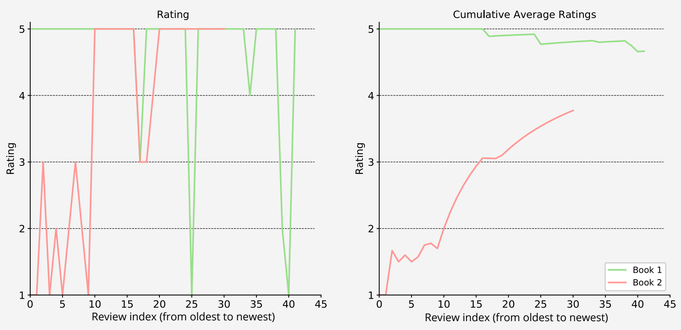
untie the strong woman blessed mothers immaculate love for the wild soul. by Clarissa Pinkola Estés
First review: ★★★★★

Book 1

untie the strong woman blessed mothers immaculate love for the wild soul. by Clarissa Pinkola Estés
First review: ★☆☆☆☆

Book 2

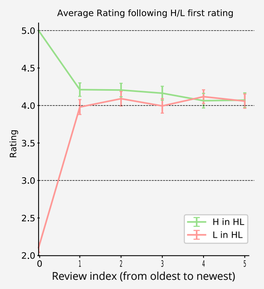
Perfect study case: 2 identical books
- one with a first review of 1/5
- the other has a first review of 5/5.



Herding Effect observed:
Book 2 took 10 consecutive reviews before getting back to around 5/5 reviews.

Generalization

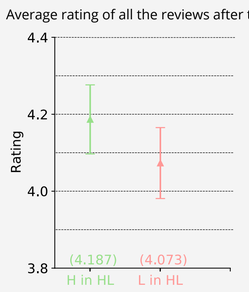
Can we observe the effect on the entire dataset ?



On the whole HL category:
- An average of 4 reviews to recover from a diverging 1st review
- Converging rating after the herding effect faded.

Long Term Effect

Until when are the reviews impacted?



After 10 reviews:
- A small difference can still be perceived.

Conclusion

Amazon is well aware that neutral and objectives reviews is one of the key factor to efficiently promote and sell products online. Unfortunately, for them and their customers, effects such as the herding effect observed in this study can bias the rating of some products. To preserve the quality of their review, Amazon took different counter measures:
- present a **weighted average to customer** (a machine learning based model that is based on the different attributes of reviews e.g. the usefulness as voted by other users, to increase the weights of more reliable reviews)
- **hidden reviews**
- **VINE program** proposes to best reviewers (based on the same criteria than the weighted average) are offered promotions on product in exchange for their trusted reviews (usually used when there are no reviews yet)