Antigoni Kourou – 11118172
antigoni.kourou@student.uva.nl

University of Amsterdam
Business Information Systems
January, 2016

MASTER THESIS PROPOSAL

Towards A More Efficient Online Feedback System: The Airbnb Case

I. Introduction

Sharing economy is an important phenomenon grown exponentially over the last decade. By utilizing information technology, individuals can reuse, distribute and share their excess capacity of goods and services. However, building trust in these online marketplaces is the key to the adoption of the sharing economy [8]. All the markets require some minimum amount of trust, but for Internet markets this is a particular challenge considering the fact that trades are typically anonymous, geographically dispread and executed sequentially. To incentivize trustworthiness, online markets employ reputation based "feedback systems" allowing traders to post information about past experiences. Examples of these systems include the traditional giants eBay and Amazon, to continue with the new big players such as Airbnb and Uber. However, many academic papers on online reputation systems and building trust in the online marketplace report the existence of bias on online reviews [1, 3, 4, 5, 6, 9], therefore reducing the bias of these systems is an important issue towards a more efficient online feedback system.

In 2008 the giant of online marketplaces eBay changed radically the way how their feedback system was working. Many researchers have analyzed the eBay changes [1, 2, 3, 4, 9] and findings suggest three ways to move toward a more efficient feedback system. A solution would be to mitigate to a new validated feedback system and follow it strictly. However abandoning the existing system and move to a new one requires a lot of effort and sometimes the model also does not fit considering the differences in the type of transactions. The second solution suggested is to build channels of feedback in a targeted way, for example only one side feedback or the element of anonymousness. The third solution learnt from the eBay case suggests using complementary methods for feedback analysis. This third solution offers in itself a lot of potential considering the big variety of tools for data analysis. This paper proposes text mining of reviews as a complementary method for feedback analysis in the reputation systems. The research will be focused on the reviews system of Airbnb. In the next section, I treat the current issues of Airbnb feedback system and afterwards introduce the proposed solution to be tested. The last section is an overview of the research planning.

II. Problem statement

Airbnb is a large online marketplace for accommodations, therefore reputation and trust is very important for the transactions on Airbnb. Before discussing the issues of the system, let's take a look on how it works. The Airbnb feedback system is two sided, meaning that both guests and hosts have 14-30 days to review each other. The users are encouraged by email, login notifications or other forms of reminders to rate their experience and the feedbacks are revealed simultaneously when both the guest and the host have rated each other. The structure of feedback consist of three parts: firstly, the users is asked to give a general rating from 1-5 stars and a general comment, secondly the users rate six defined categories (Accuracy, Communication, Cleanliness, Location, Check in and Value) and the average ratings are

published only after three reviews; and lastly the users are asked if they would recommend the listing or not.

A recent research on this system implies that the system suffers from the bias on reviews [5]. In addition the research suggest that the bias on the system is caused mainly because of three reasons. First, ratings are the only data on feedback analysis of the system, meaning that text reviews are revealed for the public to read but they do not affect the overall rating of the listing. Second, based on the surveys of Airbnb itself, the non-reviewers tend to have worse experience than the reviewers and the third reason is the fact that the system does not offer an option for the feedback to remain anonymous as most of the users prefer. The next section proposes a way how to use complementary analysis in order to reduce the bias of the feedback system.

III. The proposed solution

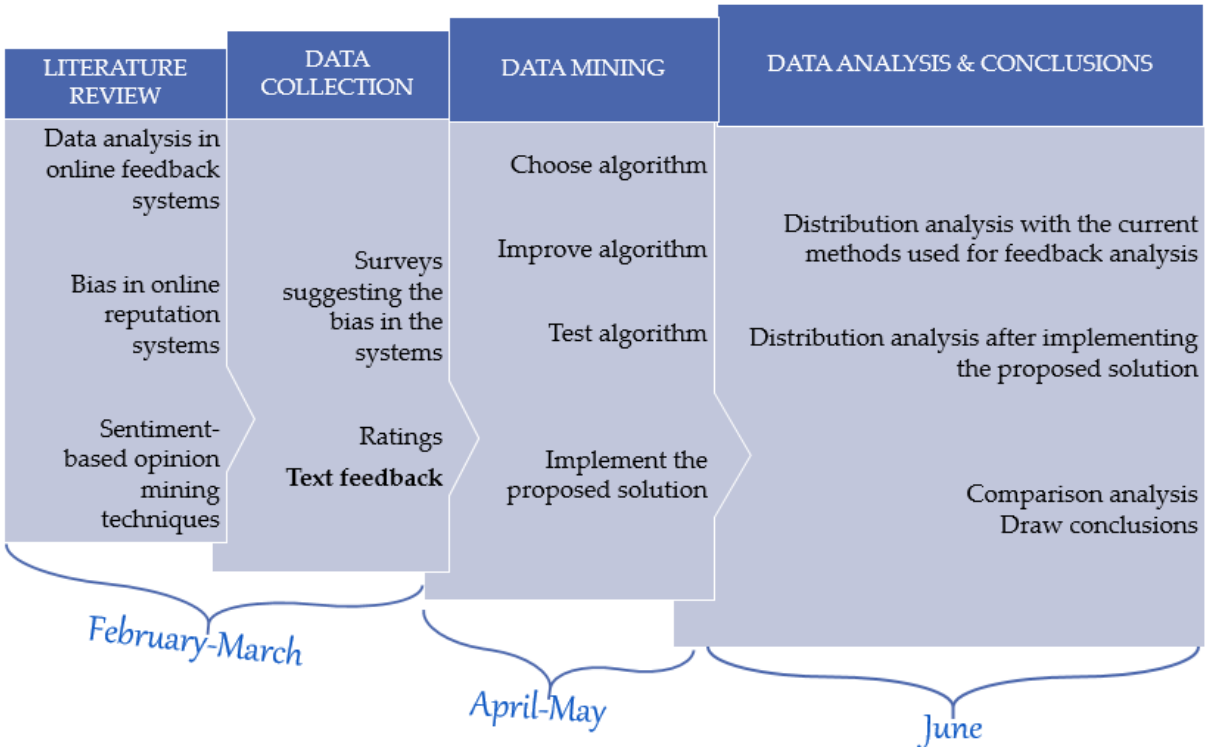
Text reviews as part of the feedback in the online marketplace have a big importance for the users of these platforms, which is often underestimated from their owners. Research in the field suggest that text opinions influence the users' decisions even when the rating for the listing is high [5]. Furthermore, the study of the Airbnb feedback systems argues that a negative rating is followed by a text in 45% of the cases, which implies the great power of text mining for discovering the negative features of the listing. The methods for doing so fall into the category of sentiment based opinion mining methods. Examples of their application include mainly the movie rating systems (Netflix, IMDb) and the product rating systems (eBay). This research proposes the implementation of sentiment based opinion mining methods as complementary for the review analysis in the online feedback systems of the accommodation market, explicitly in the Airbnb feedback system.

This research is based mostly on the question: "How can sentiment-based opinion mining methods complement the analysis of reviews in an online reputation system?" The research aims to test the methods which can effectively calculate the reputation scores of the text reviews and afterwards find the ways how these methods can be integrated with the current methods of feedback analysis. To be more precise, the Airbnb system calculates now the overall rating for a listing based on the average score of at least three reviews and this score has a proven bias (tend to be always positive). Given the fact that text reviews reveal often the negative aspects of the listing, generating a low score of feedback for them and calculating this score in the overall rating, will we reduce the bias? I believe that the answer is yes, however in order to have an answer for these questions the research is planned as described in the next section.

IV. Research planning

As shown in the figure below, this research is now in the phase of literature review. Searching of academic theories and empirical research is focused on the bias of the reputation systems, the data analysis made on these systems and the sentiment-based opinion mining techniques. This phase is planned to last until the end of March and it is accompanied by data collection. The data is scrapped from the Airbnb platform and will be filtered in order to consist of {name_of_reviewer, coordinates_of_listing_reviewed, overall_rating_given, category_rating_given, text_feedback_given}. This data will be used to find and test the methods for generating a score for the text_feedback_given on reviews. The language of the algorithm will be Java (considering the experience with Mallet:LDA) or Python and it will be based on the word sentiment given by SentiWordNet. Afterwards, the ways how to integrate this method with the existing methods of rating analysis will be considered (can be average in the overall score, percentage of the score of reviewer etc.). The final and the most important phase of research is answering the question if this complementary method will reduce the bias in the online reviews. Bias will be measured as the difference

between average experience and the reported experience. This metric represents how far the reputation system is on average in representing the experience of users. I chose to use this method as this is the method used from Airbnb to show the existence of bias in their feedback system. Comparing both cases of bias will help me give an answer to the research question and based on it can draw conclusions on how text mining can be used on review analysis in a broader context, including the e-commerce purposes.



References

[1] Bolton, G., Greiner, B., & Ockenfels, A. (2013). Engineering trust: reciprocity in the production of reputation information. *Management Science*, *59*(2), 265-285.

[2] Cabral, L., & Hortacsu, A. (2010). The dynamics of seller reputation: Evidence from ebay*. *The Journal of Industrial Economics*, *58*(1), 54-78.

[3] Dellarocas, C., & Wood, C. A. (2008). The sound of silence in online feedback: Estimating trading risks in the presence of reporting bias. *Management Science*, *54*(3), 460-476.

[4] Dini, F., & Spagnolo, G. (2009). Buying reputation on eBay: Do recent changes help?. *International Journal of Electronic Business*, *7*(6), 581-598.

[5] Fradkin, A., Grewal, E., Holtz, D., & Pearson, M. (2016). Bias and Reciprocity in Online Reviews: Evidence From Field Experiments on Airbnb (Preliminary-Do not cite without permission).

[6] Ghose, A., & Ipeirotis, P. G. (2011). Estimating the helpfulness and economic impact of product reviews: Mining text and reviewer characteristics. *Knowledge and Data Engineering, IEEE Transactions on*, *23*(10), 1498-1512.

[7] Luca, M. (2011). Reviews, reputation, and revenue: The case of Yelp. com. *Com (September 16, 2011). Harvard Business School NOM Unit Working Paper*, (12-016).

[8] Owen, T. (2014). Building Trust in the Sharing Economy.

[9] Resnick, P., Zeckhauser, R., Swanson, J., & Lockwood, K. (2006). The value of reputation on eBay: A controlled experiment. *Experimental economics*, *9*(2), 79-101.