

LORIA Laboratory, Campus Scientifique  
54506 Vandoeuvre-lès-Nancy, France

# PhD Thesis Proposal

**Title:** Recommender Systems for Opening Opinion Bubbles and Echo Chambers : Application to Political News

**Duration :** 3 years

**Starting date :** October. 1st 2021

## 1 Thesis Supervision

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## 2 Motivation and Context

The issue of information diversity is crucial for healthy democratic debates and has arisen recently due to the increasing use of social media as a source of information [1]. The use of these platforms has raised concerns because information diffusion does not follow the usual editorial process (information checking, editorial decision), but is in part processed by recommendation systems (RS) [2] that provide users with information mainly aligned with their initial opinions. Doing so, RS might enclose users in an opinion bubble [3, 4]. Likewise, platforms without RS allowing users to share and offer their own content can lock them into echo chambers (some people tend to only read resources that confirm or reinforce their initial positions).

In a political information context, opinion bubbles and echo chambers can cause polarization. This process leads users to move toward more extreme political viewpoints and actions than those to which they were originally inclined. It can be detrimental to democracy and carry on actions which may cause public troubles [3].

The project this PhD thesis is part of aims to analyse and model opinion bubbles and echo chambers over time and proposes innovative algorithms to open them. The project builds on a multidisciplinary expertise in political science, digital economics, media studies, content analysis and recommender systems.

## 3 Objectives

Within this project, the PhD thesis is dedicated to designing algorithms to open opinion bubbles, mainly through a recommender system. Such a RS has to provide news in line with users' topics of interest, with a gradual broader spectrum of political opinions. The target is not a total change of users' opinions but a greater awareness of other opinions or viewpoints, to contribute to a healthy democratic debate.

The main steps in this PhD thesis are to :

- Define user profiles : what features have to be considered in the profile to provide with recommendations. This step will be strongly related to the news content analysis performed by another PhD student ;
- Design an algorithm to identify and model filter bubbles
- Design a temporal and diversity-oriented RS. The diversity will have to be redefined for the domain of news and opinion awareness. One challenge will be to be to consider users' feedback about recommendations.
- Design an explanation module. To increase the adoption of the recommender system by the users, the recommendations have to be explained, especially as the recommendations are not fully in line with the users opinion.

## 4 Candidates Profile

The successful candidate has knowledge and experience in machine learning, recommender systems, user modeling, data science and an inclination for human-oriented problems.

Fluency in French language is not compulsory but recommended in order to be able to understand the resources shared during the experiments and the political context of the country.

## 5 Application

The required documents for applying are the following :

- resume ;
- a motivation letter ;
- your degree certificates and transcripts for Bachelor and Master ;
- master thesis if it is already completed, or a description of the work in progress, otherwise ;
- all your publications, if any ;
- at least one recommendation letter from the person who supervises(d) your Master thesis (or research project or internship).

## Références

- [1] Hunt Allcott, Luca Braghieri, Sarah Eichmeyer and Matthew Gentzkow. The Welfare effects of Social Media. *Am. Economic Rev.*, 110(3), 629-676, 2020.
- [2] Neil Thurman, Judith Moeller, Natali Helberger and Damian Trilling. My Friends, Editors, Algorithms, and I : Examining Audience Attitudes to News Selection. *Digital Journalism* ?, 7 ?(4), 447-469, 2019.
- [3] Cass R. Sunstein. *#Republic : Divided Democracy in the Age of Social Media*. Princeton U.P., 2017.
- [4] Quentin Grossetti, Cédric du Mouza and Nicolas Travers. Community-Based Recommendations on Twitter : Avoiding the Filter Bubble. In *International Conference on Web Information Systems Engineering* ?, 212-227, 2019.