How do scholars collaborate with each other? Comparative study on Co-authorship Networks of Scholars Worldwide Using Big Data

Abstract

Are there any similarities and/or differences regarding how scholars collaborate with their colleagues in different universities worldwide? The aim of this research is to investigate the trends, differences, similarities and changes over time in the co-authorship networks of individual scholars. To do so, we have gathered big data from Google scholar profiles of 5000 scholars including information about all their papers and publications, their affiliation, keywords they have used to introduce their research interests on their profile. These scholars are selected from higher ranked universities like Oxford and Harvard to be compared with lower ranked universities like the university of Milan and Tehran university in Iran.

The goal is to see how authors' collaborations change over time throughout their scientific career: are there drastic changes in the recent years compared to the early years of their careers? To elicit the networks, the researcher used "scholar" and "igraph" packages in R to build a recursive crawling function to reach out to the authors' Google scholar profiles and publications as reference of collaborations. Each paper and the names of authors was seen as a single adjacency list to extract the relationships. These adjacency lists represent the tie between ego (first author of this paper) and alters (each of co-authors). If the relationship is reciprocated, it was added to the network as well. It means if one of the co-authors appeared to be the first author of another paper, the relationship changes from a one-way directed one to a two-way undirected one, showing the reciprocity of collaboration. If there was more than one collaboration between two or more authors, this was taken into account through multiple relationships. And lastly, if a paper is written by a single author, it was represented with a loop (tie to oneself). The year of publication of each paper was used and in an aggregate of papers in a year, the evolution of collaborations is compared through years in scientific career.

The focus of the study is the structure of egocentric networks. Data on composition of egocentric networks is not available, although that could be another interesting research question to see if there are compositional differences of scientific networks among scholars worldwide or not? One of the main ideas here is to see how scholars are building and developing their collaboration networks. Are there differences among higher ranked scholars and universities behaviors in terms of the change in their scientific career collaborations over time with lower ranked universities' scholars? Are there differences between earlier years of scientific career, with the subsequent or later years? Are there differences among scientific fields (extracted based on research interests keywords) in the co-authorship patterns, as an example between hard sciences and social sciences? Are there statistically significant relationships among the authors' h-index and i10-index and their egocentric network properties? Are authors building distant relationships in shape of unique dyads and triads to work with multiple and more scholars to maximize their scientific proliferation or not? What about publishing in more unique journals and/or trying to publish in some particular journals repeatedly? Can we find any significant trends in the variation of number of journals papers are published in, between scholars in different universities?

The study is still a work-in-progress, so far the researcher has finished the data gathering process and this abstract mostly included the network extraction procedures, and the ideas and questions that the researcher is going to answer to them based on analysis of data. The prospects of getting interesting results and the trends of how scientific collaborations develop, change and grow or shrink over time, are promising. This enables us to see how scientific collaboration among universities worldwide evolve over time.