

Cover Letter: A bibliometric study of research topics, collaboration and influence in the Iterated Prisoner's Dilemma.

Nikoleta E. Glynatsi¹ and Vincent A. Knight¹

¹*Cardiff University, School of Mathematics, Cardiff, United Kingdom*

To the editors,

This paper presents a bibliometric study of the field the “Prisoner’s Dilemma”. It identifies and presents five research topics in the field using a topic modeling technique, and moreover, it explores the collaborative behaviour of its authors using a graph theoretic analysis of the co-authorship network. Our work extends and improving on previous results which include manuscripts appearing in Nature Communications.

A bespoke piece of software is used to automatically collect metadata from 2420 articles on the field, from 4 prominent journals, which includes Nature, and the preprint server arXiv. The Latent Dirichlet Allocation technique is used to identify five research topics in the field which are demonstrated to have been relevant over the course of time. The collaborative behaviour of the field is analysed and compared to two other game theoretic fields, “Auction games” and “the Price of Anarchy”. Our results demonstrate that the Prisoner’s Dilemma is a collaborative field but it is not necessarily more collaborative than other scientific fields, moreover, authors in the Prisoner’s Dilemma do not influence or gain much information by their connections, unless they are connected to a “main” group of authors.

This paper offers a strong contribution on two fronts:

- It demonstrates the usage of modern data mining and natural language processing on identifying the topic structure of a subject area which has attracted the attention of researchers across fields.
- It demonstrates the usage of modern data mining and data analysis techniques on understand the behaviour of authors in game theoretic fields; which in a sense, understanding behaviour, is the aim of the game theory itself.

We feel that our paper is an excellent fit for Nature Communications as our paper is within the scope of the journal, as demonstrated by a number of publications in the field. One such example is the work of Li, Aste, Caccioli and Livan: “Early co-authorship with top scientists predicts success in academic careers” which in 2019 was published in Nature Communications and demonstrated how a bibliometric analysis can be used to study the impact of co-authorship with established, highly-cited scientists on the careers of junior researchers.

This work has been carried out with the highest standard of reproducibility: all scripts for collecting data and code for the analysis are not only well described but they are also all open source, archived and made available online. Furthermore the piece of software developed for this work is easily installable for python and available to researchers to carry out similar work.

Thank you for taking the time to consider our work,

The Authors.