To understand a journal through four features: An example of Journal of Integrative Cardiology

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Abstract

Purpose: Identifying journal features is important and meaningful. However, no journal combines Google map with social network analysis (SNA) to present publication information. Our aims were to visualize the journal characteristics for Journal of Integrative Cardiology (JIC) and presenting resulting findings using SNA.

Methods: Selecting 115 articles on October 21, 2017 from the JIC website, we analyzed author names, keywords, and the corresponding author's nation to report features: (1) article types, (2) nation distribution, (3) the most productive authors and their authorship clusters, and (4) journal main keywords since 2015. We present both a global map with the functionality of a Google Map (zooming, etc.) and network maps based on normalized relations. SNA Pajek software was performed in this study.

Results: We found that (1) the most frequency of types is Research Article (44, 38.26%); (2) the most number of papers are from nations of US (26, 22.6%), Italy (22, 19.13%), and Brazil (16, 13.91%); (3) the most productive authors are Márcio Galindo Kiuchi and Shaojie Chen; (4) the most linked Keywords are blood pressure, heart failure and cardiovascular disease et al.

Conclusions: Google map combined with SNA provides wide and deep insight into the relationships among nations, coauthor collaborations, and abstract keywords for JIC. The results can be offered to strategy and decision making for the target journal.

Introduction

Comorbid is often defined in medicine as existing simultaneously with and usually independently of another medical condition. Cardiovascular comorbidities were common both before and after diabetes [1]. The high comorbidity between psychiatric disorders and cardiovascular disease has received increasing attention recently [2]. In many situations, it is very hard to observe the association of two or more symptoms at one moment.

An apocryphal story often told to illustrate the concept of co-occurrence is about beer and diaper sales. It usually goes along with both beer and diaper sales which were strongly correlated [3-5] in a market place. As such, all possible pairs of our observed phenomena can be combined and analyzed using computer techniques. However, we have not seen any computer algorithms that help us selecting the most possible pairs co-occurred with each other.

Social network analysis (SNA)

Social network analysis (SNA) [6-8] has applied to authorship collaboration in recent years. It is because co-authorship among researchers that forms a type of social network, called co-author network [7]. We are thus interested in using SNA to explore the most pair relations (e.g., beer and diaper in marking sales) for a journal through what we observed and collected from data, such as abstract keywords, coauthor collaborations, and others related to the target journal, especially using Google map to present these features.

Authors are usually required to provide three to ten key words that represent the main content of the article for an article [9-13]. Keywords or short phrases published with an abstract can assist indexers in cross-indexing the article. However, few study investigated whether keywords are substantially associated with the abstract and what keywords that can represent the researched journal in academics.

Author collaborations and international relations

Many papers have been collected and saved online on website. We have seen some computer scientists placing high hope on those machine-learning algorithms, data mining or artificial intelligence(AI) to quantify research information [14,15] for use in academics. Accordingly, it is possible for us to apply those data and related techniques to understand the features of a specific journal.

For the reason that using internet information is increasing the yield of knowledge from data generated in the course of inquiry [16-

18]. How to further display and develop new knowledge for a target journal is required to explore and further study.

Aims of the study

Our aims are to investigate journal features of Journal of Integrative Cardiology (JIC) in following topics: (1) article types, (2) nation distribution, (3) the most productive authors and their authorship clusters, and (4) journal main keywords since 2015.

Methods

Data sources

We downloaded data including author names, keywords, and the corresponding author's nation from the website of JIC on October 21, 2017 at https://www.oatext.com/Journal-of-Integrative-Cardiology-JIC.php#Archive. Microsoft Excel VBA (visual basic for applications) modules were programed by authors to organize data for use in this study. A total of 115 JIC articles were retrieved.

Data arrangement to fit SNA requirement

Prior to visualize representations of research findings using SNA, we should organize data in compliance with the SNA format and guidelines using Pajek software [19]. Microsoft Excel VBA was used to arrange data fitting the SNA requirement. For more information about the data format, see Pajek guideline at http://vlado.fmf.uni-lj.si/pub/networks/pajek/.

Graphical representations to report

Article types

Many article types are categorized in JIC, such as Case Report, Review Article, and Short Communication, et al. We recorded the type for each article and made a table to present the first journal feature.

Author nations and their relations

Google map is suitable for presenting the author distribution by nation.

The most productive authors and their authorships

Coauthor collaborations for JIC can be drawn using SNA combined by Google map. Their bubbles are sized by the number of paper publication, colored by cluster, and the lines are connected with the chance of co-authorship. Through which, we selected the most productive authors who published the most number of papers in JIC with their colleagues.

Keywords to present the journal research domain

If keywords represent the research domain for JIC, the stronger relations between two keywords can be highlighted through the SNA on Google map, like the concept of co-occurrence about beer and diaper sales. The presentation for the bubble and line is interpreted similar to the previous section.

Statistical tools and data analyses

SNA Pajek software [19] was used to obtain the measures of centrality. Google map was applied to display visualized representations for JIC features. Author-made Excel VBA modules were prepared for organizing data.

Results

Article types

All 115 JIC papers since 2015 are categorized in Table 1. The most frequency of types is Research Article (44, 38.26%). Case Report (25, 21.74%) and Review Article (14, 12.17%) are following (Table 1).

Author nations and their relations

Corresponsive authors' nations of JIC are distributed in Figure 1. We can see the top 3 nations are U.S (26, 22.6%), Italy (22, 19.13%), and Brazil (16, 13.91%). The diagram shown in Figure 1 presents author location among nations based on JIC publication. The bigger bubble represents the more number of papers published in the past 3 years (Figure 2).

The most productive authors and their authorships

The top 2 productive authors (including coauthors in papers) are listed as the two: Márcio Galindo Kiuchi and Shaojie Chen with a big bubble size and a wider connected line (Figure 3).

Keywords to present the journal research domain

The most linked Keywords are blood pressure, heart failure and cardiovascular disease, et al. (Figure 4). We can see that many bigger bubbles with wider connection lines are shown in the left bottom side of Figure 4, indicating they are commonly co-occurred and discussed in JIC papers.

Discussion

This study combined Google map with SNA to demonstrate that (1) the most frequency of types is Research Article (44, 38.26%); (2) the most number of papers are from nations of US (26, 22.6%), Italy (22,19.13%), and Brazil (16, 13.91%); (3) the most productive authors are Márcio Galindo Kiuchi and Shaojie Chen; (4) the most linked Keywords are blood pressure, heart failure and cardiovascular disease, et al.

What this adds to what was known

Many previous researches [6-8] have investigated coauthor collaboration using SNA. An apocryphal story often told to discover

Table 1. Article types of Journal of Integrative Cardiology

Article type	Frequency	%
Research Article	44	38.26
Case Report	25	21.74
Review Article	14	12.17
Short Communication	9	7.83
Mini Review	7	6.09
Editorial	3	2.61
Commentary	2	1.74
Research Article	2	1.74
Case Study	1	0.87
Editorial-	1	0.87
Editorial	1	0.87
Letter to Editor	1	0.87
Opinion Article	1	0.87
Perspective	1	0.87
Retrospective Study	1	0.87
Short Communication-	1	0.87
Update	1	0.87
Total	115	100.00

Figure 1. Corresponsive authors' nations for the Journal of Integrative Cardiology.
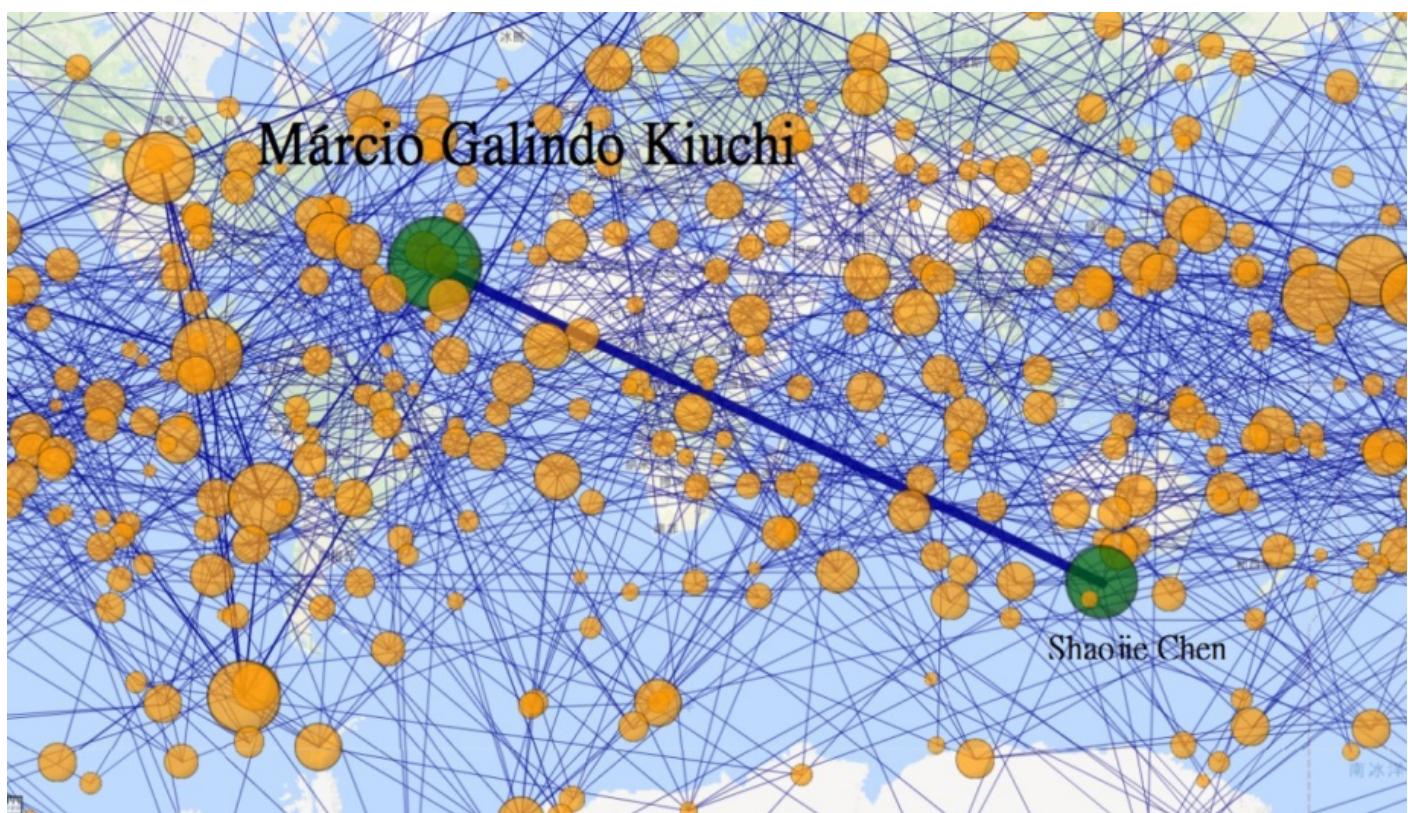
**Figure 2.** The most productive authors are the two with a green color.
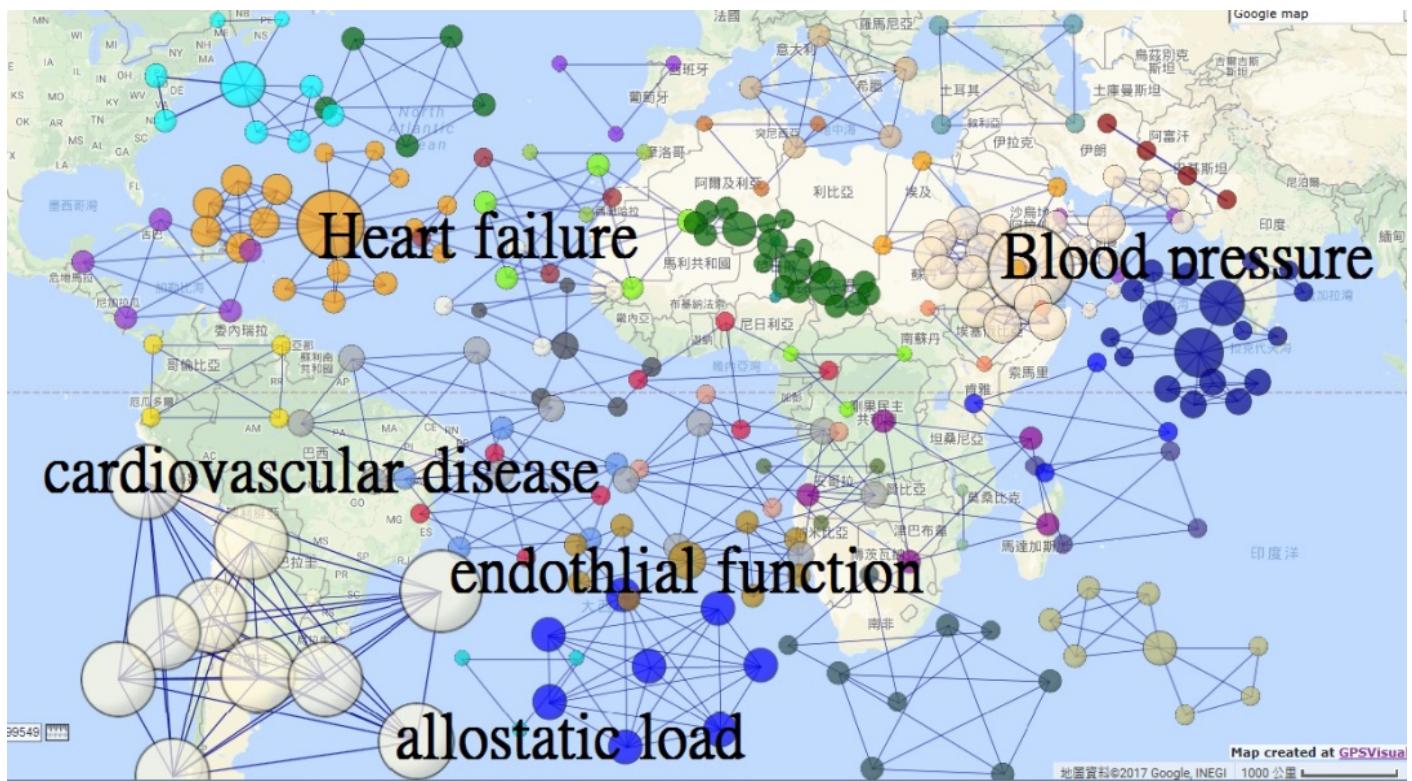
Figure 3. Keyword relations on a Google map.

the co-occurrence about beer and diaper sales [3-5]. However, we have not seen any that can demonstrate a concrete way to show how to conduct this exploration (or, say, how to dance on data) and to present informative messages to readership. We showed how easy the SNA can display all possible pairs of our observed phenomena at a short time using the free-charged Pajek software.

Journal authorship collaboration can be compared with each other (Figure 2). We can see that the author-pattern was the prevailing pattern which is similar to the previous study [6]. Hence the JIC researchers have good collaboration in the subject category of cardiology which is consistent with the previous studies that investigated scientific collaboration of Iranian Psychology and Psychiatry Researchers [20,21].

There are two papers [22,23] incorporated MeSH (medical subject headings) into social network analysis to explore interesting journal knowledge, but failed to demonstrated it in detail or using Google map, like we did in this study. The way we illustrated the strongest relation in all possible couples of interest is novel and promising in future, especially in the field of bibliometrics and medicine researches.

What it implies and what should be changed?

Scientific publication is one of the objective measurements to evaluate the achievements of a medical specialty or discipline [22]. Since the advent of bibliometrics, citation analysis has been widely used in many disciplines to evaluate the influence of academic articles [23-31]. It is worth using SNA, especially incorporating with Google map, to report journal features in future.

Several algorithms and measures have been developed and used with SNA to graphically explore data. If we investigate whether any author or paper most fits the research domain of a journal and its scope within the journal's keyword network, the centrality measures using

SNA can be applied [6]. It means that the core subject can be analyzed using the centrality measure [7,8] yielded in SNA.

Strengths of this study

Incorporating Google map with SNA is the strength of this study. The nation distribution in Figure 1 is merit in easily understanding the feature of international collaborations for the journal. Most authors of JIC come from U.S., Brazil, and Italy, see the bigger cluster in Figure 1. Authors from Australia are not seen any published in JIC till now. One picture is worth ten thousand words. We hope following studies can report more such kinds of information using SNA and Google map to readers in future.

Limitations and future study

The interpretation and generalization of the conclusions of this study should be carried out with caution. First, the data of this study were collected from JIC website. It is worth noting that any attempt to generalize the findings of this study should be made in the similar journal domain with similar topic and scope contexts. Second, although the data were extracted from JIC website and carefully dealt with every linkage as correct as possible, the original downloaded text file including some errors in name of nation because some were not listed with the nation under the corresponding author name. That might lead to some bias in the resulting nation distribution even if we have made great efforts in search of nation name using other relevant information such as the institute name. Third, there are many algorithms used for SNA. We merely applied centrality measure to present the prestigious feature. Any changes made along with algorithm used will present different pattern and judgment. Fourth, the social network analysis is not subject to the Pajeck software we used in this study, Others such as Ucinet [32] and Gephi [33] are suggested to readers for use in

future. Fifth, all Google maps are shown in the language based on the user's location. Although the Chinese characters are shown in figures, interested readers can use the linkage in references [34-36] to practice it with their own language shown on Google map.

Conclusion

Social network analysis provides wide and deep insight into the relationships among nations, coauthor collaborations, and abstract keywords related to JIC. The results can be offered to strategy and decision making for the target journal.

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