

Data Analytics: Global Contributions of World Continents to Computer Science Research

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Abstract. In this paper, we present and analyze comprehensive data about scholarly contributions that were indexed in Scopus database between 2012 and 2017. The datasets are categorized (based on the country where the research was carried out) into: Africa; Asia Pacific; Europe; Middle East; North America; and South America. Scholarly contributions of each region are measured based on fifteen Scival metrics namely: grant award volume (count); grant award volume (value); international collaboration; academic-corporate collaboration; scholarly output; citations; field-weighted citation impact; outputs in top citation percentiles; publications in top journal percentiles; citations per publications; publication views; citing-patents count; patent-cited scholarly output; patent-citations count; and the number of authors. Frequency distributions and trends across the six-year study period are presented in graphs and plots. The analyses provided in this paper are made easy to facilitate further inferential studies towards a more objective and better decision making by research institutions.

Keywords: Data analytics · Computer science · Research · Data mining

1 Introduction

Computer science is one of the fastest growing field of research due to its multidisciplinary application in diverse aspects of human endeavour. Computer science re-search seeks to develop simplified and efficient approach to computation and its applications. The global research community is actively working towards achieving greater feats in computer science. However, empirical evidence and statistical analyses of scholarly contributions of each region of the world to this discipline is not publicly available yet.

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In this paper, we present and analyze comprehensive data about scholarly contributions that were indexed in Scopus database between 2012 and 2017. Understanding the scholarly contributions of world regions to computer science research will help funding bodies to make right decisions in the administration of limited resources [1–3]. The volume of data and the depth of statistical analyses presented in this paper will encourage more empirical research in the emerging field of ranking analytics that seeks to objectively assess scholarly contributions to academic research [4]. The results presented in plots and graphs will make further exploratory studies much easier for useful insights and logical conclusions [5–8]. In addition, the information provided in this paper will help researchers in computer science to explore new research collaborations [9,10]. Data presentations in this paper are made easy to facilitate data reuse, data interpretations, and further inferential studies towards a more objective ranking and better decision making.

2 Research Methodology

Research areas that are covered in this dataset include: artificial intelligence; computational theory and mathematics; computer graphics and computer-aided design; computer networks and communications; computer science applications; computer vision and pattern recognition; general computer science; hardware and architecture; human-computer interaction; information systems; signal processing; and software. Only publications indexed in Scopus that fall under the "Computer Science" category using Elsevier classification as at 8th December 2017 are included in this data article.

Scientific contributions are categorized (based on the country where the research was carried out) into: Africa; Asia Pacific; Europe; Middle East; North America; and South America. Of the 57 countries in Africa, 56 have publications focused on Computer Science within the six-year study period. On the other hand, 48 of the 56 countries in Asia Pacific have publications focused on Computer Science within the study period. Also, out of the 49, 32, and 18 countries in Europe, North America, and South America, only 48, 29, and 15 have publications in Computer Science from 2012 to 2017. Middle East, North America, and South America. All of the 17 countries in Middle East have at least one publication in Computer Science within 2012–2017.

3 Results

Figures 1, 2, 3, 4, 5 and 6 illustrate the distributions of awarded grant count, awarded grant value, international collaboration, academic-corporate collaboration, scholarly output, and scholarly output growth by world regions (2012–2017). The quotas of Africa, Asia Pacific, Europe, Middle East, North America, and South America in global citations, overall citations, field-weighted citation impact, outputs in top citation percentiles, publications in top journal percentiles, and citations per publication are shown in Figs. 7, 8, 9, 10, 11 and 12.

The trends in publication views, overall publications views, citing-patents count, patent-cited scholarly output, patent-citations count, number of authors, and author growth rate can be clearly seen in Figs. 13, 14, 15, 16, 17, 18 and 19.

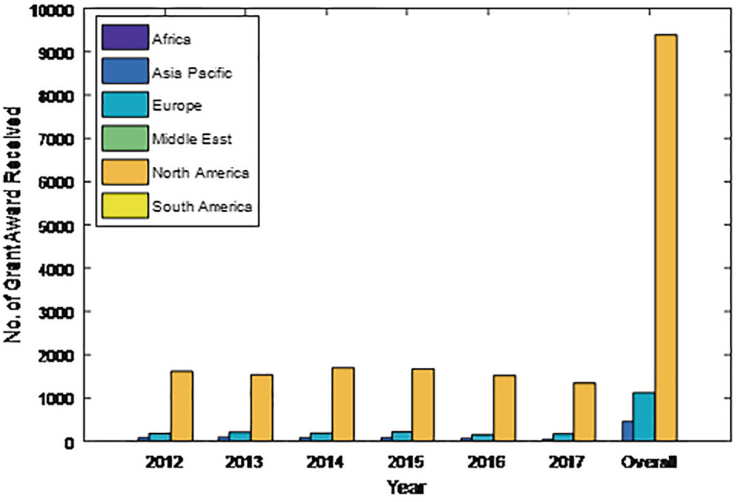

Fig. 1. Bar chart of awarded grants received by world regions

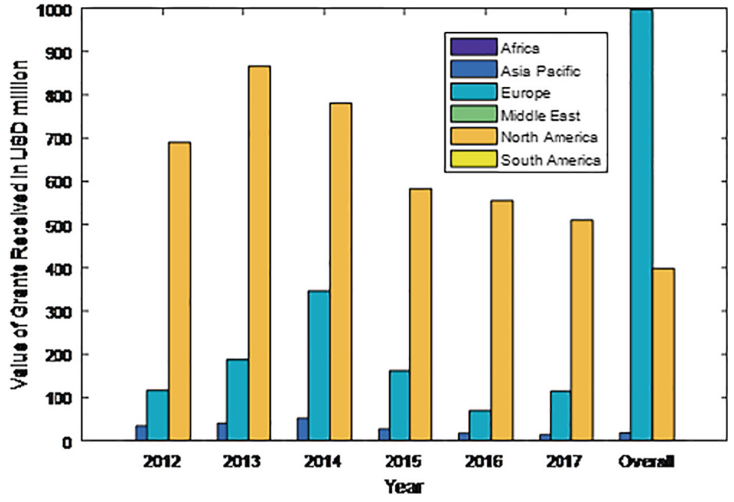

Fig. 2. Bar chart of awarded grants value received by world regions

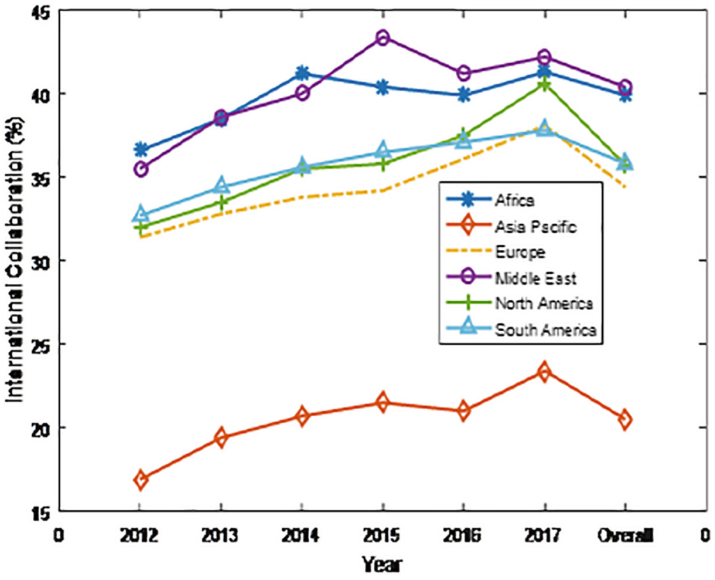

Fig. 3. Plot of international collaboration by world regions

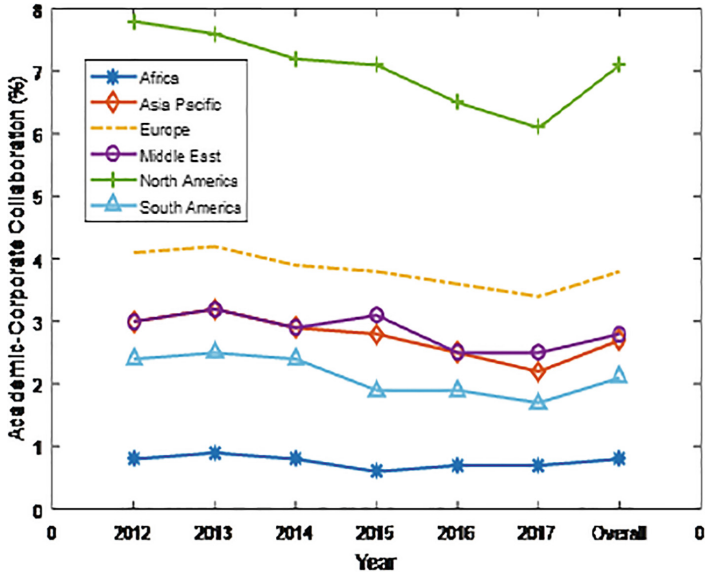

Fig. 4. Plot of academic-corporate collaboration by world regions

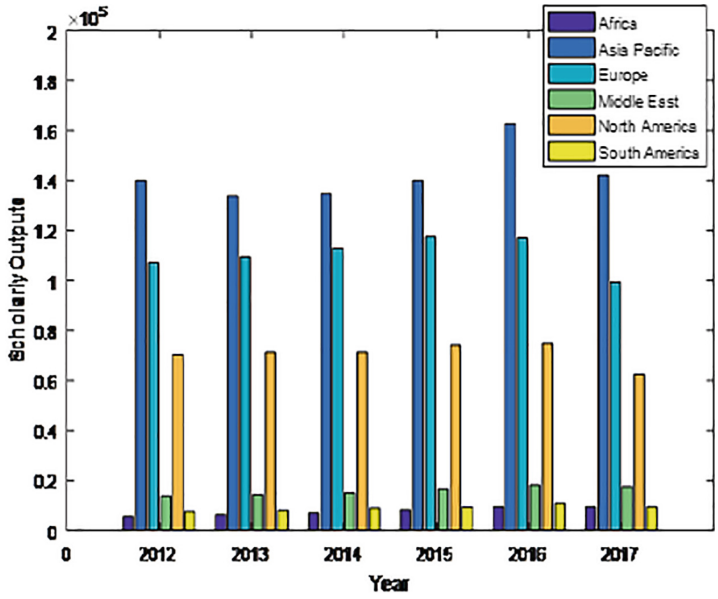

Fig. 5. Bar chart of scholarly outputs by world regions

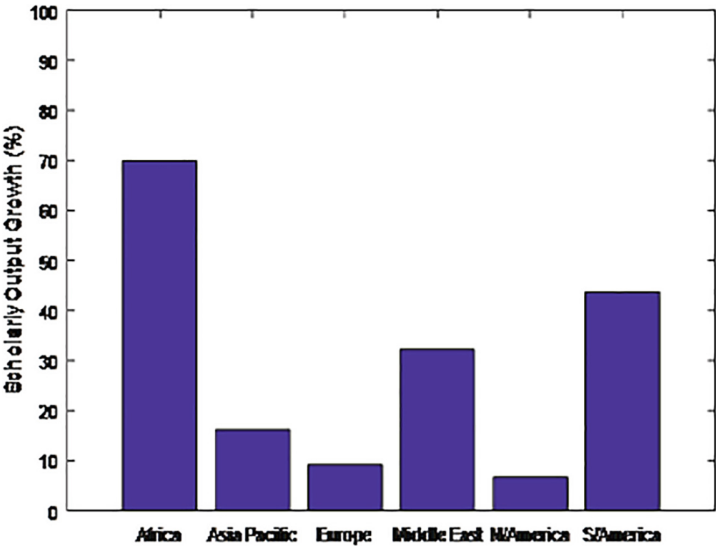

Fig. 6. Bar chart of scholarly output growth by world regions

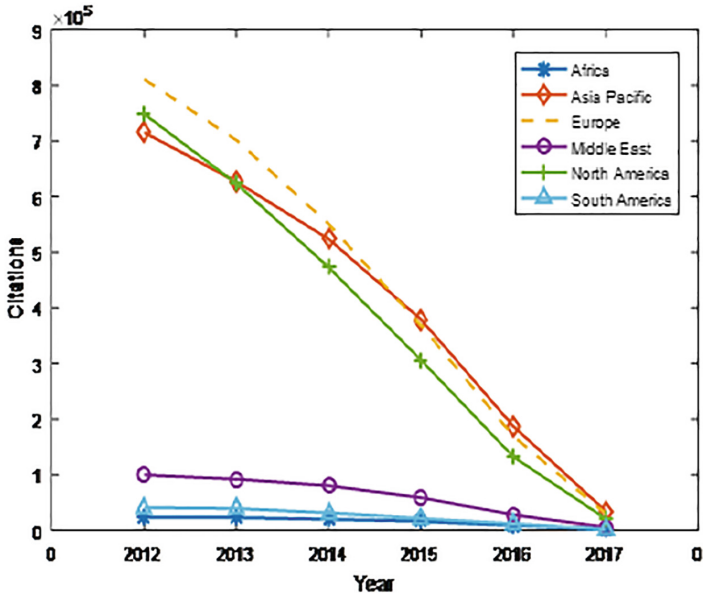

Fig. 7. Plot of citation by world regions

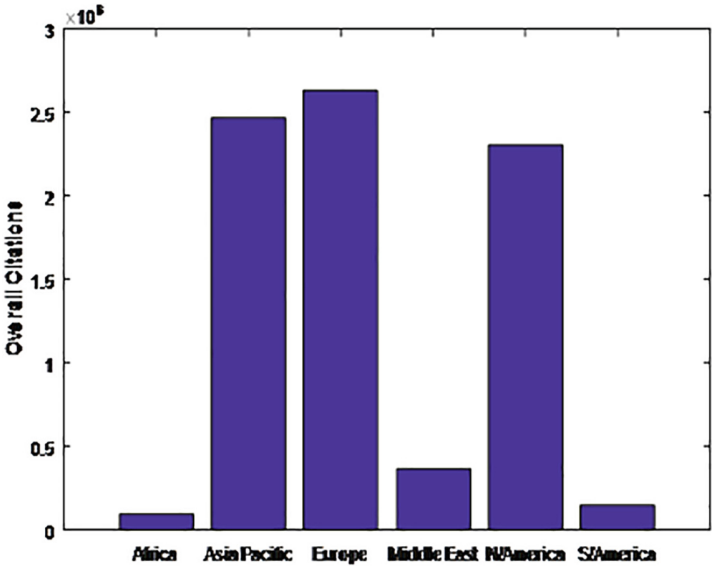

Fig. 8. Bar chart of overall citation by world regions

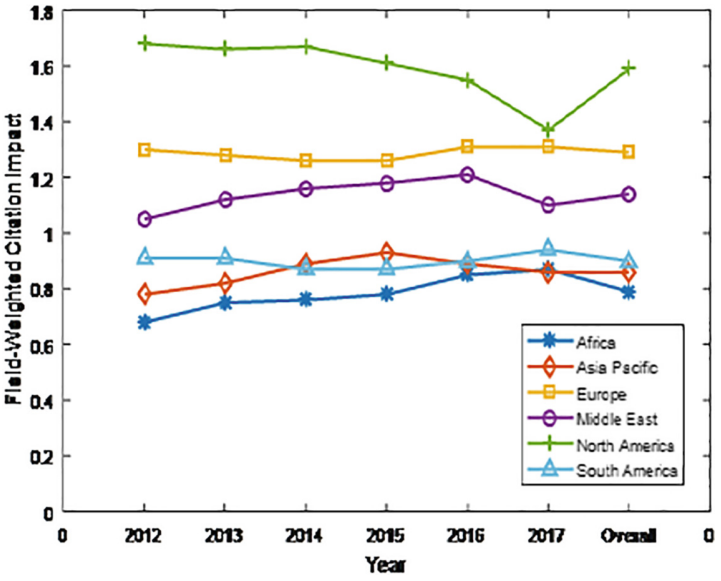

Fig. 9. Plot of field-weighted citation impact by world regions

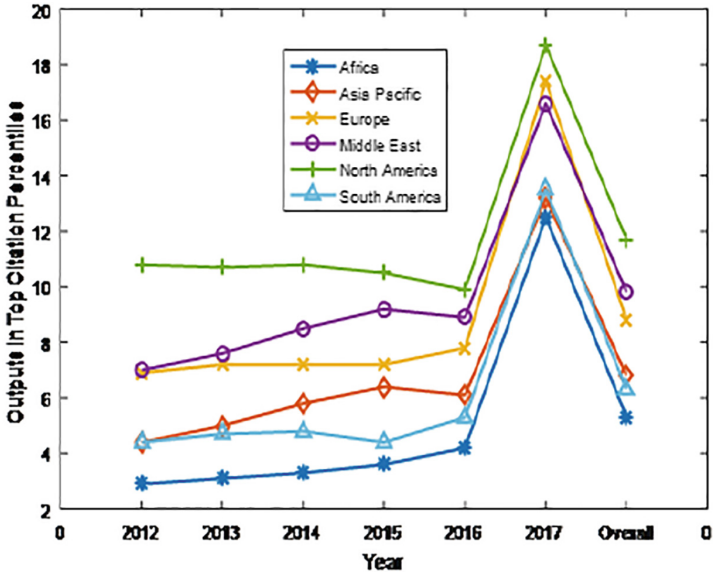

Fig. 10. Plot of outputs in top citation percentiles by world regions

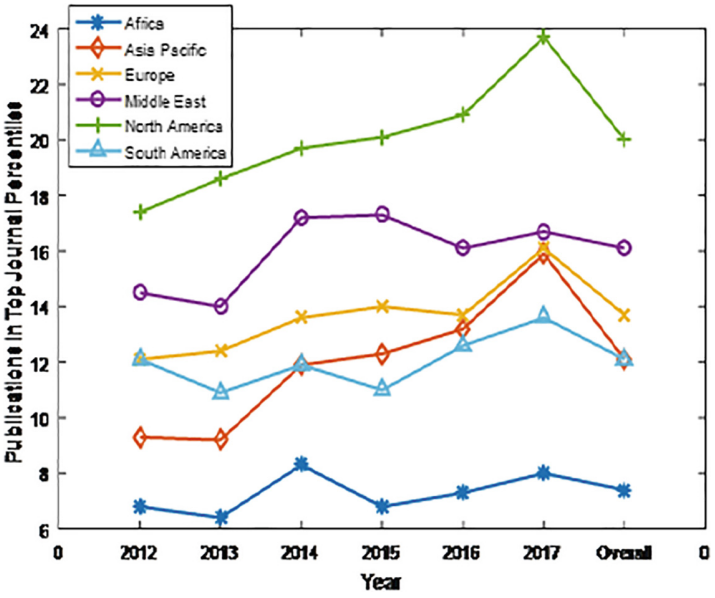

Fig. 11. Plot of outputs in publications in top journal percentiles by world regions

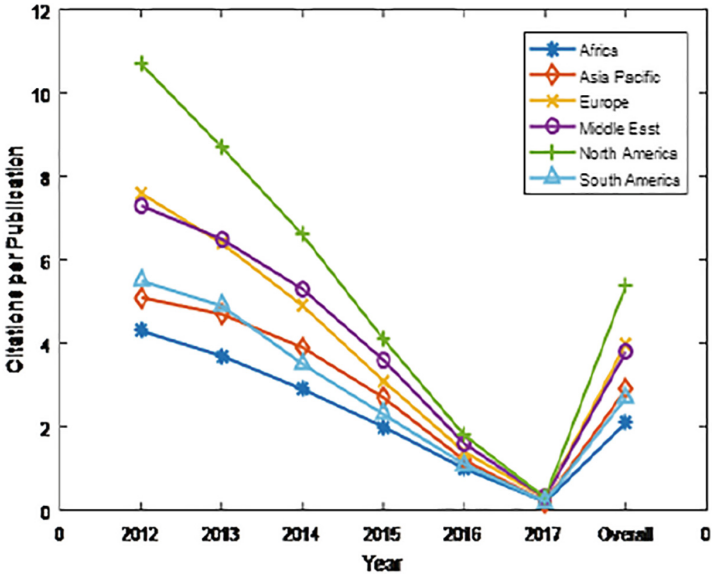

Fig. 12. Plot of citations per publication by world regions

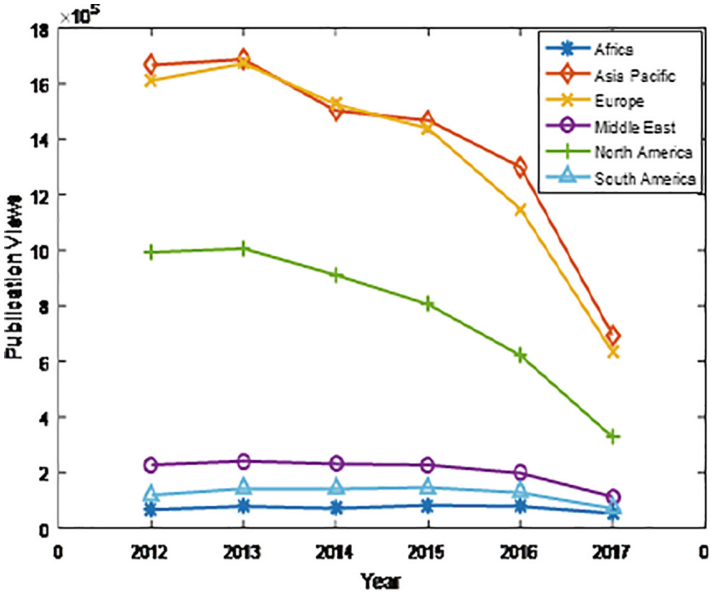

Fig. 13. Plot of publication views by world regions

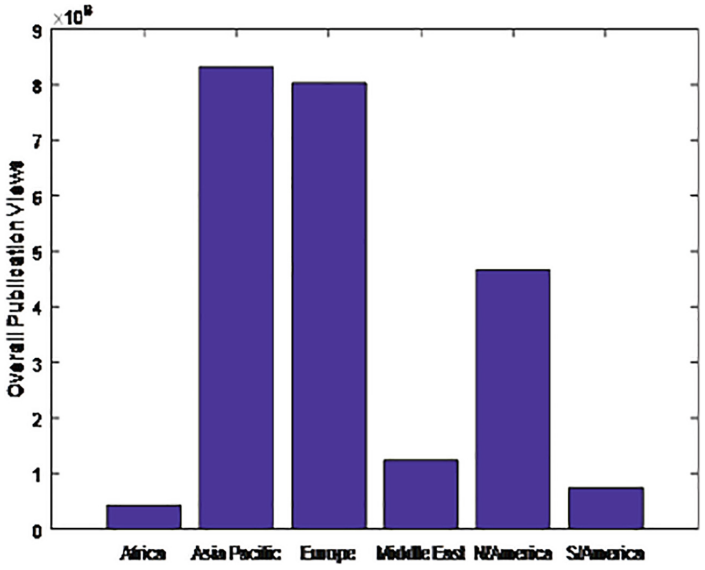

Fig. 14. Bar chart of overall publication views by world regions

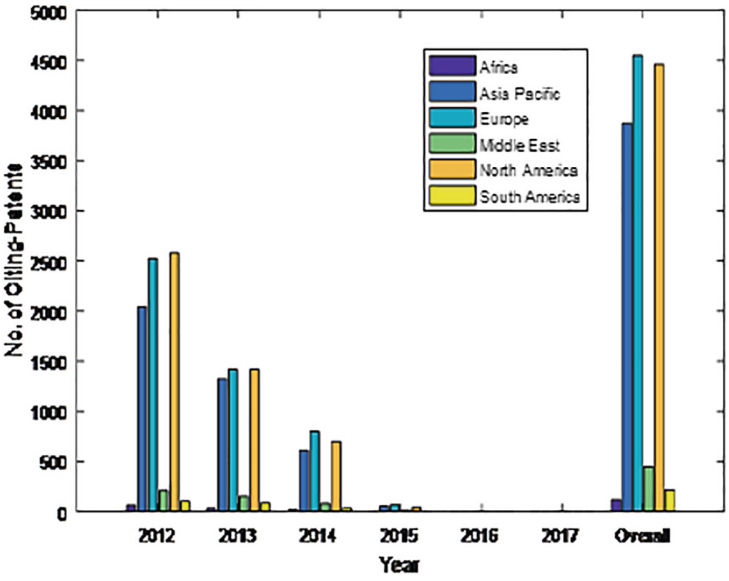

Fig. 15. Bar chart of citing-patents by world regions

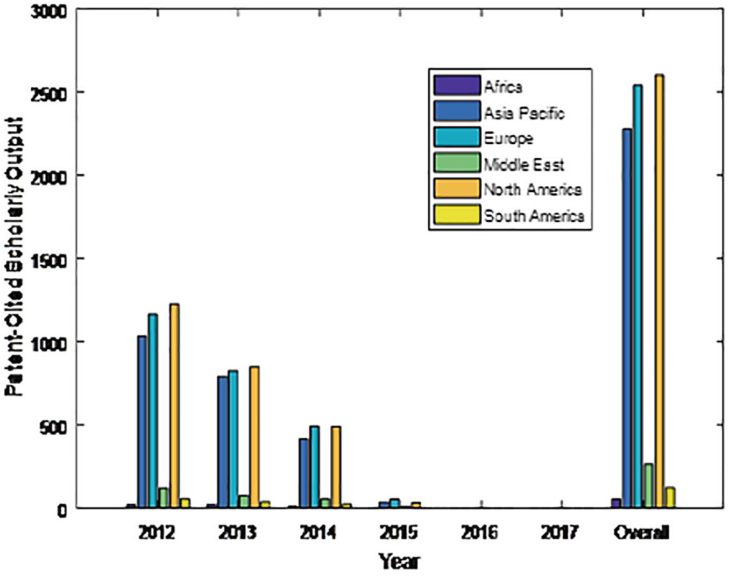

Fig. 16. Bar chart of patent-cited scholarly output by world regions

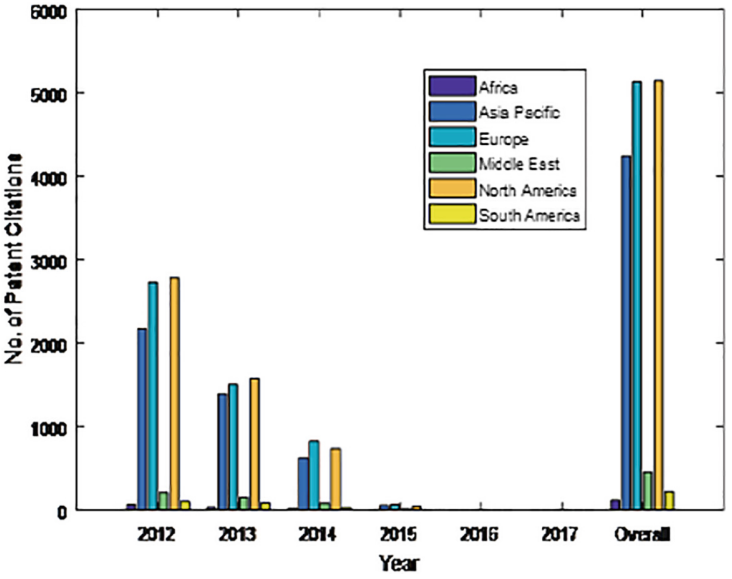

Fig. 17. Bar chart of patent citations by world regions

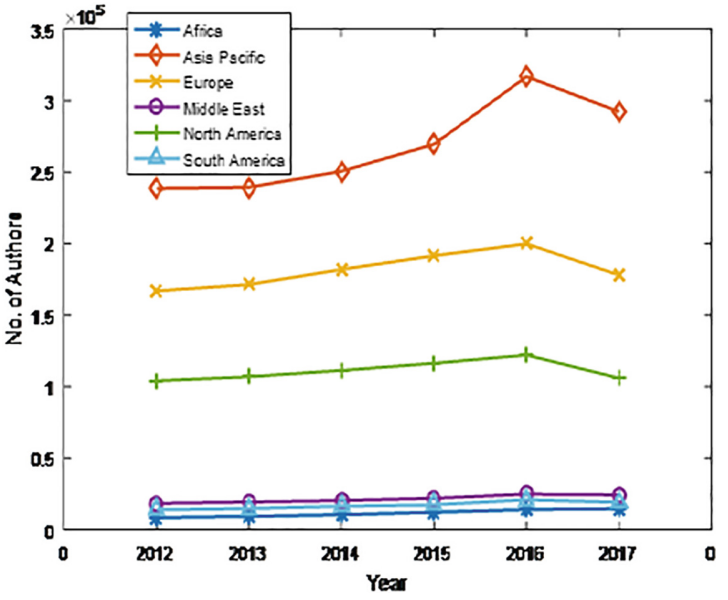

Fig. 18. Plot of number of authors by world regions

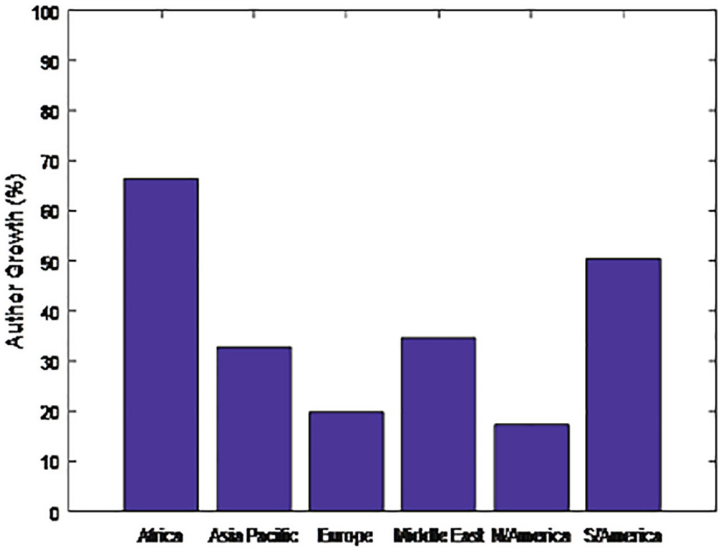

Fig. 19. Bar chart of author growth by world regions

4 Conclusion

In this paper, we presented and analyzed comprehensive data about scholarly contributions that were indexed in Scopus database between 2012 and 2017. Frequency distributions and trends across the six-year study period were presented in tables, graphs, and plots. The data showed that there is paucity of awarded grants for certain regions due to the fact that only a limited number of grant awarding bodies are considered in Scopus database. Understanding the scholarly contributions of world regions to computer science research will help funding bodies to make right decisions in the administration of limited resources. The volume of data and the depth of statistical analyses presented in this paper will encourage more empirical research in the emerging field of ranking analytics that seeks to objectively assess scholarly contributions to academic research. In short, the Information provided in this paper will help researchers in computer science to explore new research collaborations.

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