

CHAPTER 2

Bibliometric Analysis of Pervasive and Ubiquitous Computing Research

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2.1 INTRODUCTION

Oxford English Dictionary defined pervasive as “spreading throughout an area of group of people”. Meanwhile, ubiquitous is defined as “present, appearing or found everywhere”. The two terms seem like similar concepts in computing where ubiquitous computing would be everywhere, and pervasive computing would be in all parts of our life (Judge, 2020). During the course of this study, we have found out that in fact, researchers have been using the terms interchangeably. With the used of terms established, this study has decided to look at the publication trends of pervasive and ubiquitous computing in the last ten years from 2013 until 2022.

Figure 2.1 showed the publication trends in pervasive and ubiquitous computing in the past 20 years. We can separate the trend into four different phases. During the first phase (2003-2004) which were continuance from the earlier years, the publication trend is trending upward which in fact started from the first document published in 1992. The next phase (2005-2010) was the most prolific period of the research where between 314 to 421 documents were published yearly during this period. Then begin the downward trend (2011-2017) in phase three, where the publications have started to dwindle down. Even though phase four (2018-2022) is continuing the downward trend but it is a more consistent trend of publications where the

number of documents were consistent between 72 and 90 documents. Phase four is chosen as the main focus on this bibliometric analysis chapter to better show the latest trend of the research in the area Pervasive Computing.

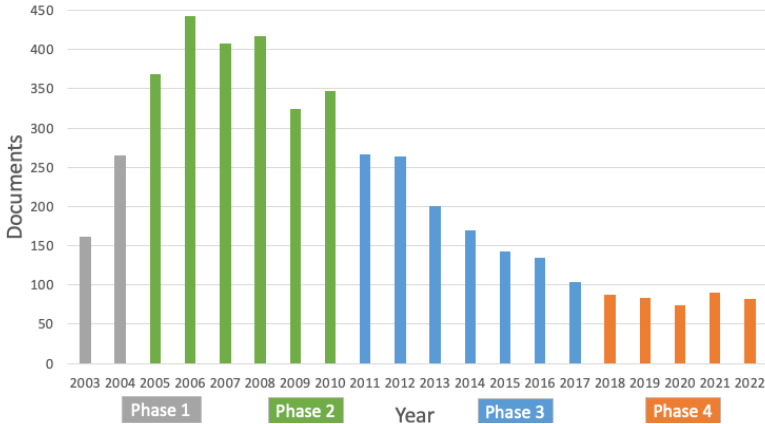


Figure 2.1 Annual publication trends for the last 20 years

For the past five years, there are 753 documents published from 419 different sources written by 1745 authors. The rapid advancement of key component of pervasive and ubiquitous computing like IoT, edge computing, cloud computing and distributed computer system necessitated a fresh assessment of its recent trends. We will look at the growth of publications, preferred publication sources, top contributors, and top keywords, using an established research database of Scopus.

2.2 RESEARCH PURPOSE AND QUESTION

The goal of this bibliometric analysis is to provide answers to three major questions:

- (1) How have distribution patterns changed over the last seven years excluding the current year of 2022?
- (2) What are the top publications sources in this field?

- (3) Who is the most influential and prolific author in this field?
- (4) What are the main topics, themes and trends discussed by the researchers?

The answers will assist current and future researchers in the field of pervasive and ubiquitous computing.

2.3 METHODOLOGY

Figure 2.2 depicts our search strategy, which is a modified version from (Zakaria et al., 2021). The strategy is divided into three major phases. The first phase is gathering the documents from Scopus website. Then, all documents were subjected to bibliometric analysis. We used Biblioshiny, a web interface for bibliometric (Aria & Cuccurollo, 2017), which is a R programming tool used to analyse and generate the relevant data. It is used in conjunction with Microsoft Excel to further analyse the data and generate charts and graphs.

2.3.1 Data Source

The Scopus database was used for the bibliometric analysis, which was conducted at the beginning of October 2021. The search terms “Pervasive Computing” or “Ubiquitous Networking” contained in the title between 2015 and 2021 were used to search for relevant documents published in any language. We chose a seven-year period because we want to see the current trend of this research topic. However, the current year 2022 was excluded because the published documents are too recent and did not have enough time to be cited by other articles.

Originally, a total of 784 documents were identified from the Scopus database. However, 31 erratum documents were excluded to bring the new total number to 753 documents. The type of document could be article, book, book chapter, conference paper, conference review, editorial, note or short survey. Table 2.1 summarizes the repertoire’s composition based on the type of document.