Chapter 5
Information Processing in Research Paper Recommender System Classes

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ABSTRACT

Research-related publications and articles have flooded the internet, and researchers are in the quest of getting better tools and technologies to improve the recommendation of relevant research papers. Ever since the introduction of research paper recommender systems, more than 400 research paper recommendation related articles have been so far published. These articles describe the numerous tools, methodologies, and technologies used in recommending research papers, further highlighting issues that need the attention of the research community. Few operational research paper recommender systems have been developed though. The main objective of this review paper is to summaries the state-of-the-art research paper recommender systems classification categories. Findings and concepts on data access and manipulations in the field of research paper recommendation will be highlighted, summarized, and disseminated. This chapter will be centered on reviewing articles in the field of research paper recommender systems published from the early 1990s until 2017.

INTRODUCTION

The volume of web-based literature skewed towards scientific research is growing at an exponential rate and better tools and methodologies to effectively manage these documents are required. Academic search engines, archives, and digital libraries have been developed and improved to save the worsening web search situation, and for that reason, better information filtering mechanisms are being introduced daily. To easily access relevant and high-quality research papers from the Internet and other repositories, research paper recommender systems (RPRS) have been developed and integrated with information search and retrieval systems. Regrettably, the state-of-the-art RPRS has not received the much-needed attention to improve on its search, retrieval and recommendation capabilities. This chapter reviews and highlights important classification aspects concerning the recommender system in the field of research papers.

RPRS have been enabled by technologies in Information Retrieval (IR), Databases, the Web and many other technologies as depicted in Table 1. Recommender Systems (RecSys) and Search Engines (SE) are technologies that help users filter information that is found on the Web. They also help retrieve relevant and comprehensive information that is personalized based on the user's needs, bringing more benefit to users of the World Wide Web (WWW). RecSys, unlike SE, is a subclass of information filtering systems that predict ratings or make a preference that users will

Table 1. Research paper recommender systems' enabling technologies

Technology	Description
Predictive analytics	Branches of advanced analytics that uses techniques from data mining, statistics, modeling, machine learning, and artificial intelligence to make a prediction about the future of an unknown event (i.e. predictive ratings for recommending research papers in a collaborative topic modeling approach (Wang & Blei, 2011)).
Distribute file systems	A file system that processes data that is stored on a server as if it were on the local client machine (i.e. using the web search engine that spans multiple file systems to recommend documents, (Brin & Page, 1998)).
Stream analytics	Perform real-time stream processing of your data (i.e. extracting relevant records from a stream on incoming records (Bollacker, Lawrence, & Giles, 2000)).
Databases	Various structure of data held in computers that can be accessed in various ways (i.e. CiteSeer and the Papists RPRS query databases for related research papers (Watanabe, Ito, Ozono, & Shintani, 2005; Zarrinkalam & Kahani, 2012)).
Web Technologies (Internet)	Infrastructural building blocks of computer networks (i.e. enables researchers to publish and access research results as soon as it is obtained (Lopes, Souto, Wives, & de Oliveira, 2008)).

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