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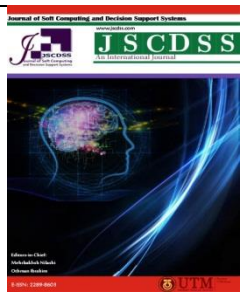

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Intelligent Recommender Systems in the COVID-19 Outbreak: The Case of Wearable Healthcare Devices

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Abstract

Since social and environmental conditions have been changed dramatically in recent years, the spectrum of diseases caused by infections is also changing at a rapid pace. The Internet of Things (IoT) is a new concept which enables users with wearable devices to monitor healthcare. Wearable devices have attracted a great deal of attention and popularity among academics and industry in the last decade. The potential of wearable technology has previously been proven in improving health efficiency and reducing healthcare costs. Wearable devices are believed to be of a very strong value, both for detection and for the tracking and control of the spread of infectious diseases such as COVID-19. Regardless of the importance of wearable devices, only a few number of studies have revealed the usefulness of wearable devices in COVID-19 outbreak. As many of people are not aware of wearable health devices advantages as a mean of tracking their health, as well as using online health communities in critical conditions with limited access to the doctors in hospitals, these types of healthcare technology should be widely introduced and advertised through online retailing shops to improve the individuals' awareness and knowledge of these devices. This can be effectively done by knowledge sharing through social media and intelligent agents in online retailing websites. One of the intelligent systems in online retailing websites is recommendation agents which would be helpful in this situation. In case of wearable health devices to be recommended to the users the in the event of outbreaks, the recommendation systems in online retailing websites must be adaptable and aware to the event of outbreaks and consider the users' demands in this situations. This study aims to investigate the advantages of wearable devices in the event of outbreaks or disasters for healthcare. In addition, the role of recommendation agents in introducing and recommending these devices is explored. Finally, this study reveals some shortcomings of current recommendation agents and provides appropriate solutions for effectiveness of these systems in the event of COVID-19 outbreak.

Keywords: Recommender Systems, COVID-19 Outbreak, Wearable Healthcare Devices, Recommendation Agents, Internet of Things, Artificial Intelligence

1. Introduction

Since social and environmental conditions have been changed dramatically in recent years, the spectrum of diseases caused by infections is also changing at a rapid pace (Control, Prevention, & Diseases, 1994; Petney, 2001; Price-Smith, 2001). The outspread of COVID-19 that was already known as 2019-nCoV has resulted in an emergency situation across the globe with heavily impacts on the global health (Nilashi, Samad, Yusuf, & Akbari, 2020; Torales, O'Higgins, Castaldelli-Maia, & Ventriglio, 2020), including mental health and significant effects on the population's lives, families as well as societies, leading to concerns by World Health Organization (WHO) (Sohrabi et al., 2020). The virus has considerably threatened the public health and contributed considerably to the increase in the expenses of the healthcare.

The Internet of Things (IoT) is the new concept which enables users with wearable devices to monitor healthcare (Ahmadi et al., 2018; Rahmani et al., 2018). IoT is a network of physical objects that are supported by embedded data communication and sensor technology, so as to interact with the states and environment of both internal and external objects (Haghi, Thurow, & Stoll, 2017). Wearable devices have attracted a great deal of attention and popularity among academics and industry in