

## Chapter 8

# Recommendation System: A Potential Tool for Achieving Pervasive Health Care

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### ABSTRACT

*Health is the most critical but very less celebrated application area of recommendation system. The purpose of this work is to put forward the present development and potential future applications of the recommendation system for the physical health of an individual and community. These recommendations are aimed to mitigate the probable future health risks. Present chapter ensembles the existing literature to illustrate the current applications of the subject. Furthermore, this put forward future scope and knowledge boundary for health recommendation system research. Because of present innovations i.e. wearable health technologies, the application of recommendation system for health has become possible. The present chapter evaluates the existing wearable health technologies and its suitability for the deployment of a responsive health recommendation system.*

### INTRODUCTION

Human illness is an unfortunate event seriously disrupting individual's life and his family. Mostly it brings grave emotional and economic losses. These losses are often of considerable magnitude, and many times, it is beyond the individual's ability to cope. Out of all illnesses, sudden illness is most critical since it gives very limited time to react. An alarm or a pre-signal in the event of sudden illness may result in saving of life. Timely alarm or pre-signal is feasible because nine out of ten cases reported as 'sudden illness' are in fact 'neglected' cases that deteriorated suddenly (Anogianakis et al., 1998). Presently, timely reporting of individual's health status area receives increasing attention from multiple disciplines of research. In the present chapter, we have elaborated one of the applications of information

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and communication technology (ICT) for it, the recommender system. Currently, in evolving technological scenario, personal wearable health gadgets are becoming more and more popular (Timmerer, Ebrahimi, & Pereira, 2015). These gadgets are capable of giving real-time health related information's of an individual. Real-time health information's are essential requirement for back-end analysis of entire health recommendation system.

The recommendation system is an area of information system (IS) that provides personalized recommendations to the user. The recommendation system is defined as a system that produces personalized suggestions to the user in a large space of possible options (Ferreira-Satler, Romero, Menendez-Dominguez, Zapata, & Prieto, 2012). Recently, recommendation systems are considered as one of the most efficient tools to provide the appropriate information based on users personal preferences (Dao, Jeong, & Ahn, 2012). Till date, the maximum applications of recommendation system is for business purposes, to suggest most appropriate product/services to the customer. Although, currently there are few examples of health recommendation system (HRS) (Chakraborty & Yoshida, 2016; Gao & Liu, 2014; Kushwaha, Goyal, Goel, Singla, & Vyas, 2014; Rivero-Rodríguez, Konstantinidis, Sanchez-Bocanegra, & Fernández-Luque, 2013), but recommendations for health related issues are not yet very common. Furthermore, limited presence of HRS is based on the recorded health history of a patient, and none of them can be classified as real-time HRS.

Real-time HRS can be proven effective for an individual when he/she will need to respond to a very narrow range of time like health emergency situation. The ignorance of the most appropriate response in such events may lead to severe health and financial loss, even leading to loss of life. Presently, the automated appropriate health recommendation during and before such unfortunate and unplanned incident are not in place. Therefore, the knowledge and understanding of HRS is utmost important.

The chapter has been organized into nine sections commencing with an introduction and concluding with a summary of the chapter. The second section "Modern World and Lifestyle Diseases" comprises of the current epidemiological condition of global population and major problems faced by mankind as life style diseases. As these ailments can only monitored and maintained by state of the art technological innovations like Health Recommendation Systems (HRS); this section is more of motivation and need for the development of HRS for achieving the objective of pervasive health care. Next two sections provide a crisp and clear understanding of recommender system while pointing out similarities and differences of generic recommendation system and it's specific utilization for the health care purpose. Fourth and fifth sections followed the applicability of health recommender system in the real world and addressed individual components needed to make an effective HRS. Challenges of implementing such novel technology are also not less. Such issues like health data security, privacy have been described in the seventh section. The eighth section is the promise that HRS can bring to mankind for achieving better health in society. The overall contribution of the chapter is to elucidate the potential of HRS for walking towards a ubiquitous health and wellness.

## **MODERN WORLD AND LIFESTYLE DISEASES**

In today's world, lifestyle ailments like type II diabetes, hypertension, cardiac arrest, and hyperlipidemia has reached the ceiling of severe consideration for public health decision makers. Currently, epidemiological disease landscape suggests a drift from infectious disease to such lifestyle diseases. These

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