Personal Health Coaching Framework Using Digital Twin and On-Device AI

Prof. Yeong-Tae Song

Towson University

Abstract

When a person comes down with a disease, it is important to get proper treatment at the right time to get it cured but due to various reasons, it may not be always possible. What is more important is to try not to be in such a situation by monitoring their own health and take necessary actions in a timely manner when any abnormal conditions occur. Clinical institutions such as hospitals are the places to get treatments but when it comes to maintaining personal health, they may not be the right place to be as health monitoring requires constant assessment and guidelines that may differ by person. With the advancement of health information technology, such personalized and constant guidance that can ensure health information privacy, security, and sharing may be feasible. In this talk, we propose a novel approach in personal health monitoring framework using digital twin and on-device AI. Digital twin is used to monitor, assess, and predict user's personal health by using user's most up-to-date and longitudinal health condition through clinical sensors and observed symptoms. On-device AI is used to provide secure personalized health coaching capabilities as it does not consult external AI such as ChatGPT.

Bio

Dr. Yeong-Tae Song is currently a full professor in the Department of Computer and Information Sciences at Towson University. He earned his master's and Ph.D. degrees in computer science from the University of Texas at Dallas in 1993 and 1999, respectively.

Prior to joining academia, he worked as a software engineer and ATM software test engineer in the industry for more than eight years in Seoul, Korea, and Dallas, USA. He was involved in embedded software projects for various network equipment, including high-speed Ethernet and ATM switches.

After joining the University of Arkansas at Little Rock (UALR), he collaborated on a telemedicine project with NASA and the UALR medical school as primary investigator. During his tenure at Towson University, he has served as the principal investigator (PI) for various projects funded by the state of Maryland and local industries. His research includes work on electronic health records (EHRs) and personal health records (PHRs), clinical sensors, smart e-learning, Voice over IP, and more. He has also collaborated with an African university on electronic health record systems (EHRS).

Dr. Song is a frequent speaker at conferences and seminars. He has served as a program chair and conference chair for various conferences, including those organized by IEEE. Additionally, he is an editor for several journals. He has published approximately 100 papers in conferences and journals.