M-therapy: a multi-sensor framework for in-home therapy management: A therapy of things perspective

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Internet of Things (IoT) is assumed to provide e-Health services by incorporating social networks and the IoT. Although much development in therapy monitoring has been observed recently, little advancement has been achieved in the domain of in-home therapy. Existing industrial and medical solutions require complex and expensive hardware and software that are impractical for home use. Another challenge for in-home therapy is that therapists cannot confirm whether patients are conducting the therapy correctly and for the prescribed number of times. To address these challenges, we propose the m-Therapy framework, in which multiple gesture-tracking sensors and environmental sensors are used to collect therapy and ambient data. The m-Therapy framework compresses the collected data and uploads to a big data server. The framework uses a model of the therapy to guide a patient performing therapy exercises outside medical institutions and even at home. Ambient IoT sensors can help maintain an appropriate ambient environment, which is generally maintained at the medical institutions. We have developed analytics that can provide live or statistical kinematic data, including rotational and angular range of motion of the joints of interest, and ambient environmental data, which can be shared with therapists and caregivers. We present our findings which show that the proposed m-Therapy monitoring system can be deployed in real-life scenarios.

Biography

Mohamed Abdur Rahman is an Assistant Professor in the Department of Computer Science, University of Prince Muqrin (UPM), Madinah Al Munawwarah, and Kingdom of Saudi Arabia. He is currently working as the Chairman in Forensic Computing and Cyber Security (FCCS) Departments of UPM. He received his Masters and PhD degrees in Electrical and Computer Engineering from the University of Ottawa, Canada in 2005 and 2010 respectively. His research interests include serious games, cloud and multimedia for healthcare, IoT, smart city, secure systems, multimedia big data, and next generation media. He has authored and co-authored around 98 publications including refereed IEEE/ACM/Springer/Elsevier journals, conference papers, and book chapters. He has seven US patents on Physio Therapy and more than 20 are pending. He has received more than 12 million SAR as research grant. He is the founding Director of Advanced Media Laboratory. He has presented his works in more than 20 different ACM and IEEE International Conferences. He has served as a Member of the organizing and technical committees of several international conferences and workshops. Recently, he received three best paper awards from ACM and IEEE conferences. He is a Member of both IEEE and ACM.

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