MEDINFO 2017: Precision Healthcare through Informatics
A.V. Gundlapalli et al. (Eds.)

doi:10.3233/978-1-61499-830-3-1216

Use of Person-Generated Health Data in Kinect-Based Stroke Rehabilitation Systems: A Systematic Review

Gerardo Luis Dimaguila, Kathleen Gray, Mark Merolli

Health and Biomedical Informatics Centre, University of Melbourne, Melbourne, Victoria, Australia

Abstract

It is important for patients to have access to the health information they generate, for them to be actively engaged in their own healthcare. This is relevant to Kinect-based post-stroke rehabilitation systems; as such there is a need to review the literature based on person-generated management and utilisation. Previous systematic reviews on Kinect for stroke rehabilitation have not used this as part of their criteria. This systematic review fills that gap.

Keywords:

Review, Systematic; Stroke; Health Technology

Introduction

Person-generated health data (PGHD) are health, wellness and clinical data that people generate, record and analyse for themselves [1]. While PGHD's importance for individuals or patients have yet to be conceptually defined, it is well known that when patients understand their illness, they become active problem solvers and improve their health behaviour, e.g., people will stop smoking when they personally see the connection between that and an illness they are experiencing [2]. It is therefore important for patients to have access to the health information they generate. This is relevant to post-stroke rehabilitation systems using body-tracking technology Kinect, which have been developed as a response to the need for the effective home-based rehabilitation that requires less professional and financial resources [3-5] because such systems generate patient-relevant data. There is therefore a need to review the literature on Kinect-based stroke rehabilitation to understand if and how person-generated data are managed and utilised. Previous systematic reviews [3-5] have focused on describing the intervention, methodologies and results, and have not given attention to person-generated data management.

Methods

The terms "Kinect", "stroke", "cerebrovascular accident", "CVA" and "rehabilitat* (% for ACM)" were used to search for peer-reviewed English articles in PubMed, BioMed Central, IEEE Xplore, and ACM. There was no date restriction. Papers included are those that used Kinect as a body-tracking device for a technology-based stroke rehabilitation system. The search was last updated on December 7, 2016.

Results

A total of 35 papers were included in the review, out of 88 search results. It was discovered that patient data access came in the form of feedbacks. 15 of the studies provided visual or auditory feedbacks for patients to follow correct gestures or positions; 3 studies provided task counts, e.g., completed/to be completed; 5 studies simply provided game scores, not clearly related to performance; and 13 studies did not discuss provision of feedback or data utilisation. The numbers include 1 paper that provided both performance feedback and task counts. For the complete list of papers, please contact the corresponding author.

Conclusions

The results show that there is insufficient attention given to person-generated data from Kinect-based stroke rehabilitation systems. While most studies provide some form of feedback, they do not allow the patients to actively engage in their own rehabilitation, nor do the studies try to understand the health behaviour impact of providing data access to patients. This is indicative of the need for future researchers of technology-based rehabilitation to consider PGHD and patient access to information in their systems' design and implementation.

Acknowledgements

The primary author would like to acknowledge the support of the Health and Biomedical Informatics Centre; and Newman College (University of Melbourne), his organisational sponsor.

References

[1] S.T. Rosenbloom, Person-generated health and wellness data for health care., *Journal of the American Medical Informatics Association* **23** (2016), 438-439.
[2] M.B. Sagar, Elizabeth, Participatory medicine: model based tools for engaging and empowering the individual., *Interface focus* **6** (2016).
[3] A.F. Da Gama, Pascal; Teichrieb, Veronica; Navab, Nassir, Motor rehabilitation using Kinect: A systematic review, *Games for Health* **4** (2015), 123-135.
[4] H.M.K. Hondori, Maryam, A review on technical and clinical impact of Microsoft Kinect on physical therapy and rehabilitation, *Journal of Medical Engineering* (2014).
[5] D.C. Webster, Ozkan, Systematic review of Kinect applications in elderly care and stroke rehabilitation, *Journal of Neuroengineering and Rehabilitation* **11** (2014).

Address for correspondence

Gerardo Luis Dimaguila
E-mail : dgl@student.unimelb.edu.au