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مرکز تحقیقات فناوری اینترنت اشیاء ایران

Exploiting IoT technologies for enhancing Health Smart Homes through patient identification and emotion recognition

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Abstract

Currently, there is an increasing number of patients that are treated in-home, mainly in countries such as Japan, USA and Europe. As well as this, the number of elderly people has increased significantly in the last fifteen years and these people are often treated in-home and at times enter into a critical situation that may require help (e.g when facing an accident, or becoming depressed). Advances in ubiquitous computing and the Internet of Things (IoT) have provided efficient and cheap equipments that include wireless communication and cameras, such as smartphones or embedded devices like Raspberry Pi. Embedded computing enables the deployment of Health Smart Homes (HSH) that can enhance in-home medical treatment. The use of camera and image processing on IoT is still an application that has not been fully explored in the literature, especially in the context of HSH. Although use of images has been widely exploited to address issues such as safety and surveillance in the house, they have been little employed to assist patients and/or elderly people as part of the home-care systems. In our view, these images can help nurses or caregivers to assist patients in need of timely help, and the implementation of this application can be extremely easy and cheap when aided by IoT technologies. This article discusses the use of patient images and emotional detection to assist patients and elderly people within an in-home healthcare context. We also discuss the existing literature and show that most of the studies in this area do not make use of images for the purpose of monitoring patients. In addition, there are few studies that take into account the patient's emotional state, which is crucial for them to be able to recover from a disease. Finally, we outline our prototype which runs on multiple computing platforms and show results that demonstrate the feasibility of our approach.