



DECLARATION OF GERARD P. GRENIER

I, Gerard P. Grenier, am over twenty-one (21) years of age. I have never been convicted of a felony, and I am fully competent to make this declaration. I declare the following to be true to the best of my knowledge, information and belief:

1. I am Senior Director of Publishing Technologies of the Institute of Electrical and Electronics Engineers, Inc. ("IEEE").
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8. The article below has been attached as Exhibits A to this declaration:

| | |
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| A. | R.G. Lee, et al. "A Mobile Care System With Alert Mechanism" IEEE Transactions on Information Technology in Biomedicine, Vol. 11, Issue 5, September 2007. |
|----|--|

9. I obtained a copy of Exhibit A through IEEE Xplore, where it is maintained in the ordinary course of IEEE's business. Exhibit A is a true and correct copy of the Exhibit as it existed on or about November 10, 2016.
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11. R.G. Lee, et al. "A Mobile Care System With Alert Mechanism" was published in IEEE Transactions on Information Technology in Biomedicine, Vol. 11, Issue 5. IEEE Transactions on Information Technology in Biomedicine, Vol. 11, Issue 5 was published in September 2007. Copies of this publication were made available no later than the last day of the stated publication month. The article is currently available for public download from the IEEE digital library, IEEE Xplore.

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Author(s)

Ren-Guey Lee ; Kuei-Chien Chen ; Chun-Chieh Hsiao ; Chwan-Lu Tseng

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Abstract:

Hypertension and arrhythmia are chronic diseases, which can be effectively prevented and controlled only if the physiological parameters of the patient are constantly monitored, along with the full support of the health education and professional medical care. In this paper, a role-based intelligent mobile care system with alert mechanism in chronic care environment is proposed and implemented. The roles in our system include patients, physicians, nurses, and healthcare providers. Each of the roles represents a person that uses a mobile device such as a mobile phone to communicate with the server setup in the care center such that he or she can go around without restrictions. For commercial mobile phones with Bluetooth communication capability attached to chronic patients, we have developed physiological signal recognition algorithms that were implemented and built-in in the mobile phone without affecting its original communication functions. It is thus possible to integrate several front-end mobile care devices with Bluetooth communication capability to extract patients' various physiological parameters [such as blood pressure, pulse, saturation of haemoglobin (SpO₂), and electrocardiogram (ECG)], to monitor multiple physiological signals without space limit, and to upload important or abnormal physiological information to healthcare center for storage and analysis or transmit the information to physicians and healthcare providers for further processing. Thus, the physiological signal extraction devices only have to deal with signal extraction and wireless transmission. Since they do not have to do signal processing, their form factor can be further reduced to reach the goal of microminiaturization and power saving. An alert management mechanism has been included in back-end healthcare center to initiate various strategies for automatic emergency alerts after receiving emergency messages or after automatically recognizing emergency messages. Within the time intervals in system setting, according to the medical history of a specific patient, our prototype system can inform various healthcare providers in sequence to provide healthcare service with their reply to ensure the accuracy of alert information and the completeness of early warning notification to further improve the healthcare quality. In the end, with the testing results and performance evaluation of our implemented system prototype, we conclude that it is possible to set up a complete intelligent health care chain with mobile monitoring and healthcare service via the assistance of our system.

Published in: IEEE Transactions on Information Technology in Biomedicine (Volume: 11, Issue: 5, Sept. 2007)

Page(s): 507 - 517

INSPEC Accession Number: 9632985

Date of Publication: 10 September 2007

DOI: 10.1109/TITB.2006.888701

ISSN Information:

Publisher: IEEE

PubMed ID: 17912967

Sponsored by: IEEE Engineering in Medicine and Biology Society
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mobile care system, healthcare service, healthcare quality, emergency messages, back-end healthcare center, wireless transmission, signal extraction devices, information transmission, information analysis, information storage, front-end mobile care devices, physiological signal recognition algorithm, Bluetooth communication, mobile phone communication, chronic care environment, role-based intelligent mobile care system, professional medical care, health education, patient monitoring, physiological parameters, chronic diseases, arrhythmia, hypertension, alert mechanism

Author Keywords

ubiquitous, Alert, Bluetooth, Java programming, mobile care, mobile phone

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Ren-Guey Lee (M'06) was born in 1965. He received the M.S. degree in electrical engineering from National Chen Kung University (NCKU), Tainan, Taiwan, R.O.C., in 1989, and the Ph.D. degree in electrical engineering from National Taiwan University (NTU), Taipei, Taiwan, R.O.C., in 2000.

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Kuei-Chien Chen received the B.S. and M.S. degrees in electrical engineering from National Taiwan University of Science and Technology (NTUST), Taipei, Taiwan, R.O.C., in 1985 and 1990, respectively. He is currently working toward the Ph.D. degree at the Graduate Institute of Computer and Communication Engineering, National Taipei University of Technology (NTUT), Taipei.

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