

A Smart-phone-based Health Management System Using a Wearable Ring-type Pulse Sensor

Yu-Chi Wu^{*&} Wei-Hong Hsu^{*&} Cho-Hsu Chang^{+&}
Wen-Ching Yu^{#&} Wen-Liang Huang^{*%} Meng-Jen Chen^{*%}

***Department of Electrical Engineering**

+Department of Information Management

#Department of Business Management

&National United University

%National Kaohsiung University of Applied Science

Taiwan, R.O.C.

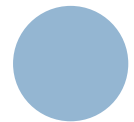
Outline

Introduction

System Architecture

333 Health Management Mechanism

Conclusions



Motivation

- ◆ At the end of 2008, the elder population was 2.4 million in Taiwan, according to the report from Taiwan Ministry of Interior, and it was about 10.4% of the total Taiwan population.
- ◆ This percentage has already exceeded the standard of aging society set by the World Health Organization.
- ◆ Forecast: By 2025, the elder population in Taiwan will exceed 20% of the total population.

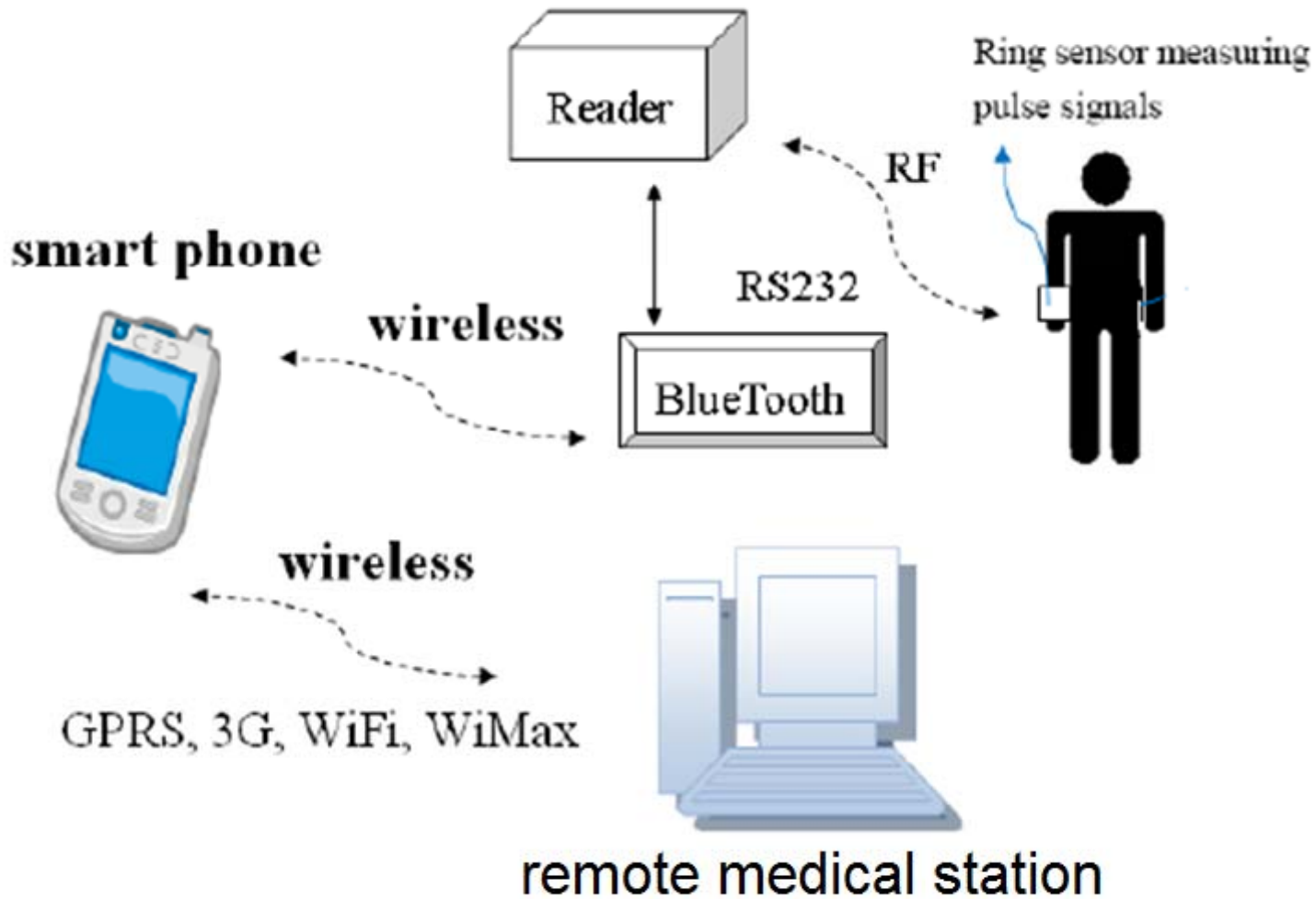
Motivation

- ◆ To cut down the medical cost of these elders and to ease the burden of young people, many countries are developing long-distance home care systems to constantly monitor physiological signals of the elders so that early diagnoses for chronic diseases can be possibly made.
- ◆ The market revenue of home health care for these elders would reach 600 million US dollars in 2015. The “long-distance home health care service” has become one of the key emerging businesses in Taiwan .

Introduction

- ◆ In this paper, a mobile e-health management system is presented to practice the concept of “Prevention is better than cure.”
- ◆ This system integrates
 - ◆ a wearable RFID ring-type pulse/temperature sensor and a RFID reader,
 - ◆ a smart phone with built-in GPS.
- ◆ The user can monitor his/her own pulse and temperature from the smart phone where “exercise-333” health management mechanism helps him/her to develop a healthy life style:
 - ◆ to workout 3 or more times a week, at least 30 minutes per time, raising the heart rate to 130 per minute.

System Architecture



SYSTEM ARCHITECTURE



Windows Mobile 6.0 platform

Physiological data on smart phone

Physiological information display

MainForm 2009 年 10 月 10 日 23 時 13 分

Indoor temperature 室溫: 28.6

Body temperature 體溫: 36

Heartbeat 心跳: 73

73

TagStatus: Normal ...

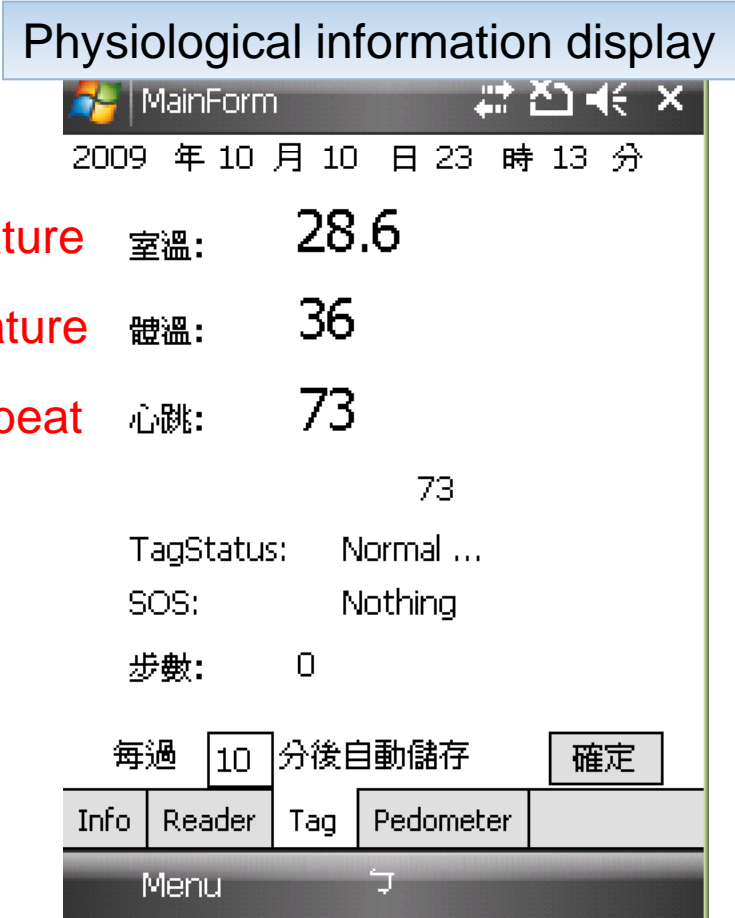
SOS: Nothing

步數: 0

每過 10 分後自動儲存 確定

Info Reader Tag Pedometer

Menu ↵

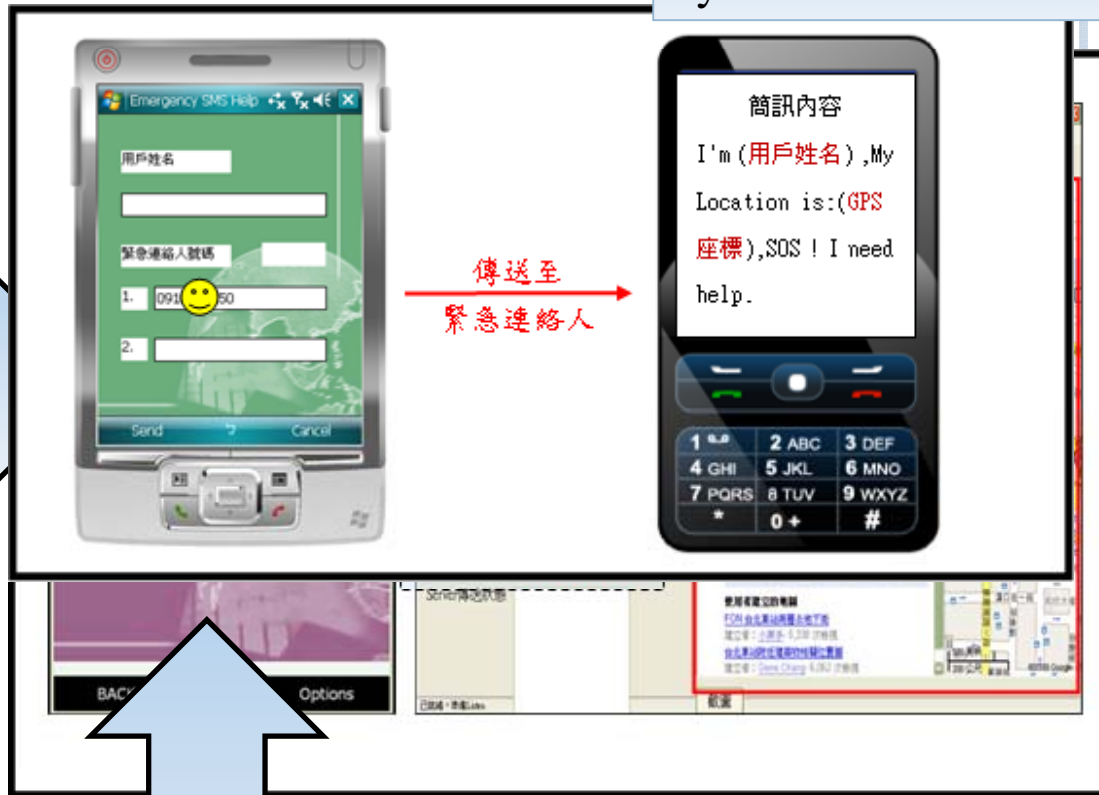


Data to remote medical station

GPS coordinates



SMS send to remote server



Send packet to remote by 3G

Physiological information



333 health management mechanism

- ◆ According to the research report conducted by a hospital in Taiwan, exercise-333 can effectively prevent cardiovascular diseases.
- ◆ The concept of “exercise-333” is quite simple; i.e., taking exercise 3 times a week and lasting for more than 30 minutes with heart rate over 130 each time.
- ◆ The health management mechanism developed in this paper, based on the system architecture discussed previously, can help to remind the user to develop such a healthy life style.

Exercise-333 health management GUI

Based on the fact that in Taiwan every 100 people have 108 cellular phones, the high popularity of smart phone makes the presented health management system effective and convenient to help people on developing a healthy life style.

The user can set up 3 weekdays as checking points.

It shows the progress status of exercise-333 to remind the user.

It shows the status whether heart rate is over 130 for more than 30 minutes during a day.

Indicating the condition whether exercise-333 is accomplished or not at the of each week.



Conclusions

- In this paper, a mobile e-health-management system has been presented.
- The presented system consists of a wearable ring-type pulse sensor and a smart phone to provide a mobile “exercise-333” health management mechanism.
- The user can monitor his/her own pulse and temperature from the smart phone where the “exercise-333” health management mechanism helps him/her to develop a healthy life style: workout 3 or more times a week, at least 30 minutes per time, raising the heart rate to 130 per minute.