

# A Home Mobile Healthcare System for Wheelchair Users

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# Content

- ▶ Introduction
- ▶ Motivation
- ▶ Related Work
- ▶ Proposed Architecture
- ▶ Hardware Design
- ▶ Prototype
- ▶ Conclusion
- ▶ Future work

# Introduction

- ▶ Quality of life is main target of Smart Cities
- ▶ Importance of Mobile Healthcare services
- ▶ Chronic Disease Influence
- ▶ Hard For Wheel chair users to do daily actives
- ▶ Home devices should be remotely operated

## What makes a city Smart?



# mHeath and IOT

- ▶ Intelligent portable instruments
- ▶ Helps elderly to protect daily life
- ▶ Helps to solve interconnection issues
- ▶ Using wireless body area network & Smart Phone Technology

# Motivation

- ▶ Many mobile health care devices Available
- ▶ There are some limitations
- ▶ Weak Interaction
- ▶ Lack of mobility
- ▶ No centralized control
- ▶ Lack of real-time monitoring

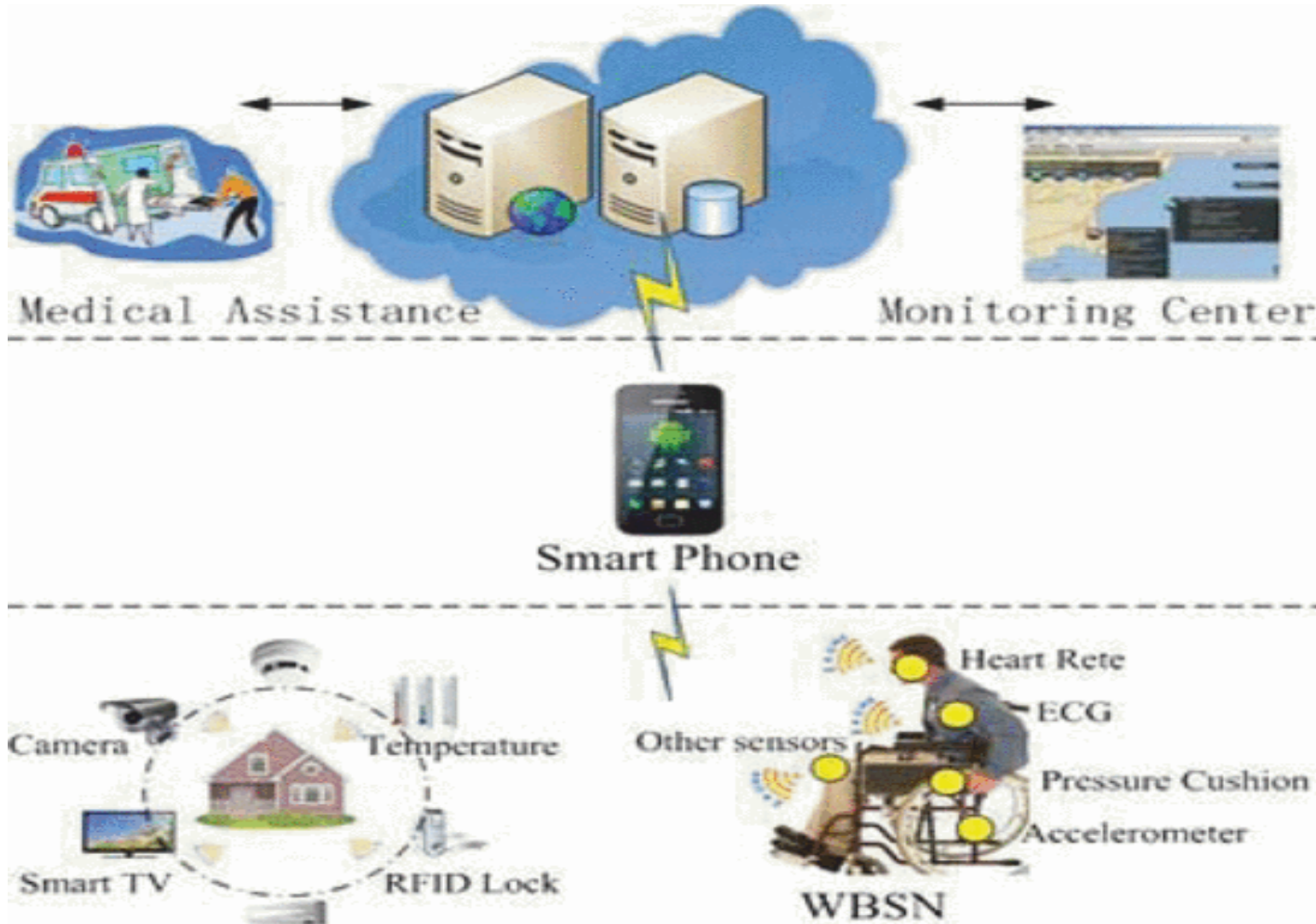


# Related Work



- ▶ Independent Lifestyle Assistant  
A Fully automated home environment, Developed by Honeywell
- ▶ AwareHome  
Indirectly track behaviour of elderly, Developed by Georgia Institute of Technology
- ▶ OpenHealth  
Self health monitoring application, Developed by Cornell University
- ▶ Smart wheelchair  
Wheelchair can measure heart rate, aspiratory rate & motion state

# Proposed Architecture



# Proposed Architecture

This Architecture has three main layers

- ▶ **WBSNs and Smart Object**

- This explained status of user on physiology parameters and living environment

- ▶ **Smart Phone Layer**

- It acts as gateway for local sensor network, also perceive the surroundings in outdoors & manage smart objects.

- ▶ **Data Center Layer**

- It receives the data from gateway via internet & react according to received data.



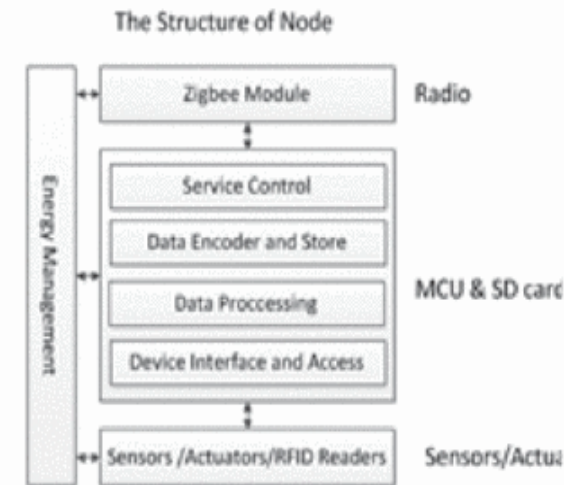
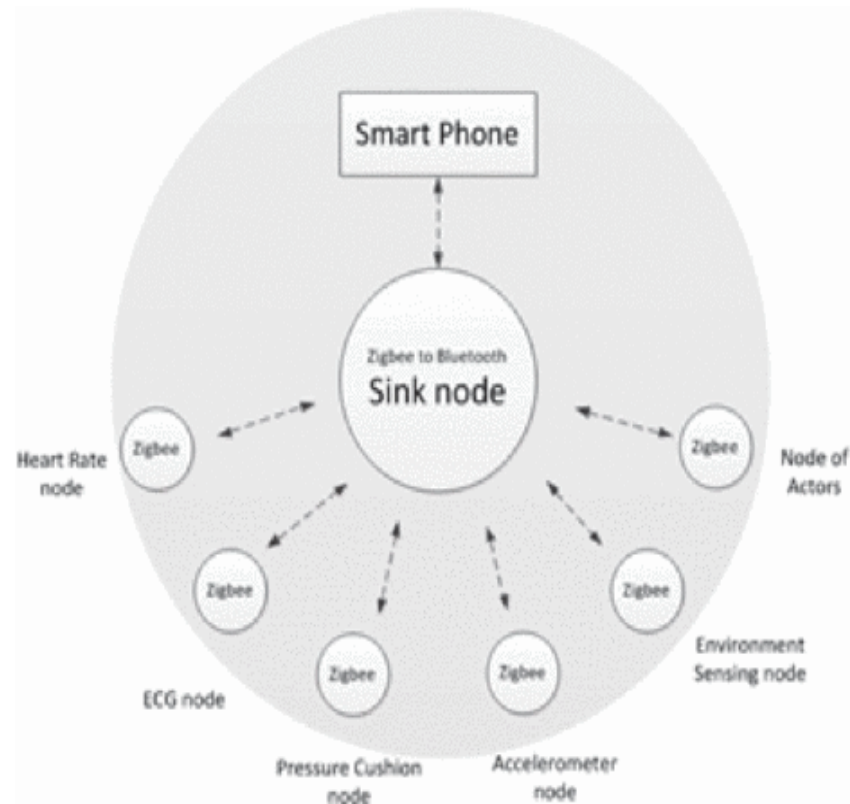
# Hardware Design

Hardware Design has five Components

- ▶ **Wireless Body Area Networks**
- ▶ **Wheelchair Perception**
- ▶ **Physiological Parameters**
- ▶ **Living Environment Perception**
- ▶ **Intelligent Actuators**

# Wireless Body Area Network

- Defines the connection of smart objects with internet
- ZigBee and Bluetooth act as communication mode
- Sink node get data from children node.



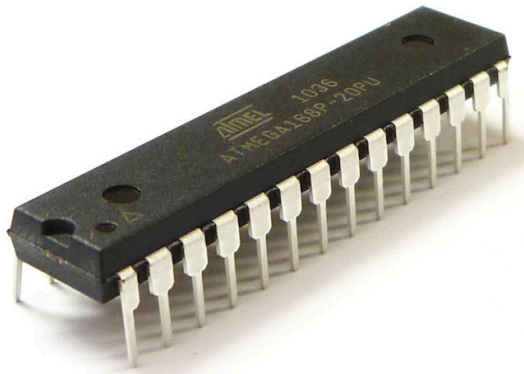
# Wheelchair Perception

- ▶ Wheelchair has pressure cushion to check the human body falling
- ▶ Build in Accelerator sensor to check the falling of wheelchair



# Other components

- Physiological parameters: Heart rate Sensor, EEG Sensor etc. (expendable)
- Living perception has sensors of living environment parameters
- Intelligent actuators: IR, RFID, Bluetooth etc.
- CC2520 chip and ATmega168p processor.



# Prototype and Implementation

- ▶ Validity of mhealth system checked by using of Smartloft IOT platform, provides data connection.
- ▶ Control mechanical of this system tested on Andriod 4.04, Cortex A9 1.2 GHz

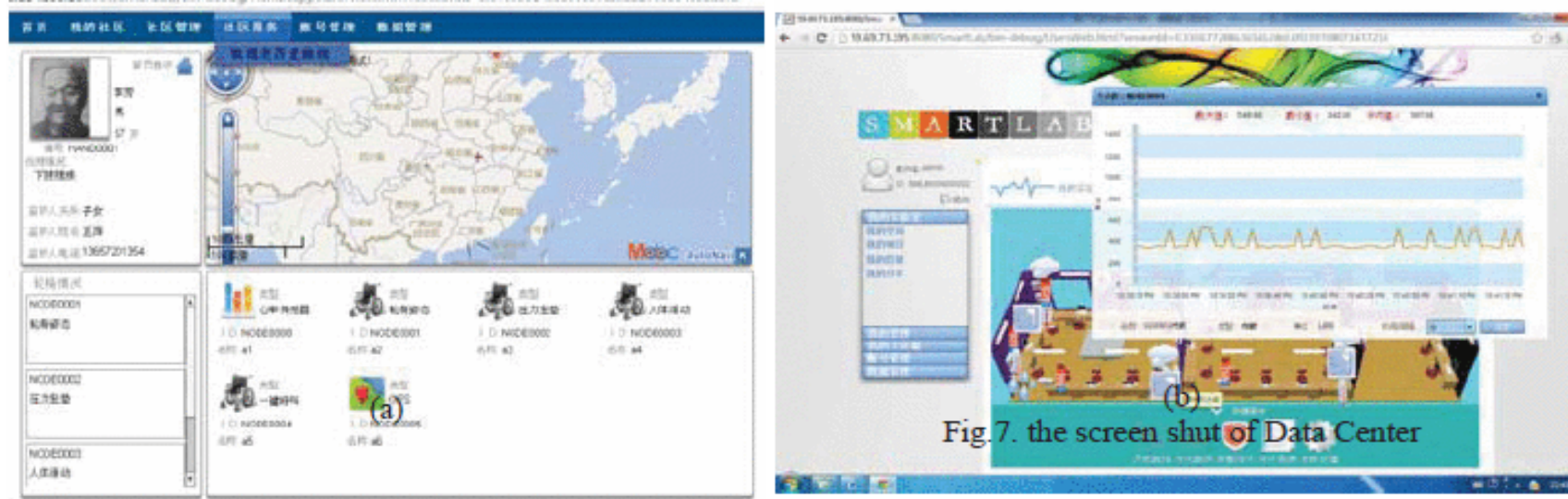


Fig 7. the screen shut of Data Center

# Conclusion

- ▶ Mobile data collection improves the flexibility and portability of measurement system.
- ▶ This system based indirectly healthcare monitoring which is more comprehensive.
- ▶ It has remote monitoring center, so users and family members can operate the home intelligent devices

# FutureWork

- ▶ In future work they will try to combine WBAN with social network
- ▶ Add More Security & More Accuracy

# References

- ▶ <http://www.slideshare.net/btletstalk/smart-cities-40580109>
- ▶ [http://www.lehighvalleylive.com/phillipsburg/index.ssf/2009/07/accident\\_in\\_phillipsburg\\_injur.html](http://www.lehighvalleylive.com/phillipsburg/index.ssf/2009/07/accident_in_phillipsburg_injur.html)
- ▶ <http://www.ti.com/product/CC2530>
- ▶ <http://akizukidenshi.com/catalog/g/gl-03033/>