

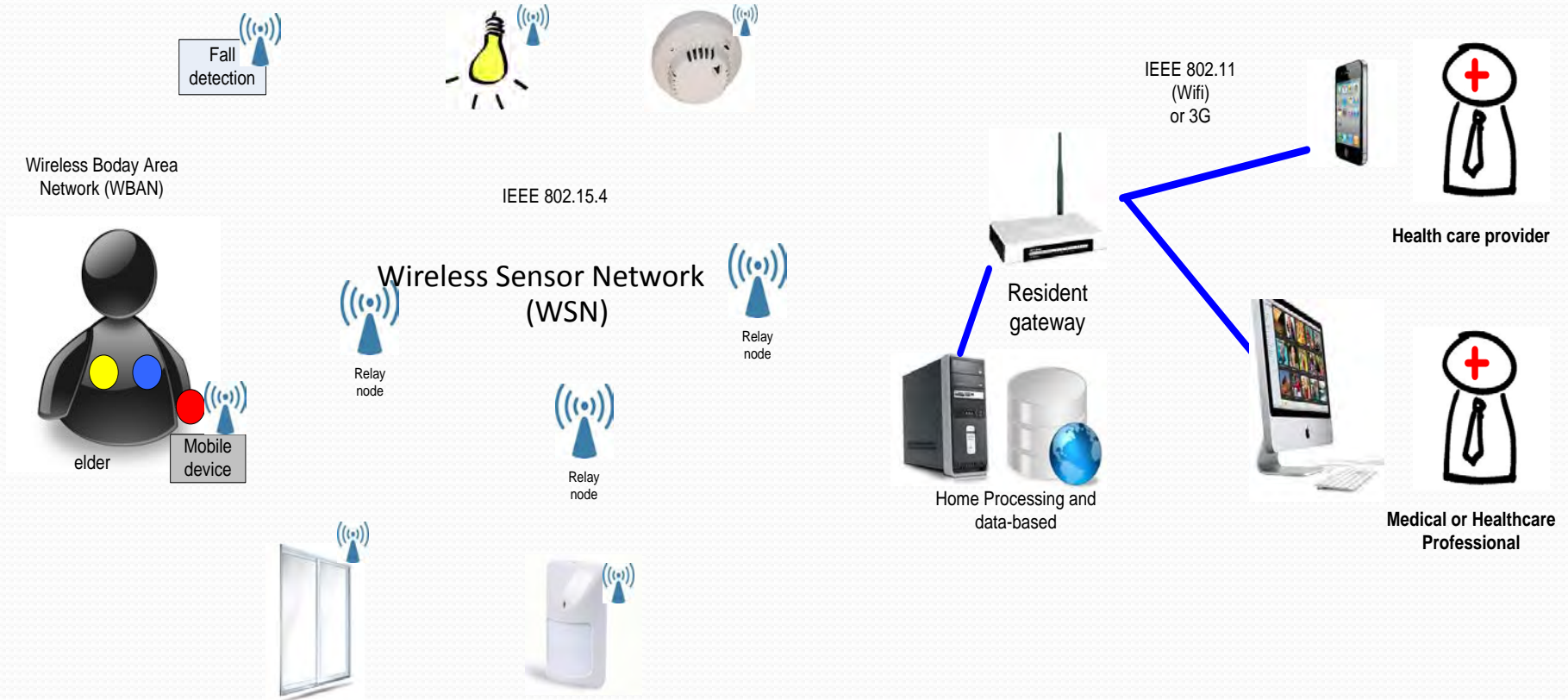
Technologies for Healthcare Monitoring and Smart Home

Nattha Jindapetch

ศูนย์ความรู้เฉพาะด้านเครือข่ายเซนเซอร์ไร้สาย

คณะวิศวกรรมศาสตร์ มหาวิทยาลัยสงขลานครินทร์

Wireless Healthcare @ Smart Home



พัฒนาโดย ศูนย์ความรู้เฉพาะด้านเครือข่ายเซนเซอร์ไร้สาย

Wireless Healthcare @ Smart Home

Key technologies

- Wireless Sensor Network (WSN)
- Wireless Body Area Network (WBAN)
- Wireless healthcare sensors
- Wireless smart home
- Communication networks and devices
- Apps. for mobile health or “mHealth”

Wireless Sensor Network (WSN)

Monitoring

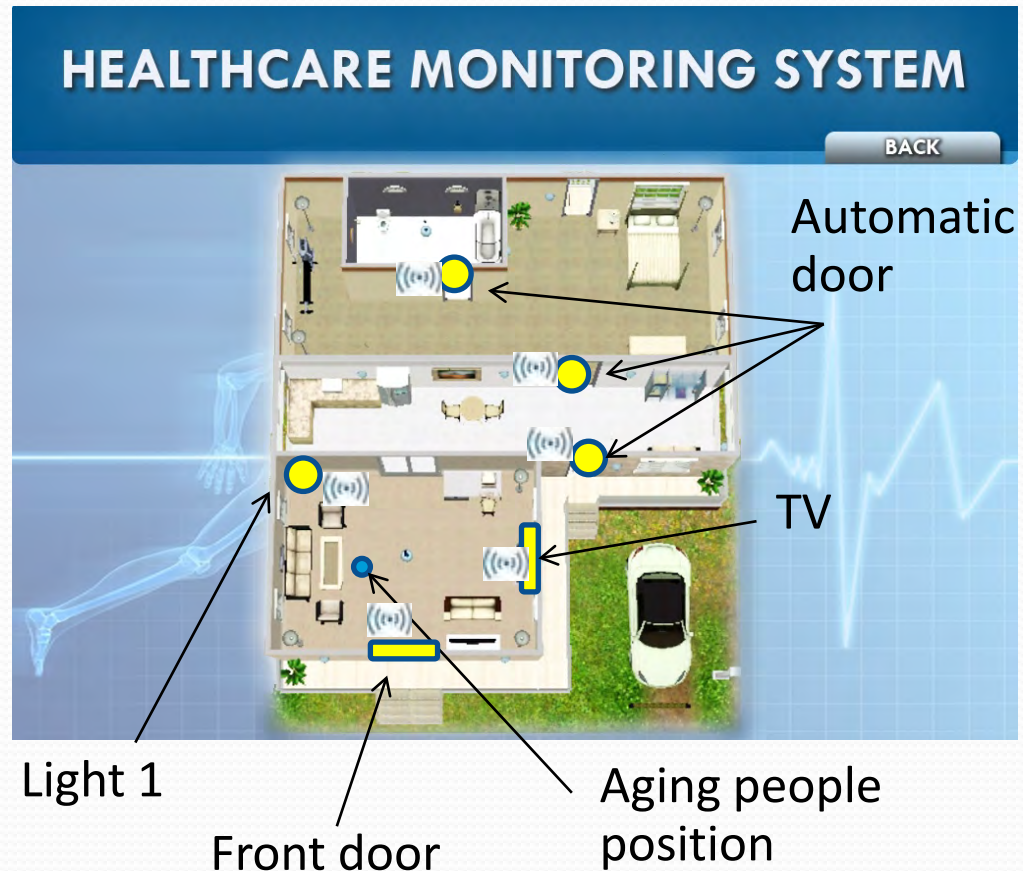
- Position
- Fall detection
- ECG monitoring
- Etc.

Control

- On/Off lights
- Slide automatic doors
- On/Off TV
- Etc.

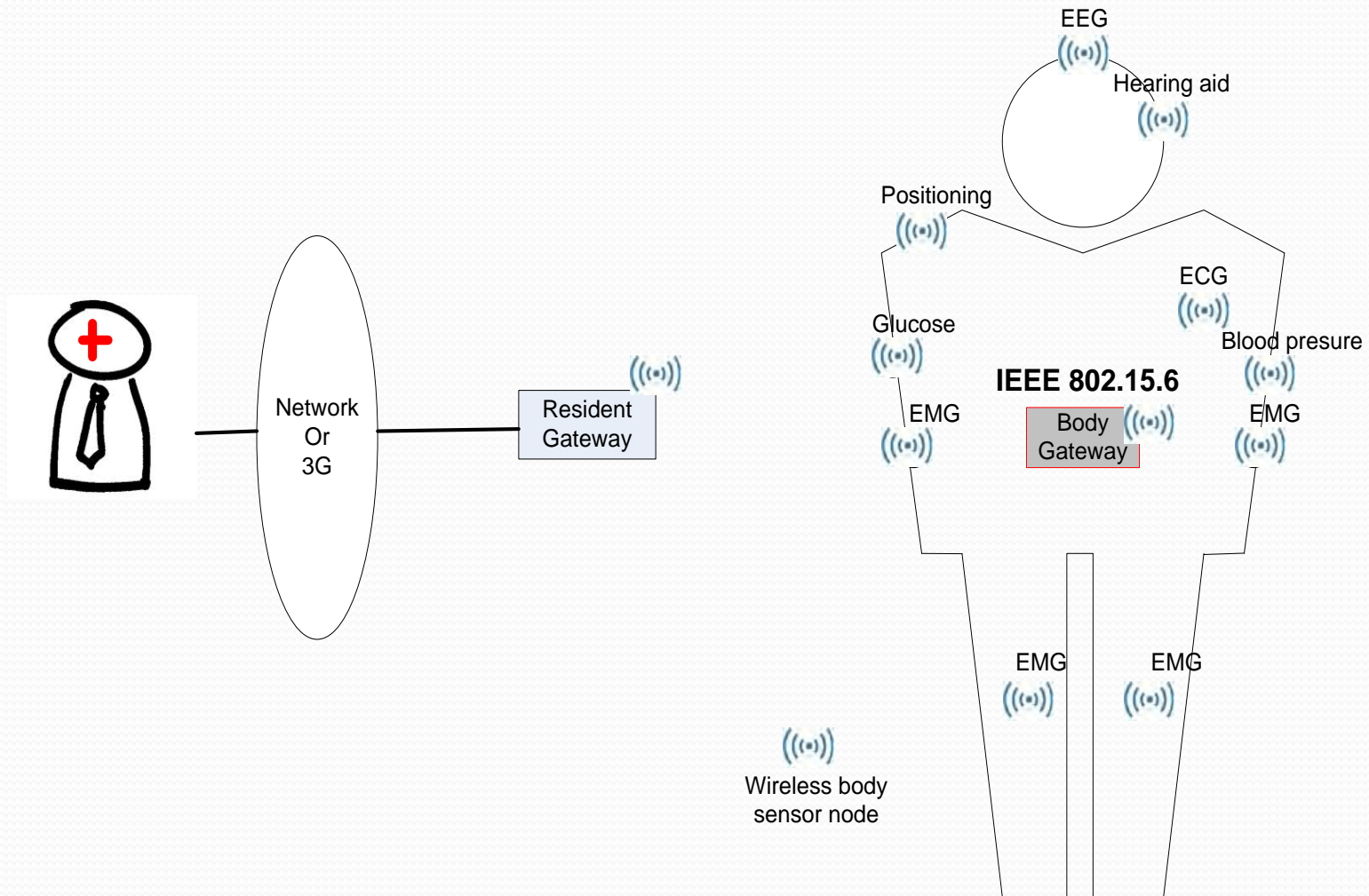
พัฒนาโดย

ศูนย์ความรู้เฉพาะด้านเครือข่ายเซนเซอร์ไร้สาย

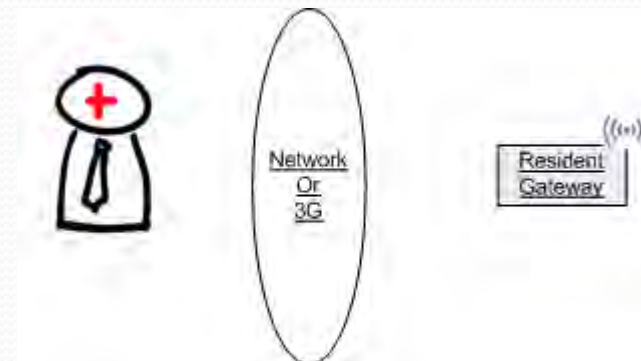
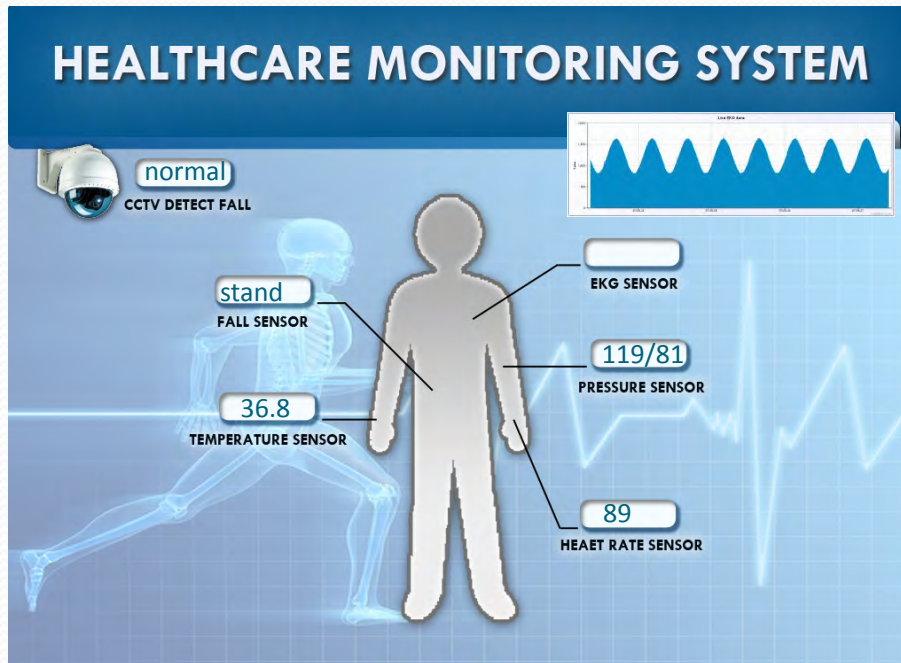


Sensor node

Wireless Body Area Network (WBAN)

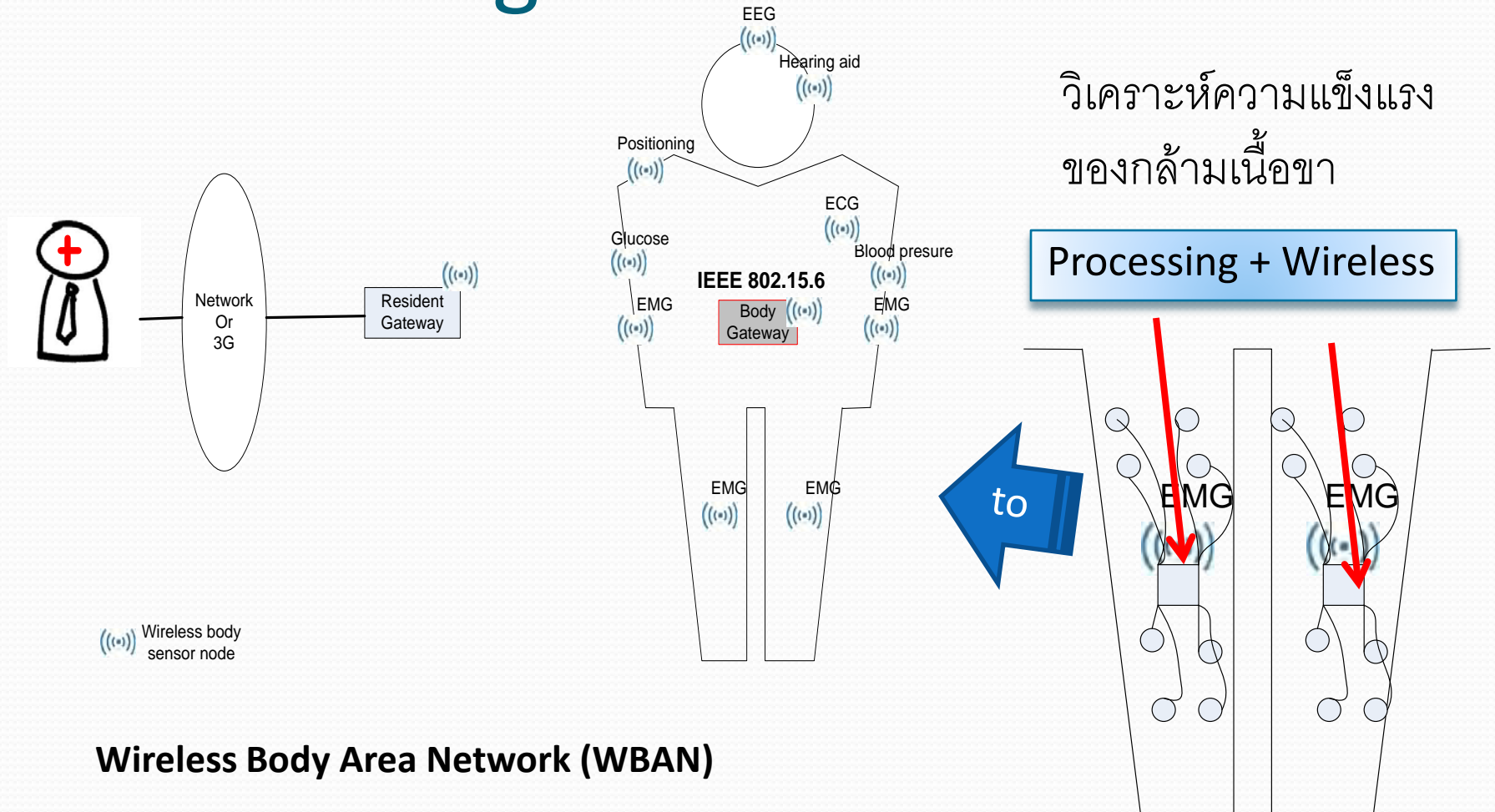


Wireless Body Area Network (WBAN)



GUI at doctor side

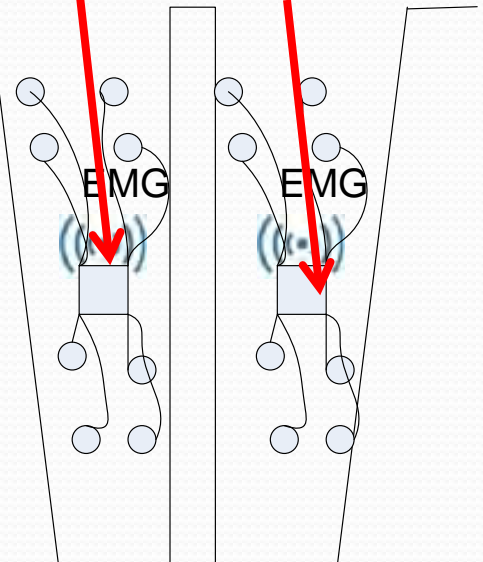
A wireless multi-channel EMG Feedback Signals



วิเคราะห์ความแข็งแรง
ของกล้ามเนื้อขา

Processing + Wireless

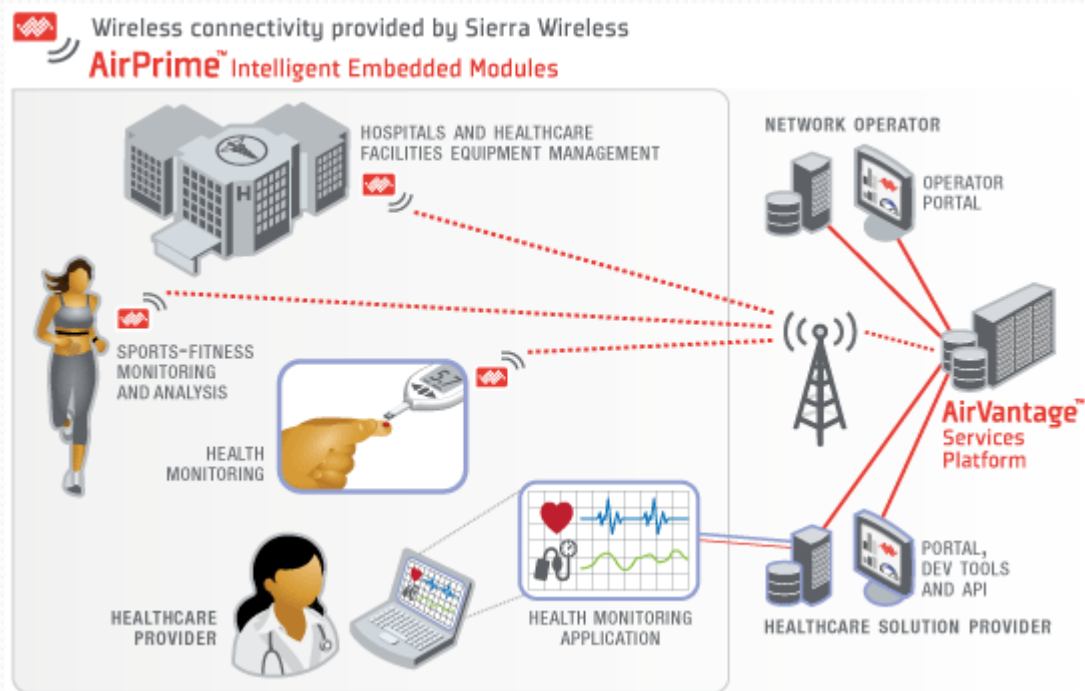
to



Wireless Body Area Network (WBAN)

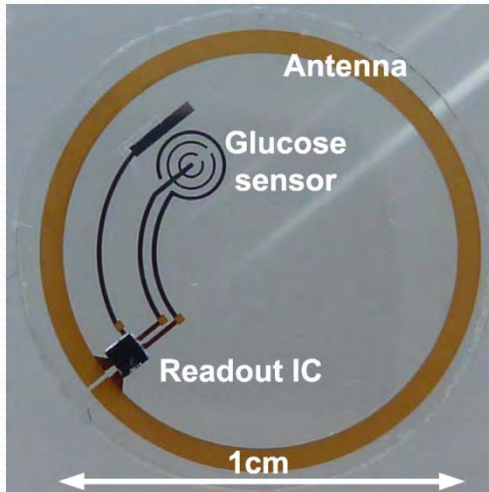
Wireless Healthcare Sensors

- Glucose
- ECG
- EMG
- Blood pressure
- Vital sign
- Etc.

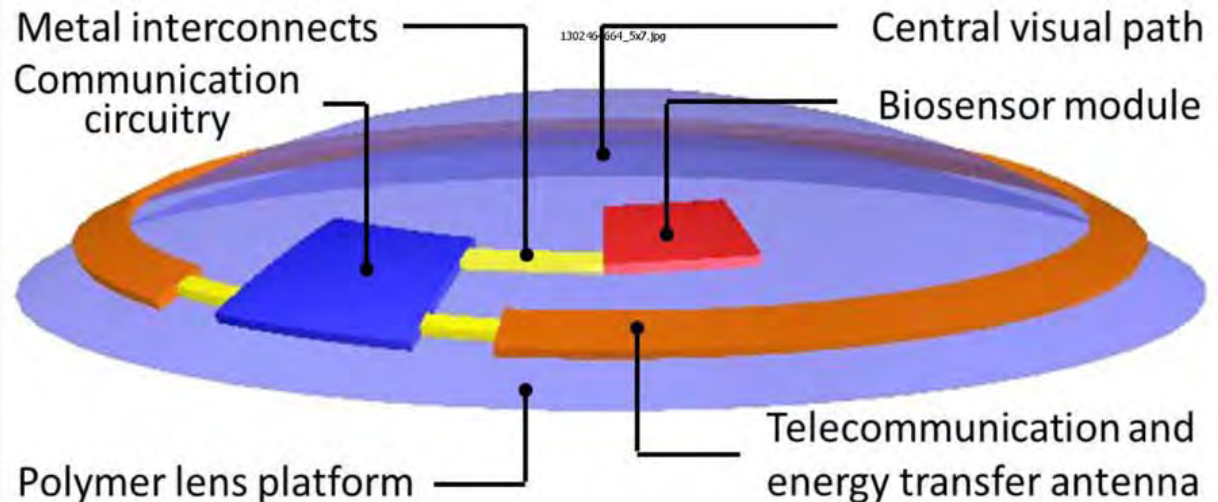
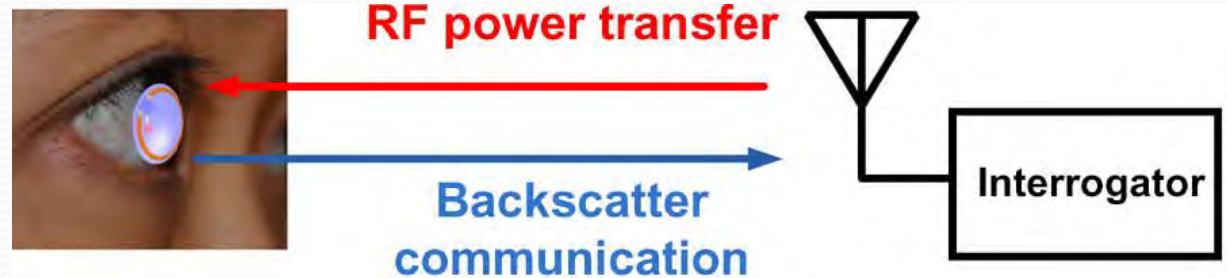


ที่มา: sierrawireless.com

Wireless Healthcare Sensors



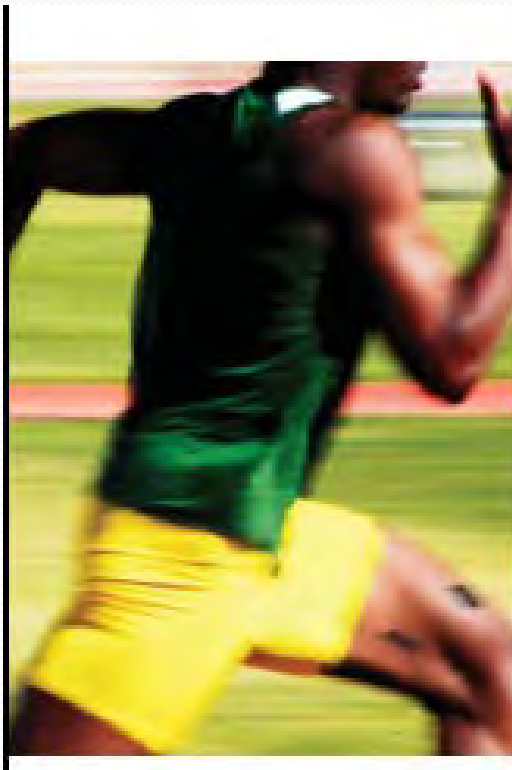
**Noninvasive
wireless sensor
platform for
continuous health
monitoring**



Yu-Te Liao et al, A 3- μ W CMOS Glucose Sensor for Wireless Contact-Lens Tear Glucose Monitoring, IEEE JOURNAL OF SOLID-STATE CIRCUITS, VOL. 47, NO. 1, JANUARY 2012

Wireless Healthcare Sensors

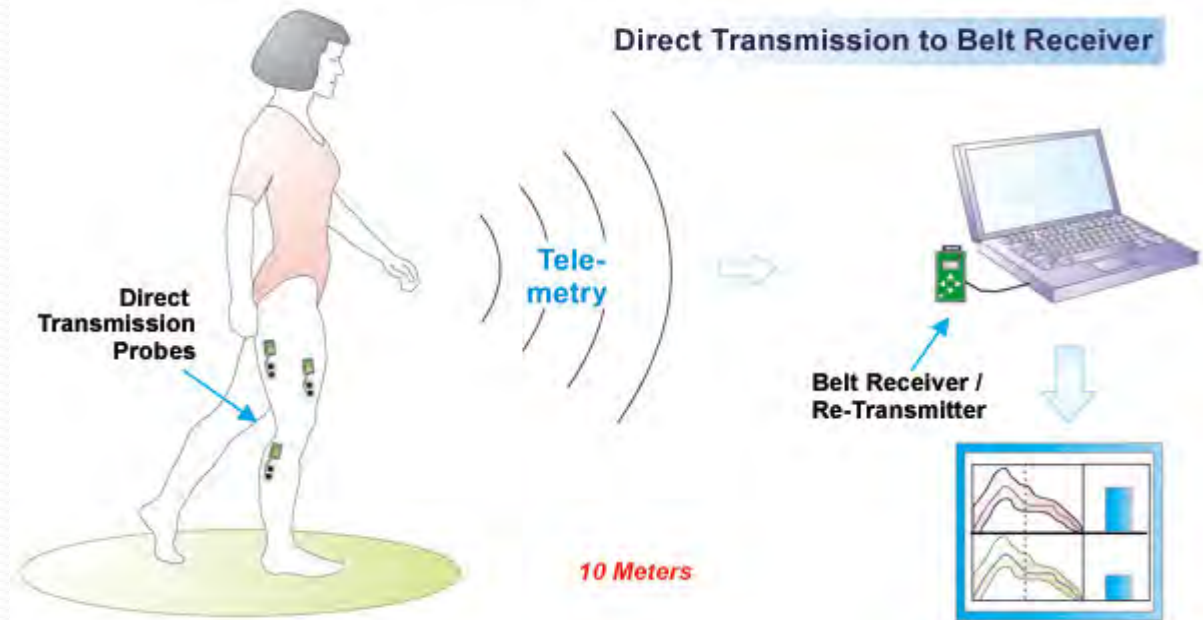
Portable Surface EMG System using Wireless Probes



Wireless Healthcare Sensors

TeleMyo™

Direct Transmission Telemetry for EMG & Sensors



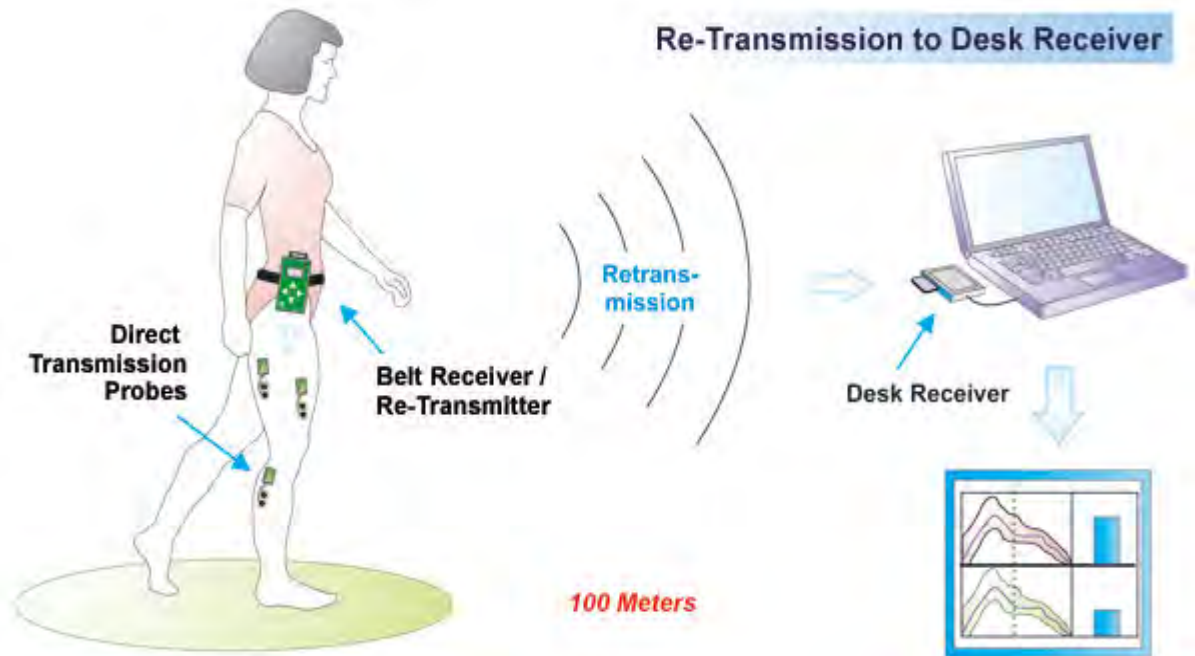
- Direct connection to any PC via USB connection (transmission range 10m)
- Wireless retransmission of signals in real time to any Noraxon USB receiver (transmission range up to 100m)
- Data logging via Flash Memory card

<http://www.noraxon.com/products/instruments/telemetry-dts.php>

Wireless Healthcare Sensors

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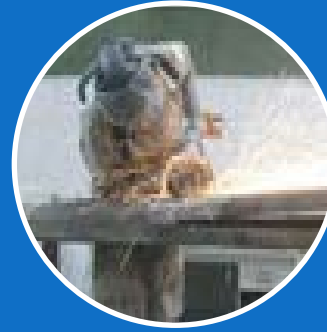
Applications for Surface EMG



Research



Clinical



Ergonomics



Sport
medicine



Wireless Healthcare Sensors

Impact of Wireless blood pressure in Japan Tsunami

On June 11, on the campus of Iwate Medical University, Qualcomm, through its Wireless Reach™ initiative, joined the University and Medical Platform Asia (MedPA) to announce an expansion of Wireless Health Care @H areas. This expansion provides 200 wireless hypertension patients, and is part of a large-scale effort to help survivors of the earthquake and tsunami.



of health
check their
work to n
monitoring will allow doctors and nurses
manage the health of at-risk patients.



farm6.static.flickr.com

www.qualcomm.com

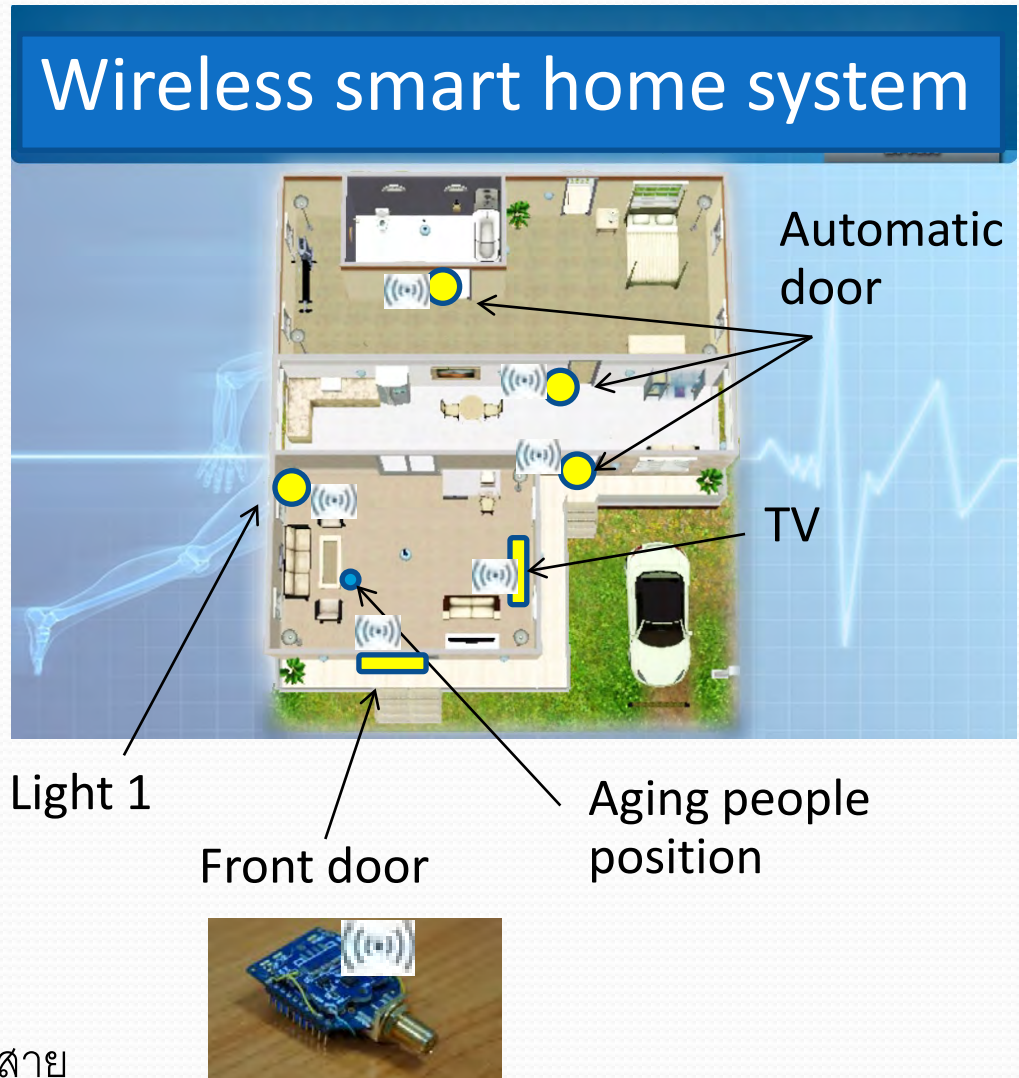
Wireless Smart Home

Sensors

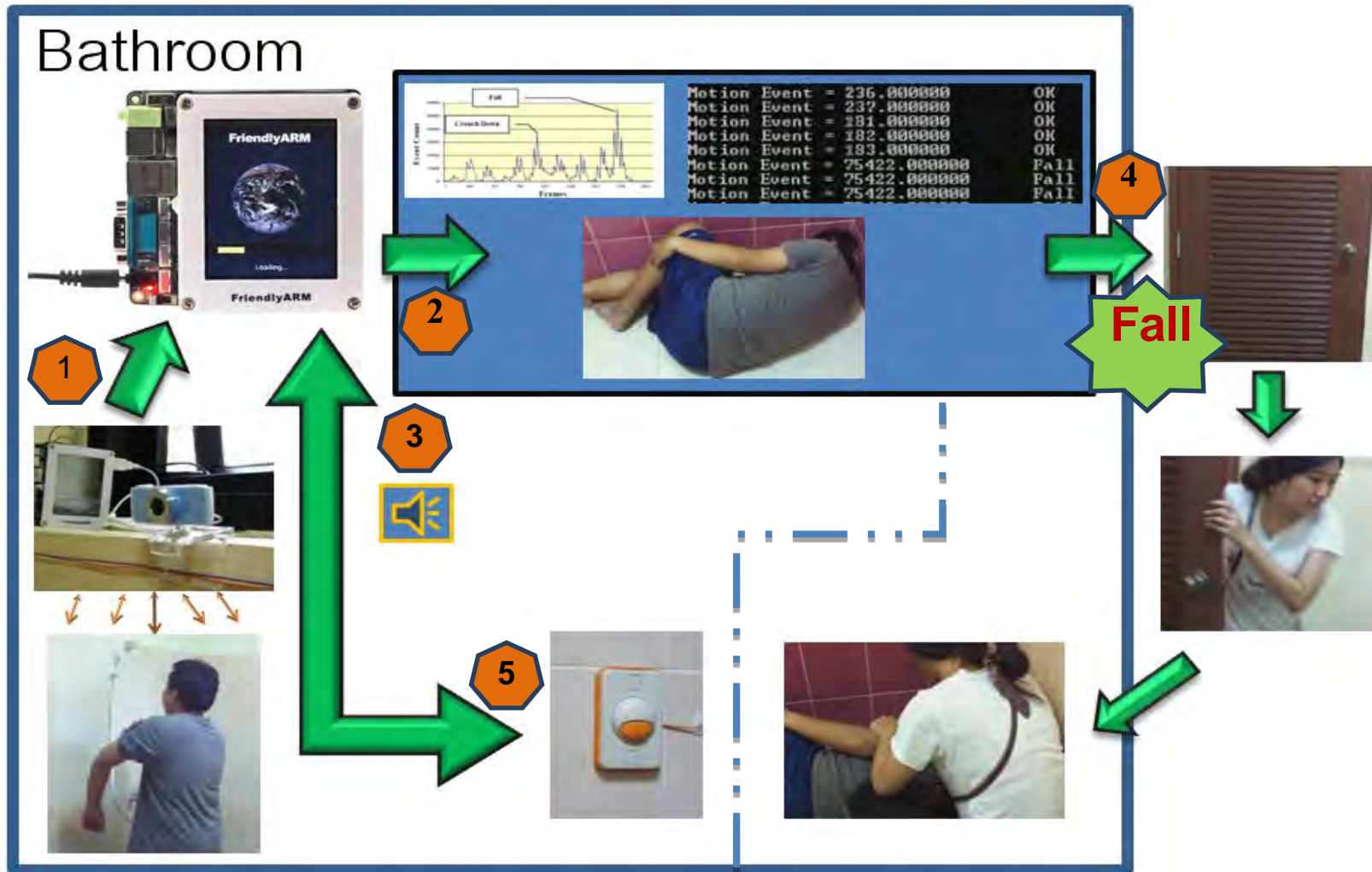
- Fall detection
- Proximity
- Position
- Temperature
- Smoke
- Speech
- Etc.

พัฒนาโดย

ศูนย์ความรู้เฉพาะด้านเครือข่ายเซนเซอร์ไร้สาย



Fall Detection System in Bathroom

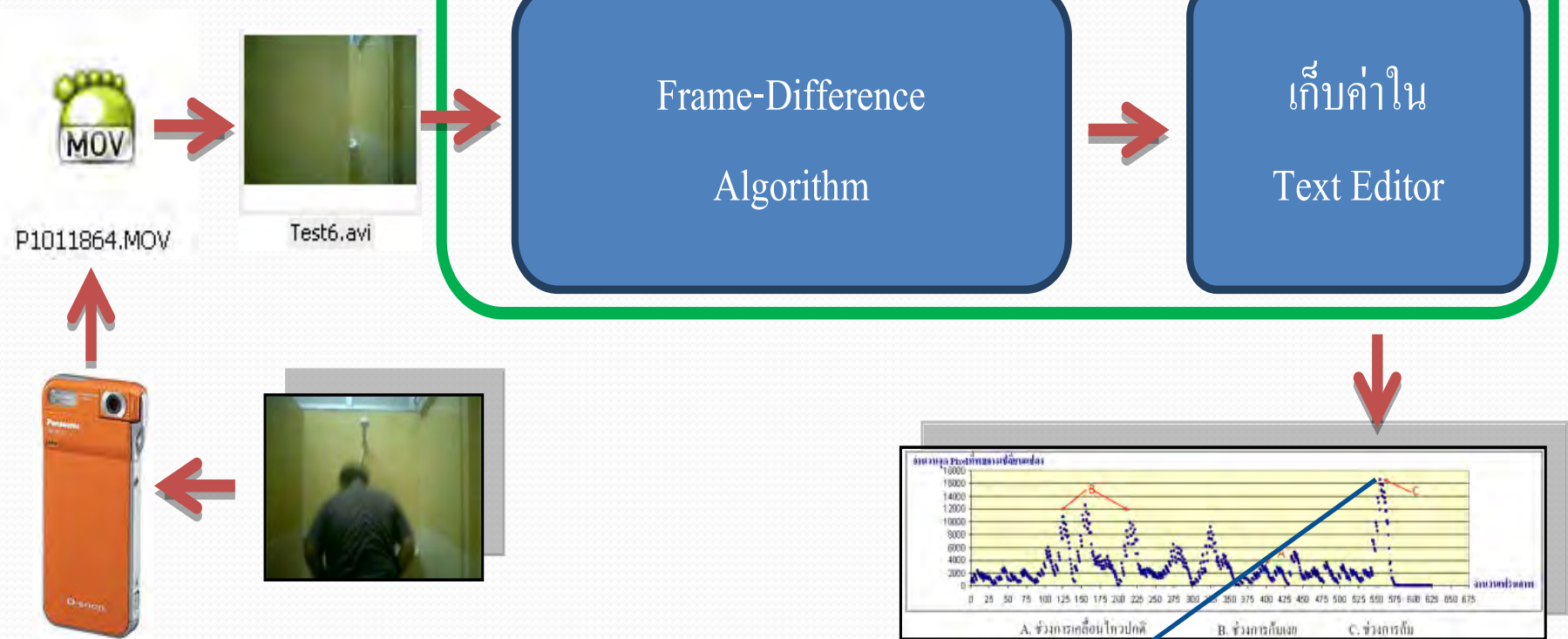


พัฒนาโดย ศูนย์ความรู้เฉพาะด้านเครือข่ายเซนเซอร์ไร้สาย

Privacy Preservation

in Fall Detection System in Bathroom

ประมวลผลบน Computer ด้วย MS Visual C++



พัฒนาโดย

ศูนย์ความรู้เฉพาะด้านเครือข่ายเซนเซอร์ไร้สาย

Only fall event is reported

Communication networks and devices

- Networks
 - 2.5G -could transmit data as well as voice
 - 3G-more sophisticated web browsing, streaming video, gaming, and multimedia messaging service
 - 4G-greater overall speed and greater bandwidth carrying capacity
- Devices
 - Smart phone
 - Tablet

mHealth using 4G mobile networks



**The Employment Effects of Advances in
Internet and Wireless Technology:
Evaluating the Transitions from 2G to 3G and from 3G to 4G**

Robert J. Shapiro and Kevin A. Hassett

January 2011

mHealth using 4G mobile networks

- More advanced apps for remote medical monitoring
- Real-time monitoring of intensive care patients by various specialists
- ECG monitoring by cardiologists
- Fetal monitoring by obstetricians
- More accurate diagnostic apps by remotely accessing CT scans or MRIs while on the go, and apps for real-time virtual consultation
- Patients also should be able to use 4G-based mHealth applications, including apps that use cloud-based services, to monitor their own diabetes, asthma, obesity and other conditions.

ขอบคุณค่ะ