eNightLog-照顧腦退化症患者的監測系統
eNightLog - Nighttime Monitoring System for Caring Elderly with Dementia

協助護老院護理人員監察及照顧腦退化症患者的系統
A system that can help caregivers of elderly homes to monitor and care for dementia patients

隨著全球人口老齡化，腦退化症的問題日益嚴重。在護老院中，不少患有腦退化症的長者會被強制臥床，甚至餵服安眠藥，以免他們隨意遊盪，導致走失或發生意外。這套監控系統利用事件追蹤和各種傳感技術，包括遠程生命體徵傳感器和非侵入式成像設備等，持續監察患病長者的睡眠狀況和夜間活動。若有異常情況發生，系統便會即時發警號予護理人員，有助減輕他們的工作量及提高處理事故的效率。

IR 3D Time of flight senor window

UWB sensor function indicator

系統設置
System setup

Bed-monitoring system
Server unit
Remote unit
Client unit A
Client unit N
(a)

Bed-monitoring client unit
Computer and network unit
Microcontroller and power control unit
Lighting unit
Aroma control unit
Near Infrared 3D time of flight sensor
UWB time of flight sensor
Voice and snoring detection sensors
Environment sensors
(b)

（a）服務器和客戶端以及（b）客戶端單元的系統框圖
System block diagrams for (a) server and clients, and (b) client unit

Lying on bed
Sitting on bed or bed side
Leaving bed

系統檢測到的用戶姿勢例子
Samples of user posture detected

Wake up
Move to bed side
Leaving bed side zone / Fall
Leaving bed and entry bed side monitor zone

跟踪事件序列的例子
Example of event sequence being tracked

The problem of dementia is becoming more and more prominent as global ageing populations are growing fast. In nursing homes, elderly people with dementia are often restrained in bed or administered sleeping pills. The purpose of such treatment is to prevent patients from wandering, which may result in getting lost or accidents. This monitoring system, equipped with event sequence tracking and different kinds of sensing technologies, including remote vital sign sensor and non-invasive imaging device, can continually monitor the patient's sleep and night-time activities. In case of unusual incident, the system will send an alert message to the caregiver at once, reducing the workload and increasing the efficiency of the caregiver.
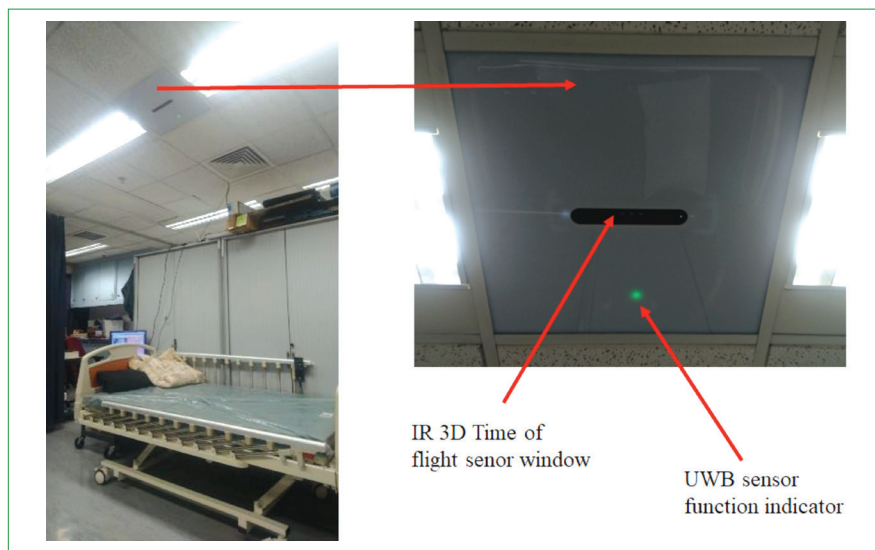
特色與優點

- 結合傳感與成像方法，以非約束的方式監察用戶的生命體徵、睡眠質素、跌倒及離床等行為問題
- 單次設置模式，啟動警報後毋須重設系統
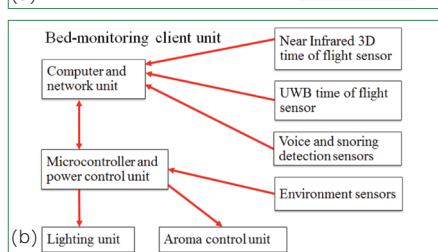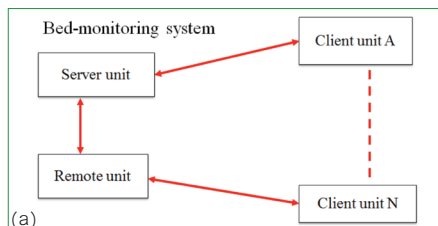- 追蹤夜間所發生事件的順序，包括睡醒、離床和跌倒等，以提高準確度

應 用

- 監測睡眠質量及睡眠時的生命體徵
- 在患者睡醒時通知護理人員，以防患者起床時跌倒
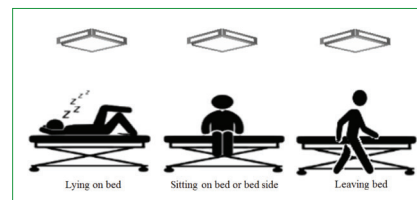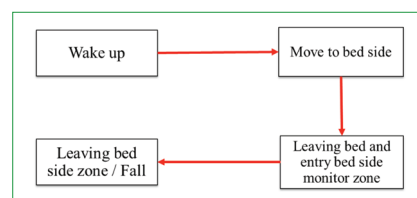- 根據實時獲取的信息，提供相應的燈光顏色和強度，釋放香氣，以緩解患者的行為問題
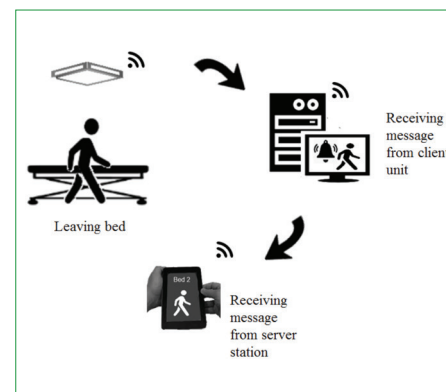
獎 項

第46屆瑞士日內瓦國際發明展 - 金獎 (2018年4月)

Leaving bed
Receiving message from client unit
Receiving message from server station

察覺到特定事件序列後的系統行動，包括向護理人員發送訊息
System action after specific event sequence detected, including sending message to the caregiver
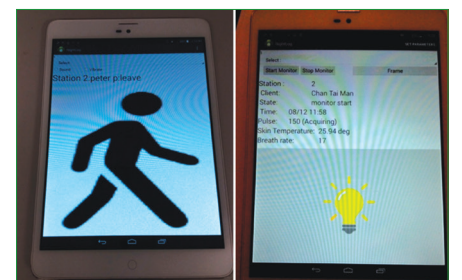
發送到平板電腦的示例消息
Sample message sent to tablet
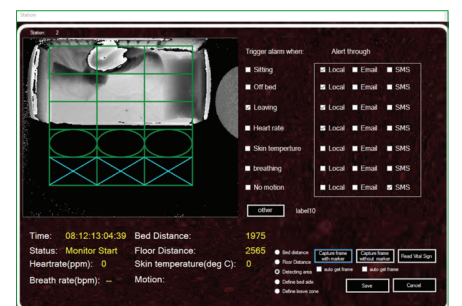
系統配置控制面板畫面的例子
Sample screen of system configuration control panel

Special Features and Advantages

- Non-restraint approach with remote sensing and imaging technologies to detect vital signs, sleep quality, falls and behavioural problems such as bed leaving
- Single setup requires no re-configuration after each alarm
- Tracking of the sequence of night events including waking up, bed leaving and fall event for improving the system accuracy

Applications

- Monitor sleep quality and vital signs during sleeping
- Prevent the patient from falling from bed by alerting the caregiver when the patient is awake
- Based on the information captured in real time, provides the corresponding colour and intensity of light and releases aroma for easing the behavioural problems of elderly people

Award

Gold Medal – 46th International Exhibition of Inventions of Geneva, Switzerland (Apr 2018)

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