# 中文摘要

失智症是眾多老人常見問題之一，會使老人在生活、情緒及身體健康等方面產生階段性地惡化，由於失智症初期的症狀不明顯，經常被民眾錯認為是正常的老化過程之一，錯失治療的黃金期。而一旦發病後，則生活會失去自理能力，出門不認得回家的路，嚴重影響到生命安全，造成失智老年人本身及其照顧者很大的困擾。

本研究目的主要是開發一套失智老人健康照護整合服務系統，除了提供一結構式臨床失智評量系統(SCDR)，讓一般非專業的人員也能藉由此一資訊平台之評量結果，來掌握家中長者認知能力的情況，能夠早期發現此一疾病外，同時也建構一套失智老人室內與戶外走失協尋系統，來加強老人走失意外事件的預防，避免不幸事情的發生。我們所設計的 Web-base 失智評量系統的表單內容主要整合 CDR、ADL 與 IADL 等量表，本系統目前已經正式在醫學中心使用，累積超過 150 筆個案資料，這些個案經由系統評估後，其中 5 人有可疑失智症狀，輕度失智程度有 27 人，中度失智程度有 31 人，重度失智程度有 87 人。另外我們針對失智量表個案的評估分數與評估量表項目進行進一步分析，結果顯示隨著個案失智程度提升，個案的 ADL 與 IADL 分數皆呈現下滑趨勢；而評估項目所使用的記憶力、定向力、判斷力與問題解決能力、社區事務、居家嗜好、自我照顧等六個向度

也與個案的失智程度呈現正相關性。

失智老人室內監控與戶外走失協尋系統主要是整合無線射頻身分識別系統 (RFID)、衛星定位系統 (GPS)、行動數據通訊 (GSM) 以及地理資訊系統 (GIS) 等技術，在不影響到老人生活的情況下，建構一套失智老人走失預防與協尋系統。本研究總共提出包括室內活動區域監控、戶外活動區域監控、緊急求救機制與遠端監控模式等四種監控機制。在使用者介面設計方面，透過服務管理平台，家屬或志工可以利用手機、PDA、Notebook 以及 PC 等各種不同的行動裝置，掌握走失老人的即時位置。而在協尋系統效能與穩定度分析上，我們在不同地形、不同時段、不同電信公司與不同手機型號情況下進行實驗，結果顯示 240 次實驗中的通報簡訊，都可以被系統 100%的接收以及處理，系統平均在 35 秒左右可以提供眷屬失智老人最新的位置資訊，位置誤差評估為 8 公尺。最後在 11 位使用者意見調查結果顯示，有 8 位受訪者滿意我們系統的表現，有 10 位願意推薦親人使用本系統。

# 英文摘要

In general, about 75% of the elderly have one or more chronic diseases, of which dementia is one of the most common. Research on elderly persons with dementia recently carried out in Taiwan has found that the incidence of dementia among the elderly is about 4%. Problems specific to dementia include memory impairments, behavioral problems, other mental symptoms, and patients' inability to take care of themselves.

The purpose of this study is to integrate WWW, Radio Frequency Identification (RFID), Global Positioning System (GPS), Global System for Mobile communications (GSM), and Geographic Information System (GIS) to construct an integrate healthcare service system for elderly with dementia. It consists of web-based on-line dementia evaluation system, indoor residence monitoring system and outdoor wireless healthcare system. The first subsystem, the web-based dementia evaluation system, provides a structured clinical dementia rating form to help caregiver or family member to assess the level of elder’s dementia if he has this disease. This subsystem not only can calculate the result of CDR, ADL, and IADL for diagnosis automatically, but also can help physician analysis the correlation between CDR and other factors, i.e. memory, orientation judgment and problem solving, community affair, home hobbies and Personal care.

Indoor residence monitoring subsystem and outdoor wireless healthcare subsystem are a stray prevention system for elderly persons suffering from dementia without interfering their activities of daily livings. We also aim to improve the passive and manpowered way of

searching the missing patient with the help of the information technology. Our system provides four monitoring schemes, including indoor residence monitoring, outdoor activity area monitoring, emergency rescue, and remote monitoring modes, and we have developed a service platform to implement these monitoring schemes. The platform consists of a web service server, a database server, a message controller server, and a health-GIS server. Family members or volunteer workers can identify the real-time positions of missing elderly using mobile phone, PDA, Notebook PC, and various mobile devices through the service platform. System performance and reliability is analyzed.

Experiments of outdoor wireless healthcare subsystem performed on three different time slots, from three locations, through three mobile telecommunication companies shown that the overall transaction time is about 35 seconds and the average deviation of the geographical location is about 8 meters. System reliability is analyzed via 240 times experiments, the result shows our system can process all messages. Eventually, there are 8 out of 11 questionary respondents satisfied with the performance of the system, and 10 out of 11 like to recommend their relatives using this system.