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Smart Electric Wheelchair with Outdoor Care and Security System for Dementia Elder

增進失智老人外出照護與安全之智慧
電動車輔具系統

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作品摘要

臺灣人口近年快速高齡化，老人照護相關領域成為了重要議題。其中，許多行動不便的銀髮族習慣以電動輪椅代步，如此便造成許多問題，例如交通安全，老人走失等。為了解決這些問題，本團隊開發出一智慧電動輪椅，整合通訊與 GPS 定位，以及老人生理訊號監測等功能。方便醫院，安養中心或家庭遠端追蹤、管理老人的行蹤，給予幫助。本團隊開發的智慧型輪椅預計達到以下功能：

1. GPS 即時路徑及生理訊號紀錄功能，紀錄老人在外的行動路徑及生理狀態，以方便線上管理，並在超出正常活動範圍或出現異常生理訊號時向家屬或養護機構提出警報。
2. 語音導航提示系統：以語音的方式提示老人回家的方向。
3. 增加老人在外行動安全例如防撞警示以及自動事故通報功能。
4. 其他幫助功能，如服藥提醒。

團隊期望經由這套系統，可以減少照護人力需求，也讓老人更常走出家門與社會接觸，給銀髮族們創造出一個更加安全友善的環境。

The goal of this project is to develop a smart electric wheelchair with outdoor care and security system for dementia elders within a year. Recently, aged population in Taiwan increases owing to the advancement of modern medical technology. The demand for medication and care for aged people are also increased, including the demand for mobility assistive equipment. Moreover, the aged population will also face to problem of dementia. However the common treatment is to severely restrict the actions of dementia patients, which is a violation of freedom. Therefore, it is important to aid aged dementia patients moving freely but without dangerous in the future. This project presents researches and developments of a mobility assistive equipment system, which can improve the safety during movement and help the medical team provides better medical treatment to the user. The integrated functions of this system includes positioning, navigating, collision detection, overturn detection, data upload,

medication reminding, ECG and body temperature recording, and electric muscle stimulator. Moreover, the system is designed to be easily applying to any electric wheelchair to form a smart wheelchair, which allows the elderly patients with dementia to move safely and freely. Family members can set reasonable range of movements through the user interface, and if the wheelchair exceeds the range, the system will send notification to the emergency contact. The smart wheelchair can also lead user home by the voice navigation. Furthermore, when an emergency situation such as collision or overturn occurs, the system will send SMS with position coordination to caregivers or emergency medical service. With all the advantages mentioned about, this system will help advance dementia researches and effectively improve the outdoor safety of elderly patients with dementia.



圖 1 / 完成系統全圖