

A10-135

作品名稱	居家守護微型雷達 Home Care Micro-Radar
隊伍名稱	帆船家族 SAILS Family
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作品摘要

台灣已步入老齡化時代，獨居高齡者的健康照護是目前很重要的議題，因此我們在本專題中提出一獨居高齡者24小時生理訊號監控的解決方案。在此提出的使用場景如下所述，在白天的生活中，獨居高齡者可於身上配戴一定位標籤及一接觸式生理訊號檢測，同時準確掌握高齡者所在位置及其生理訊號；在夜間睡覺時，為了避免身上配戴的感測器所造成的不適感，我們提出另一項無線生理訊號雷達檢測技術，此技術無須在身上配戴任何生理檢測晶片，透過雷達都卜勒原理，以微量電磁波無線偵測心跳與呼吸訊號。因此，無論白天或夜間發生危急狀況時，遠端照護端的醫護人員可依系統所回傳的生理訊號先得知高齡者目前的生理狀況，並可確知高齡者所在位置。

為了達到上述獨居高齡者居家照護之場景，我們提出兩項創新之技術，1) 具生理訊號檢測功能之精密定位雷達技術，2) 隱形心肺訊號雷達感測技術，搭配上上述兩項雷達技術，即可做到全天24小時的生理狀況遠距照護。實測結果精密定位雷達技術在25坪空間內擁有22公分的定位精確度，且可即時更新待測者所在的位置。此外，夜間的隱形心肺雷達感測器可成功抓取不戴晶片高齡者的呼吸與心跳週期。我們最終希望將傳統的大功率雷達小型化、低功率化，使雷達技術不僅能保衛國土，更能貼近我們的居家生活，守護高齡者的健康。



Abstract

Nowadays, Taiwan has already become an ageing society, and the health care for elderly is hence becoming an important issue. Therefore we propose a solution of vital signal detection. The application scenario is as followed: During the daytime, the elderly who live alone can wear a locating tag and a contact vital signal sensor, which consistently monitors his/her location and vital signal precisely. In the nighttime, especially when the elderly falls asleep, another wireless noncontact vital signal detection technology will be adapted to eliminate the uncomfortableness caused by the contact sensor. This technique, which does not need wearing or implanting vital detection chipset, senses the heartbeat and respiratory signal in an unaware nature via Doppler radar principle. Therefore, the distant medical care personnel can take control of the patients' real-time vital status and as well as their life patterns through this system all the time.

In this project, we developed two novel systems. The first one is a phased-array-based locating radar integrated with vital signs monitor. Within a 10m×10m area, a 22-cm locating accuracy with an instant updating rate has been demonstrated. The second system is an insensible vital signal detecting radar. The measurement result shows that the period of heartbeat and breath can be accurately detected. The combination of those two techniques will be able to provide the 24-hour health care despite a long distance.