Application Group
A17-159

寵物的智慧守護衣

Smart Pet Clothing : Guardian of Health and Mood

隊伍名稱　大顯身手
Big Show
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研究領域
包含類比積體電路、混合訊號積體電路與射頻通訊積體電路等，並致力於生醫相關晶片開發，如生理訊號無線傳輸接收系統晶片、神經調控系統晶片、穿戴式身體感測系統晶片等。

作品摘要

本作品「寵物的智慧守護衣」的目標，是為了幫助飼養寵物的飼主，能夠更加了解寵物的心理情緒與健康狀況。寵物和人類之間存在著溝通上的隔閡，這對疾病的早期發現，抑或是獸醫的診斷上都具有一定程度的不利性，現今的寵物疾病的診斷都依賴大型儀器，不僅昂貴也不具及時性，飼主在照料上也難以客觀掌握寵物的狀況，因此，本作品試圖解決寵物醫療及照護上的侷限性。

為達成便利且隨時可監控的目的，本作品應用穿戴式產品的概念，整體系統可分為硬體、軟體及使用者端。硬體方面，我們設計特殊的 ECG 及呼吸訊號感測器，並透過類比前端電路處理，可精確地量測到寵物的 ECG 訊號及呼吸訊號，資料彙整於微處理器，再通過藍芽模組將資料傳輸至使用者端，透過電路 PCB 微縮化以及編織技術，我們將感測器、類比前端電路與寵物衣服結合，使硬體端對寵物行動的影響降到最低；而在軟體方面，在接收寵物的生理數據後，就可透過演算法將其轉換成有用的資訊，提供給使用者參考以及動物醫療方面上的用途，我們依據生理訊號推算寵物的情緒指標，讓飼主不僅可以了解寵物的生理狀態，也可以了解寵物的心理狀態；使用者端的部分，我們提供 APP 和網頁兩種使用者介面，飼主可以通過智慧型手機的 APP 隨時追蹤寵物的狀況，也可以通過網頁將生理訊號上傳至雲端，以利長期追蹤慢性疾病，同時，網頁也扮演飼主及獸醫之間的資訊交流平台，提供使用者進行社群之間的交流與分享。

在未來的展望上，本作品希望擴展生理訊號的種類，提供更為完整的生理監控，同時，目標對象可以從寵物拓展至警犬、導盲犬等等工作犬，以輔助其訓練及工作。寵物的智慧守護衣讓寵物得到完善的照顧，更可使其與人類的距離更加貼近，而這就是整個計畫的最大宗旨。

圖 1. 智慧寵物衣

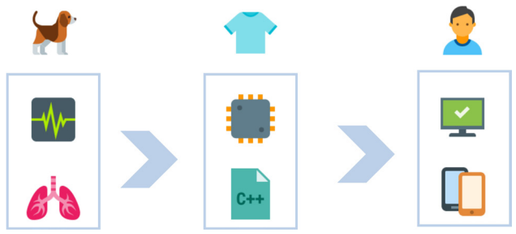

圖 2. 系統架構

Abstract

The goal of "Smart Pet Clothing : guardian of health and mood" is to help pets' owner know more about the physical and psychological condition of their pets. The gap of communication between human and pets is obstacle to discovering the disease in early stage or diagnosis of vets. Today's diagnosis of pets is relying on large instruments, which are expensive and not timely. Also, the pets' owners have difficulty in taking care of their pets because of their incapability of objectively knowing their pets' condition.

Therefore, this work is trying to solve the limitation of medical care of pets. In order to be convenient and monitor in any time, this work apply the concept of wearable device. The overall system is composed of hardware, software and user end. In respect of hardware, we design special ECG and breath sensor and analog front end circuit. Accurate ECG and breath signal can be detected. The data is collected by amicro processor and transmitted by bluetooth to the user end. Using PCB boards to micrify circuits and weave technique, we combine the hardware with pets' clothing and minimize the influence on pets' action. The software converts the data to some useful information which can provide to users or medical use. We calculate the emotion index on basis of biological signal. The owner can realize not only their pet's physical health but also mental condition. As for user end, we provide APP and website. The user can track their pet in any time by using APP on their smartphone. Also, they can upload the data to cloud for tracking long-term chronic disease. The website play as a communication platform between pets' owners and vets, letting users share and interact with each other.

In the future, this work can extend the category of bio-signal, offering more complete physical monitor. Besides ,this work can be used on not only pets but also working dogs, like police dog and guide dog, helping their training and working. Smart pet clothing take sound care of pets, shortening the distance between pets and owners. This is the major purpose of this project.

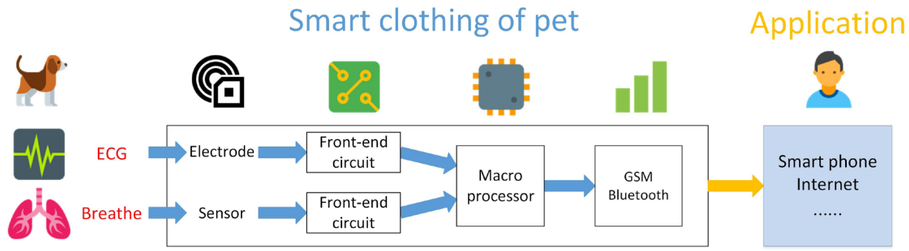

Fig 3. Overall system structure of Smart Pet Clothing : guardian of health and mood