

## IoT 智慧犬管家系統

## IoT Intelligent Steward System for Doggie

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## 作品摘要

研究動物內心情感的知名專家 Jeffrey Masson 曾言道：「狗若愛你，就會永遠愛你，不論你做了什麼事，發生什麼事，經歷了多少時光。」在人際關係複雜多變的現代社會之中，人犬之間的羈絆，因為這難得的忠誠變得更加緊密，狗成為了許多人的情感慰藉和親密的伙伴。

許多飼主如同照料自己的小孩一般，想方設法滿足小狗的需求、提供更好的休憩環境，但現今的狗屋設計往往僅配有基本的居住條件，沒有考量狗的感受。另一方面，飼主通常只能由觀察與經驗判斷狗的需求，但是現代社會飼主無法每時每刻注意狗的狀態，且若飼主行動不便也無法完善的照顧小狗，所以對於輔助助手的需求也逐步上升。

因此本作品秉持「以犬為本」的宗旨，將狗屋與相關的助手功能結合，打造智慧狗屋，既提供小狗更好的照顧，同時也減少飼主的負擔。為達到更好的效果本系統具備五大特色功能，分別為：智能監控、智慧秘書、視訊互動、智慧照護、綠能省電。

為因應小狗的生理習慣而設計完善的智能監控功能，分為兩個方面：一是環境控制，狗屋具備自動清洗功能，同時也提供溫度調控的機制；安全管理方面，透過本系統上所搭載之感測器，監控家中愛犬的狀況，有問題就透過 App 推播通知使用者。此外，為方便飼主與小狗溝通，提供視訊互動的功能。

考量到每隻狗都是獨特的個體，本系統能更主動的針對每隻狗的生活特性自我調整。將採集到的各式資料，如食量、糞便濕度、重量、心律等，建置於資料庫系統，並通過資料分析、觀察資料趨勢，系統能從現有之資訊中，推敲出小狗之生理狀況；智慧秘書功能透過機器學習 (Machine

Learning) 結合資料庫的資訊，逐步修正照護功能的行為模式，以符合每隻小狗獨特的生活習慣。同時，本系統考量節省能源，透過降低耗電量大的元件的執行頻率，達到智能省電功能。

上述功能皆以模組化設計完成，使用者可以自行搭配所需之模組，方便擴充和維修，成本相較於市面上的客製化狗屋大幅減少，降低使用門檻，使狗屋成為一套專屬愛犬的全方位照護幫手，提供更安全健康的環境，減輕飼主的負擔，解決飼主不一定有能力隨時陪伴小狗所衍伸的問題。

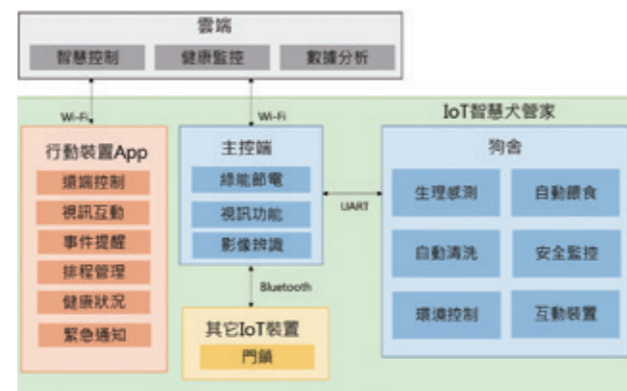


圖 1. IoT 智慧犬管家系統架構圖

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## Abstract

Jeffrey Masson, the controversial psychoanalyst and best-selling author, has said "It is as if once a dog loves you, he loves you always, no matter what you do, no matter what happens, no matter how much time goes by." Because of this rare loyalty, the bond between humans and dogs becomes closer in the complex relationships of modern society.

Many owners do their best to meet the needs of dogs and provide a more comfortable environment. On the other hand, owners usually can only judge the needs of dogs by observation and experience, but they cannot keep attention on dogs all the time. In addition, if owners have trouble moving, they may not take good care of dogs. The demand of auxiliary aides have gradually rise for these reasons.

This work take the "doggie-oriented" as main purpose to create a wisdom cage that associated with helper function. The wisdom cage can not only provide better care for dogs, but also reduce the burden on pet owners. To achieve better effect, this system implements five features, intelligent monitoring, intelligent secretary, video interaction, intelligent healthcare, and power saving.

In response to the physiological habit of dog, the sophisticated intelligent monitoring function is designed in the system and compose of two aspects. First one is environmental control which contains self-cleaning function and temperature control. Second one is problem notification through system mounted sensor. In addition, this system also provide interactive video functionality to facilitate communication between the dog and owner.

The system also considered to take the initiative to self-adjustment according to life characteristics of each dog. The system will

collect a variety of information to build a database. After that, the physiological information of the dog can be speculated through big data analysis and trend observations from existing database. Then, the wisdom secretary gradually correct caring behavior patterns to match each dog's unique lifestyle through machine learning combined with database information. Moreover, the system takes power saving into account. It develops a smart power saving function of reducing the power consumption by decreasing the frequency of implementation of large elements.

These functions are modular design, so owner can choose required modules needed. Compared to other market customized cages, the costs of this system is significantly low, enough to reduce the threshold of getting a high tech customized cage. That makes dog cage cover the full range of unique dog care and help to provide a more safe and healthy environment. Moreover, it helps to reduce the burden on pet owners and solve the problem caused by that owners have no time to accompany their dogs.



Fig 2. The proposed system diagram