

Iot-Based Pet Feeder

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Abstract- "Technology stems from humanity", this sentence is used to symbolize our modern life. It means that the interaction between devices and physical object/human in the real world is gaining more and more attention, and it declaims a natural and intuitive methodology to employ. According to previous idea and living well life has been a growing demand. Thus, how to raise pets in an easy way is the main issue recently. In this study, the authors focused on the system design to monitor the pets activates and to control pet eating time with the technology of the internet of things (IOT). Our system could be categorized as the realization of pet digital home technology, the implementation proved to meet pet owner's needs.

Keywords- Raspberry Pi3, Wi-Fi, USB camera, Inter net of thinks .

I. INTRODUCTION

Today users are more and more immersed into a complex sphere of ubiquitous information. To capture handy information, make use of context information and interact directly with the physical object is the main request in our modern world with the mobile client. That's the main issue of the internet of things (IOT). That is, the IOT provides a set of standards and methodologies to associate object in the real world. There are several approaches for the provision of applications that make such interactions as possible [1].

Besides, because of the low birth rate in Taiwan, attention should be paid to the lifestyle change rapidly. Some scholars say that when going to a park on the weekend, there are more people walking dogs than carrying babies. According to the research of Pet Care Services in the U. S. in Jun, 2006, the American's pet care service is about 363 million dollars in 2005, and the growth rate of such service every year will be reach to 6% in the future [2]. In addition, the East Europe and Asian market will become the potential market on pet service business [3]. Meadows & Flint said that the low birth rate and the link of family members becoming not closely, all caused the result that pets will take a very important role nowadays [4]. Thus, this trend will be caused by the rise of pet services.

In this study, we focus on the connection between pet services and the pet owner, to control and monitor the activities of pets is the major issue of our system. Besides, how to fulfill the pet owner needed and realize the pet digital home is our another topic in this study.

Recently, wireless communication, and digital electronics have enabled the development of low-cost, low-power, multifunctional sensor nodes that are small in size and communicate in short distance [5]. These tiny nodes consist of a collective of networked sensor nodes, which are designed to detect the object and communicate information via wireless radio. WSN represent a significant improvement over traditional sensors, one reason is WSN can be positioned far from the actual phenomenon; the other is the positions of each sensor and communication topologies are carefully engineered. WSN is one of the actual implementation of the IOT.

In our study, for the purpose to improve the pet monitor system with the ability of self-awareness and context awareness, and to help the pet owner raise the pet in a handy method, the system is involved with the idea of IOT. All the pet raising solution are based on the WSN communication. The first part of our system is "intelligent pet door". According to our idea, the pet owner can use this intelligent solution to control the access of family pets. The second solution is "intelligent pet feeder", this solution is used to customize the eating time under the pet owner control. All of the above solutions can also be done remotely

The organization of this paper is as follows. A brief review of pet products and WSN platforms are given in Section 2. The proposed system modeling is presented in Section 3 while the simulation implementations are discussed in Section 4. Finally, the conclusion is presented in Section 5.

II. RELATED WORKS

A. Pet Raising Solution

In Taiwan, as our society continues to have low birth rate and aging population, more and more people regard their pets as a family member. Such a trend has been evidenced by pet related products and market activities. For example, a proportion of pet owners start to bring their pets with them while traveling. Besides, in 2010 Asia Pacific Pet Economic Conference [2], they mentioned that the pet industry has great achievement in these years, and they forecast the market would have a double rise in the next follow two years.

B. WSN Platform

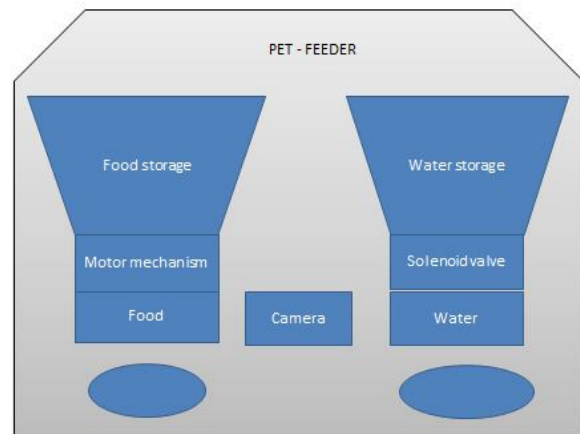
A typical WSN formed by the sensors could contain nodes with varying capabilities and collaborate with each other. There are several advanced research platforms for WSN in use by global researchers with variable sensor size, power consumption, nature of the operating system, and basic sensing abilities. The "Mica family of sensors is one of the most common sensing platforms in use [6]. It's supported by numerous operating system and sensing platforms, including TinyOS, Ivlantis OS, and Contiki. The "Mica family includes the "MicaZ, "Mica2, and Mica2Dot series of sensors. Besides, the Telos family of sensors consists of TelosA and TelosB nodes [7]. They are a newer generation of motes when compared to the Mica family, as they have a USB interface for data collection and programming. According to this design, the Tmote sky sensors contain a USB port to facilitate programming and are an exact replica of the TelosB suite of sensors. Their features make them well suited for wireless sensor network experimentation.

III. SYSTEM ARCHITECTURE & SYSTEM COMPONENTS

In the past, though there are many automatic pet monitor systems, like automatic pet door, pet feeder, however, their systems cannot meet the pet owners' needs. For example, most of the pet monitor systems are based on the infrared detector/recognition, which can be used to spot the pet at the door, register their movement and alert you when pets go into areas where they are not allowed. More, this design has some disadvantages; the infrared detector is easily to be influenced by some unknown reasons. The detection cannot go through.

In our system, we focused on the implementation of the pet monitor system with the WSN platform appended. With the system help, the pet owners can monitor the pet location, control the pet movement, pet eating time and manage the pet schedule.

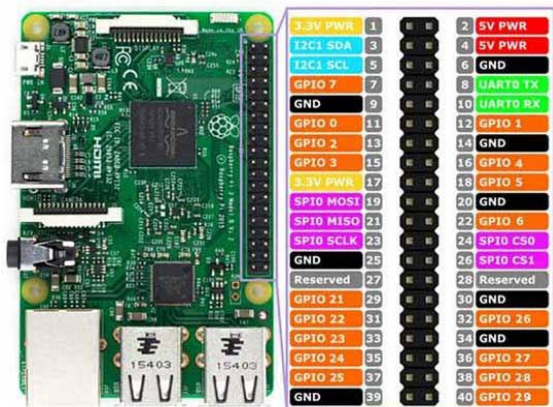
System Architecture



System Components

3.1 Raspberry Pi3:

Raspberry Pi3 is worked as minicomputer. Raspberry Pi3 has number of facilities for communicating with a computer. It has act as micro controller as well as Microprocessor. the raspberry Pi3 have performed various operation using number of ports. the food using 18th pin of the GPIO, and water using 23rd pin of the GPIO. The Raspberry Pi3 have 5V of current. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with an DC adapter.



3.2 Monitoring System

Monitoring system using USB CAMERA .it monitoring the over all pet activities and it also secure the pet feeder. This high speed USB Camera Board is fully compliant with USB video class (UVC) 1.0 standard , The USB audio class 1.0 standard . So video streaming through UVC and audio streaming through UAC is possible without any special drivers on operating system that have built in support for these UVC and UAC Standards



USB Camera

3.3 DC Motor

A DC motor converts direct current electrical power into mechanical power. DC or direct current motor works on the principal, when a current carrying conductor is placed in a magnetic field; it experiences a torque and has a tendency to move. This is known as motoring action. The DC motor are connected with Raspberry Pi3 and it can be automatically food door open.



DC motor

3.4 Solenoid valve

A Solenoid valve is an Electro mechanically operated valve . The valve is controlled by an Electric current through a solenoid :In the case of a two- port valve the flow is switched on or off;In the case of a three-port valve,the out flow is switched between the two outlet ports.

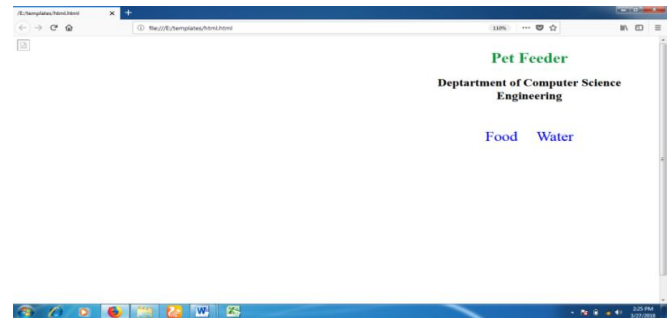


IV. MODULES

4.1Raspberry Pi3 Module:

Raspberry Pi3 is act as micro processor as well as microcontroller.it have more number of GPIO Ports but the pet feeder using two ports .the two ports are GPIO18 and

GPIO 23.the GPIO 18 is used to food and GPIO 23 is used towater .the raspberry Pi3 runed using VNC server.



4.2 Python

The python coding using Flask() library file .it act as interface between HTML Coding and PYTHON CODING.



V. CONCLUSION

An easy to feed your big dog keep track of when you feed. An able to feed remotely through Wi-Fi when you are not around. If you have all the parts around, it should take a couple of weekends to get this done. In our modern life, the interaction between devices and physical objects human is gaining more and more attention. Many of the research engaged to provide a natural and intuitive way to request services. Moreover, how to combine pet control and the IOT technology is the current trends and the future developments. In this study, the authors focused on the design of an intelligent pet monitoring system with the idea of internet of things. It's totally based on the smart home environment technology, includes the intelligent pet door and pet feeder. According to our implementation, the system can overcome the disadvantage of traditional products.

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