Design and development of IoT based Smart Pet Feeder

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Abstract— Domestic pets are very common in every country. Also, in our country there are many families who are fond of keeping pets. As people like to keep pets, pets also need special treatment and care. So, keeping pets is also not an easy task. We need to feed our pet timely. But, because of our busy schedule we are unable to do so. We have designed a smart pet feeder system. This will help us feeding pets anytime. We will be able to feed pets no matter where we are. This device will be totally dependent on internet connectivity. The main idea is to allow pet owners to automatically feed them and even monitor them. Using smart pet feeder in houses will assure pet owners and increase comfort and peace of mind. Especially when we are unavailable for them.

I. INTRODUCTION

Feeding pets responsibly and smartly is difficult for a lot of people. The problem becomes especially obvious when the owners have a heavily occupied personal life. When owners do not have time to feed them on time, they intend to leave the feeder full before leaving. The unhealthy diet will almost always cause health problem for their pets. According to the recent research, one of the top health concerns are overeating and obesity. Younger pets are usually never satisfied and can keep eating until nothing is left. Even adult pets can have a similar habit, which causes a much shorter lifespan for the pets.

Our project is automatic pet monitoring and feeding system using Internet of Things. Human interference on the part of taking care of pet when they are busy is difficult. And hence our system will be efficient enough to overcome the hurdles faced by human in taking care of pet. This Pet care System is complete equipment for monitoring all the pet activities and also by making the pet feel free.

A. Goals or Objectives:
 To feed the pets automatically when it is not possible to feed pet manually.

 To maintain and take care of pets diet.

 To call pets automatically at the time of feeding.

 To have a more personalized experience of keeping the pets to pet owner.

 To monitor the pet, even when no one is at home.

II. LITERATURE SURVEY

"Automatic Pet Monitoring and Feeding System Using IoT" this paper was published in IJCR in 2017. This was a pet feeding device that has a same purpose of feeding the pet as our device has. But an new thing was tried to be introduced by the creator through this device and that was pet collar which is used to monitor the pet by tracking its location. The main disadvantage is, as it is developed for pet which usually stays at home than keeping a tracker make no sense.[1]

"Design of Pet Feeder using Web Server as Internet of Things Application" this paper was published in 2nd international conference on Electrical Engineering (Icon-IEE) in 2016. This device was made as solution to manual feeding as a automatic feeding. The main disadvantage that we found in this device was it was using web application as a tool for monitoring and feeding pet automatically. As this web application is not a great option hence as a solution our device comes with android application which can be easily used from anywhere.[2]

"Automatic Pet Feeder Using Arduino" this paper was published in International Journal of Innovative Research in Science. (IJIRSET) which was issued in 3rd march '18. As the title suggests this was a device developed to feed the pets automatically as a solution to manual feeding. But the main disadvantage with is was it was based on Arduino where it might not be the bad option but we are using Raspberry pi as a great option [3]

"The Study and Application of the IoT in Pet Systems" this paper was Published Online January 2013 (http://www.scirp.org/journal/ait) where Chinese student were there in this project. The first device of the pet monitor system was the smart pet door, which can help the pet owner to control the pet activity. The other device is the smart pet feeder. With the system help, the pet owner could schedule the pet eating bowl time remotely. As a disadvantage they have given a pet door which may not be a great solution but replacement to this our device has camera which is used for true monitoring.[4]

As a part of survey we also went through some of the trending applications that gives are used to feed the pet. Given below is the name and findings.

a) FunPaw pet Feeder:

Available on Google app stores which provide a food to dog with time setting option.

Findings: Not durable, not working properly, very bad reviews from customers.

b) PetTec Pet Feeder.

Feeds pet as per the time set.

Findings: doesn't work with frequency router.

c) JamPet

This app is developed for users to handle intelligent pet feeder.

Findings: problem in accessing the app on phone.

III. PROPOSED WORK

The intent of our project is to avoid the difficulties related to feed the pet when pet owner is not at home. The proposed device is helpful for feeding the pet automatically and also to maintain pets' diet. This pet feeder is not only used for feeding but it also calls the pet at feeding time. Overall to have a great and ore personalized experience of keeping pet, this device would be useful.

A. Flow of the System:

After logging in, the used will click on feed button where food will be thrown through the servo motor. Before that pet feeder is started. When image is capture is it stored in cloud and then it is taken from cloud. And finally the photo is captured.
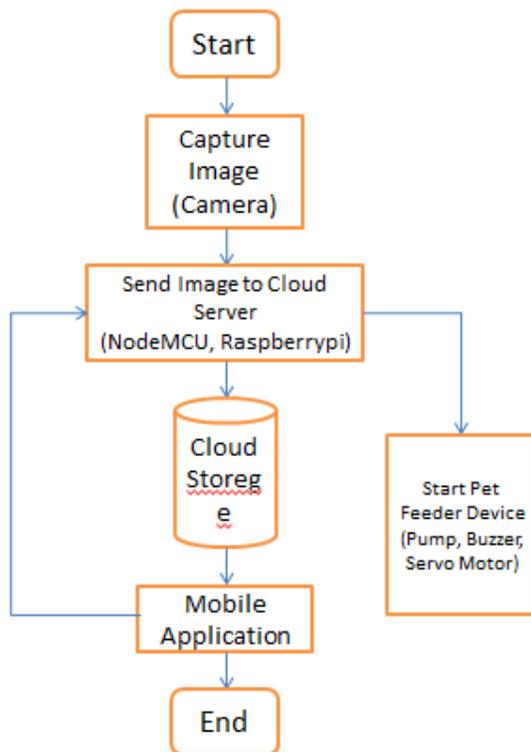

Fig. 3.1 Flowchart

B. Functional Modules:
The whole system is divided into the four modules. They

are as follows
Module 1: Raspberry Pi
Module 2: Node MCU
Module 3: Servo motor
Module 4: Camera

1) Raspberry Pi Module
It is a single computer board with credit card size, will be used for many tasks that our device does, like operation of servo motor, Buzzer, Node MCU and also to Stream video.
2) Node MCU Module
An open-source firmware and development kit that helped us to prototype or build our IoT product. It includes firmware which runs on the **ESP8266** Wi-Fi SoC from Expressive Systems, and hardware which is based on the ESP-12 module. The firmware uses the Lua scripting language.
3) Servo Motor Module
A rotary actuator or linear actuator that allows for precise control of angular or linear position, velocity and acceleration. It consists of a suitable motor coupled to a sensor for position feedback. It also requires a relatively sophisticated controller, often a dedicated module designed specifically for use with servomotors.
4) Camera Module
An Internet Protocol **camera**, or **IP camera**, is a type of digital video **camera** that receives control data and sends image data via the Internet. It will be commonly used for surveillance in or device.

IV. CONCLUSION

We have developed a mobile application for pet owners which act as an interface between pet owner and the pets. The application is available especially for people having pets. We have applied **engineering knowledge** to **analyze societal problem** of pet owners whenever they want to feed their pets & then we have **designed** solution for it. We have **analyzed** existing mobile apps related to pet feeder that help them to feed their pet during our project & try to overcome their drawbacks in our project. We have used **modern tool** android studio to implement the project. During this project we have applied **professional ethics** & have understood the importance of **teamwork & communication** while presenting project in various competitions & conferences for **project management**, which leads to engage ourselves in **lifelong learning.**

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