

# Voice Activated Pet Feeder Using Cloud

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## Abstract

In modern society, people own pets such as dogs, cats, birds and many more. However, many pet owners are not able to cater time from their busy schedule to feed their pets which is the primary responsibility of a care-taker for maintaining the health of the pet. Business pet feeders came up when majority of the pet owners found it hard to attend to the nourishment needs of their pets. Pet feeders are programmed feeders that are intended to apportion specified segments of food at certain times, so they guarantee that your furry companion will be very much benefitted from time. A nutritious, balanced diet is essential to keeping the pet healthy. In this digital age, speech recognition system is commonly used to operate devices and perform commands. Google Assistant is probably the most advanced and dynamic of assistants available. This paper intends to design a pet feeder which will ensure that the pet is fed, even when the owner is far away with the help of their phone using Google Assistant. The command from the owner is received through Google Assistant and it is recognized with the help of IFTTT. The command is then passed to the pet feeder, prompting it to dispense food for the pet.

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## 1. Introduction

Pets require special care and treatment. Due to nowadays busy life style, this task is not as simple as it used to be. Our paper intends to address this issue enabling the owners to have their pet well fed even in their absence. The goal of this work is to introduce, design and implement a smart pet feeding system. People of 21<sup>st</sup> generation are melded with technology than we could have imagined mere decades ago. The intercommunication between human and physical devices in the real world is gaining more concentration and seeks a natural initiative methodology to employ. This study examines the ability of computation, communication and control technologies to improve human interaction with pets by the technology of Cloud and IFTTT service. This work aims to ease the burden of pet owners in raising their pets. Our study not only presents the key improvement of the pet feeding system involved in the ideas of Wireless communication, but also meets the demands of pet owners to automate simple things, like monitoring, and feeding controls easily. In our proposed feeding application, we have utilized Cloud technology and IFTTT's service to serve our purpose of feeding the

pet, whenever the owner commands Google Assistant on the Phone to do so. By incorporating this system, the pet owner can avoid the strain of logging into the cloud console to customize and enter inputs. We can just tell the Android phone to do the task. The main aim is to remotely feed the pet at the click of a button. On receiving the command from the master, the trap door should open and close automatically, dispensing food for the hungry waiting pet [1].

## 2. Literature Review

There are few previous researches that have been done on automatic feeders, such as Programmable Pet Feeder[4] and Smart Pet Care System[3].

Programmable feeder are automated machines that are programmed to throw food at a particular time set by the owner. They are generally time based and administer a specific measure of food at an exact time. In this feeder, automatic feeding takes place with the help of microchip PIC18F4520 microcontroller. A stepper motor controls speed and position. DC motor dispenses the food [3]. A buzzer is used to alert the pet that the food is dispensing by resonating a beeping sound. The food dispenser is

called Turn-Table which encloses 4 divisions and is capable of dispensing distinct foods. User can input a desirable schedule for each division using the LCD[3].

Smart Pet Care System comprises of an automatic feeder, an automatic pooping pad, a camera with Raspberry Pi and an application for smartphone [3]. Automatic feeder is designed with the aid of Arduino MCU [3]. Automated feeder includes 3 layers to apportion and disperse the food. It employs Arduino to manage the feeding mechanism and a weight sensor to quantify serving size. Automatic pooping pad is used to detect pet's defecation with the help of temperature sensor, humidity sensor and ultrasonic sensor. A Raspberry Pi camera is implemented in the system to monitor the movements of the pet. The Raspberry Pi additionally functions as server. In the application, user can pick the serving size and schedule for 3 feed rates [4].

From above two cases produced, the author aspires to make a feeder which is associated with a framework that finishes those two feeders. Programmed Pet Feeder just has 4 distributors which implies it can just serve 4 times and it expects the end user to fix the schedules at the device. Smart Pet Care System can be set up with a smartphone however the end user can't look at the record of the feeding process. A camera is fitted in the application but the user has to watch it to discover their pet's activities.

Voice activated Pet Feeder is directed to take care of small to medium sized pets. This pet feeder utilizes cloud and IFTTT's service whenever the owner commands the Google Assistant on the phone to do so. The application is designed to feed the pet at a click of finger tips. User can feed the pet whenever he/she wants without any specific time schedule using natural voice to interact with Google Assistant. This application is more convenient considering that it can be designed without the need for app development and it is built in English language.

### 3. Methodology

The following components are used to build the system-

Hardware requirements:

- Arduino uno r3
- Wifi module
- Servomotor

Software requirements:

- Cloud
- Arduino IDE
- IFTTT

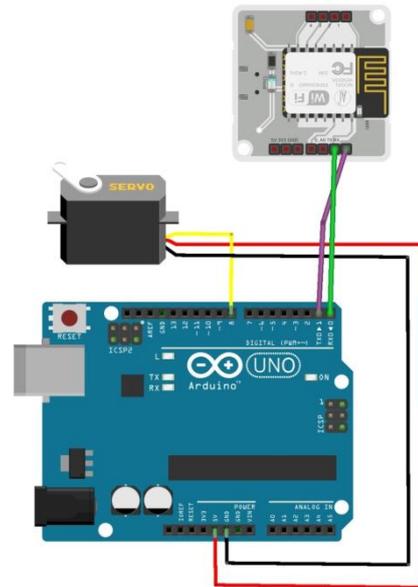


Figure 1: Circuit diagram of the proposed system

We are constructing a cloud based pet feeding automation that can automatically serve the pet whenever the owner intends to. The feeder has a base structure to which the servo motor is attached to, a rotating structure is used to transport the food, a funnel-shaped container is used for food storage, a trap door to open and close and a food bowl to collect the dispensed food.

The feeder is connected to internet using a Wi-fi module called ESP8266-01 which is a low-cost Wi-fi board. The microcontroller will interact with the module either through software serial or hardware serial commands. Arduino UNO R3 which is a microcontroller board based on ATmega328P is used. A servo which is simple, small, weighing about 20g is used to rotate the base structure and to know the speed and position of the rotating structure.

Arduino IDE(Integrated Development Environment) which is basically a software which enables better assisted code editing, compiling and debugging is used to code for each components. It runs on Java platform. The components are assembled and integrated with the programs.

The URL used to stimulate the pet feeder is a Serial Write command which has to be sent to Cloud. IFTTT(If This Then That) is a freeware web based service which creates chains of sample conditioned statements called applets. An applet is created in IFTTT to establish link to Android phone. By using the applet(+this) we can access Google Assistant service to trigger an event which will be carried out by recognising the registered phrase. When this trigger is activated, a message is sent to Cloud. For example, if we set trigger as "Feed my pet", Google Assistant would respond saying "Feeding your pet". In applet(+that), we use webhook service to transfer real time information from applet to pet feeder. In this system,

the webhook will typically post data as “Application/JSON”. The URL is used as API call for the device.

The arduino will listen to the phrase spoken in natural voice by the user and on successful command match with the phrase registered in the trigger ,the trap door will open and close ,pushing the food for the pet.

#### Advantages

- Versatile in nature
- Easily controllable
- Highly Precise
- Programmed via digital O/P
- Doesn't require control loop computations

#### Disadvantages

- High usage of power
- Very expensive compared to other motors

### 4. Implementation

In our paper, we have used these steps to implement the proposed system-

#### Step 1: Creation of URL to trigger the pet feeder

- The URL that is used to trigger the pet-feeder will be a Serial Write command that needs to be sent to Cloud.
- The Arduino will listen to the command said by the user and on a successful command match with the phrase entered in trigger, it will open and close the door in the pet-feeder, thus feeding the pet.
- The sample URL will be something like:  
`https://cloud.cloudname.com/remote/<YOUR_API_KEY>/serialWrite?data=a&deviceName=<YOUR_DEVICE_NAME>`
- Replace the API key and the device name with your own.
- Save this URL for later use.

#### Step 2: Linking Android phone to IFTTT

- Sign in to IFTTT using the same Google Email ID as the one used in your Android phone. Example: xyz@gmail.com
- After signing into IFTTT, to create an applet , click on “New Applet” from the drop down menu.



Figure 2: “New Applet” option displayed in IFTTT.

- Click on +this. It will display a list of services on which your trigger will be based on.
- Select Google Assistant service from the above list of services.

- Now a set of options will be shown. Since we want to speak to Google Assistant to trigger an action, choose the option which says - "Say a simple phrase" [1].

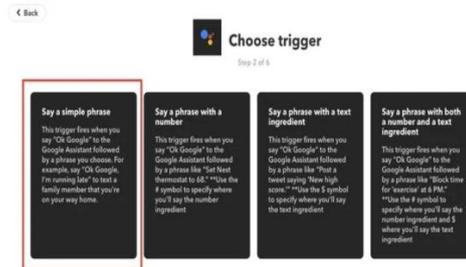


Figure 3: Options displayed for selecting a trigger for Google Assistant

- Now type a trigger. Google Assistant should recognize this trigger and send a message to Cloud. For example, we have set the trigger as "Feed my pet." in response to which Google Assistant would say "Feeding your pet" [1].



Figure 4

The fields mentioned in figure 4 have to be filled to create a trigger.

- After creation of the trigger, to instruct IFTTT about what is to be done when the trigger is activated, click +that. This will let you choose a service to execute when the trigger is activated.
- Click “Webhook” service and choose the option “Make a Web Request”. So IFTTT will send a webhook whenever the trigger is activated.
- In the next screen, enter the URL as the API call for your device. Keep method as “GET” and content type as "Application/json".
- The URL should be same as that used in the above step.
- When completed, it should look something like the picture below [1].



Figure 5: snapshot of completed applet.

### STEP 3: Pet feeder in action

- Say "Okay Google. Feed my pet." on the Android phone.
- The Google assistant should recognize the command and respond with "Feeding your pet."
- The Pet-Feeder should open and close the trap-door which dispenses food for the pet [1].

### 5. Conclusion

Voice activated pet feeding automation was carried out to store the activities and stimulate quick response from pet feeding system just by a simple command through Google's voice assistant which is commonly used by people of information era. The report showcased basic system implementation. Our proposed feeding system is convenient, cost effective, the user has to follow least number of procedures to setup. It is also takes up less space and size of the food dispenser can be customized by the owner.

For future development, this proposed system can be improved by adding some more features like sensors to detect events and changes in the environment, cameras that will permit the owner to observe their pet at home though they are mostly stationary and some more new features can be introduced in the system.

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