NuriPet: A Smart Pet Feeding Machine for SNS

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***Abstract*—We are proposing a new way for pets to post on social media networks, where pets post by pressing a pedal. For pets to post, we create a pet feeder with a camera, pedal, and internet connection. To control the machine remotely, we also developed an Android application to read and write stories on Facebook and open the trays for pet food. We interviewed three veterinarians and discussed the usability and utilization of the machine. The machine will make our lives more convenient and make sharing and reminiscing easier.**

I. Introduction

As time goes by, pet owners are increasing. According to APPA report, the total number of dogs and cats owner is 163.6 millions in 2015[1]. Besides, the majority of people who bring up pets typically have communities for sharing their pet's daily routine. Especially, they typically use on-line blog or social network service to share their stories and photos.

Recently, a dog story became a hot issue [2, 3]. It was heartbreaking pictures and story of Chubby before having him put down. Many people visited her blog and social network service to convey condolences. Like the Chubby story, stories about pets should be shared and spread among people who love pets. Unfortunately, people are too busy to share stories of their pets. Furthermore, pet owners would like to know how their pets are doing when they are not at home.

Therefore, we have developed a machine and an application for communication between pet owners, including their pets, through social network service.

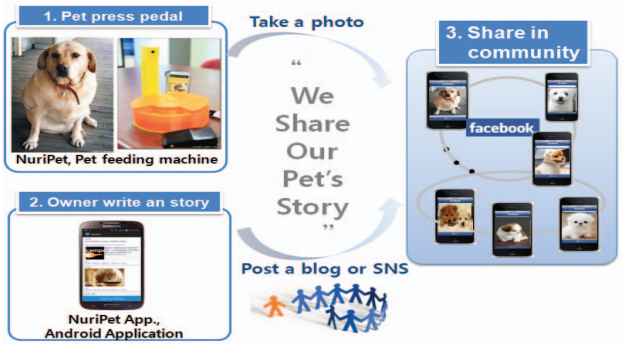

Fig. 1. Key concept diagram

Figure 1 shows the main concept of the NuriPet machine and application. Basically, Pet owners take photos and write stories. However, we added a new way to take photos. When a pet presses the pedal of the NuriPet machine, the camera of NuriPet takes a photo and sends to social network service. A pet owner checks the posting and updates a story.

To solve the problem of the new way for the posting, we made an automatic pet feeding machine with a camera, pedal and connected Internet service. Pet owners remotely control the feeding function through the NuriPet app., an Android application. Pets also control the feeding function when they press the pedal. And then the NuriPet machine opens the pet food tray. After that, the NuriPet machine takes a photo and posts it to Facebook. The pet owner updates it and shares it with their friends.

II. Smart Pet Feeding Machine

The NuriPet machine is based on the Raspberry Pi to control a camera, servomotor, pedal, and internet connection. We designed the pet feeder with SketchUp[4] to print out with 3D printer. We shared the design file with pet owners and engineers on our blog [5]. They can easily print out with their 3D printer.

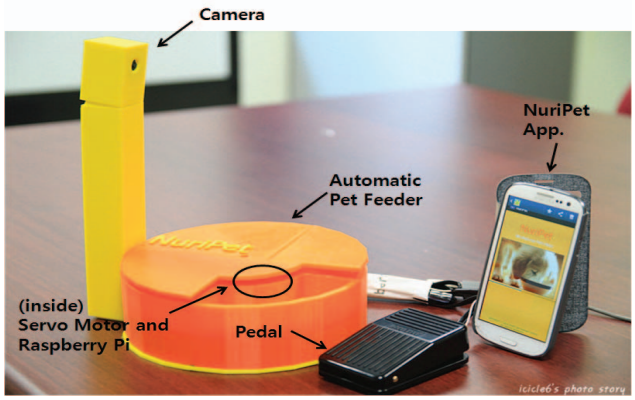

Fig. 2. NuriPet machine and application

To operate the machine, we installed Raspberry Pi inside NuriPet machine. Figure 2 shows the components of the NuriPet machine. The Raspberry Pi controls a servomotor, pedal, camera, and Internet connection. Typically, a servomotor can turn 180 degree. However, we need continuous turning. So, we used 360 degree turn servomotor to open four trays. The pedal sends a signal to the control board immediately. But, the control board only processes one signal. The other signals omit for a few minutes to prevent overuse. The control board manages the camera to take

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photos. Basically, we can control it whenever and wherever. Nonetheless, we made the two scenarios for users. Pet owner controls from NuriPet app. or pet controls from the pedal. Lastly, the control board is connected via internet to Facebook for uploading photos, which get taken by the camera.

To register a post on Facebook, we installed a simple JSP web server to get data from the board. The server submits the image taken by the NuriPet camera using the HtmlUnit[6] which is a GUI-less browser for java programs.

III. Smartphone Application

The NuriPet application is based on Android mobile platform. Figure 3 shows the user interface of NuriPet application. The application has three major features. One feature is that it is login function to Facebook account. The login function is required only first use. Another feature is the checking photos and messages. These features are exactly same as Facebook mobile website so, pet owners can read and write stories with pet photos. The messages and photos will be shared with their friends. Last feature is the control of the NuriPet machine to feed pet's food. It works when the Feed button pressed.

The application sends a message to open a tray to the board via internet. And then, the board controls the servomotor and takes a shot. After a few minute, pet owner and their friends can check the new photo on NuriPet Application and Facebook.

Fig. 3. User Interface of NuriPet Application for Android

IV. Experts Interview & Discussion

We interviewed three veterinarians. They gave us a lot of advice about the NuriPet, a smart pet feeding machine. First, they prefer to see videos instead photos. The videos can be used various purposes such as security camera. Second, it is difficult to make communities with a niche market product. To make a community, the related products and technologies should be popular. Third, the feeder should be connected the other pet toys. For instance, to stop feeling lonely, pets need a few toys when they stay alone at home. If the toys are connected with the feeder, pet owners can be relieved and check their pet's status. Last, the NuriPet machine structure is too weak. They requested a sturdy structure because pets usually bite and try to open the trays.

We discussed the utilization of the machine. Mainly, it will be used as an automatic feeding machine to feed pets. However, it can also make pet diaries which include their lovely photos on SNS. It makes sharing and reminiscing easier. Commercially, photo studios can promote hard copy photo books using the shared photo diaries. Feed manufacturers can promote their products to NuriPet users through the NuriPet application.

V. Conclusion & Future Work

In this paper, we introduced a smart pet feeding machine enabling pets and pet owners to post photos to share a pet's daily routine on Facebook. Pets can send a photo through the pedal pressing of the NuriPet machine. In addition, the machine feeds pets automatically when pet owners remotely control it through the NuriPet application. To implement the machine, we designed a pet feeder and printed it out using a 3D printer. Then we added a Raspberry Pi, camera, pedal, and servomotor to the pet feeder. Through the feeding machine, pets can open a tray for foods and take a shot to send to social network service. We also developed an Android application to control the machine remotely. Using the application, pet owners can control the machine whenever and wherever. Also, pet owners can check their pet's photos and write stories for sharing their friends.

In the future, we will add several features to the machine and the application. One feature is the ability to send voice messages. On the NuriPet application, pet owners will transmit their voice via the Internet. The machine plays the voice. In addition, we will add a proximity sensor on the machine to take photos. When pets come close to the machine, it will take a shot. Other features are live video calls and video recording. Videos are much more convenient than photos for checking up on pets. Pet owners can record video calls and edit them to make video clips through the NuriPet application. Lastly, we will redesign the shape of the machine. We need a strong structure, enough to endure pet attacks when they desire their food.

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