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To cite this article: Soumallya Koley *et al* 2021 *J. Phys.: Conf. Ser.* **1797** 012018

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Smart Pet Feeder

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Abstract: At present automated technology is a trend and is easy to access, user friendly and easy to monitor. Having pet can be an enjoyment in our life. In this paper a prototype has been proposed to solve the problem of providing food and water for all types of pet when owner is residing away from home such as lockdown situation. By the application of this prototype, the owner can supply food and water to the pet at their preferred scheduled time. The system proposed is controlled through an ATMEGA32 Microcontroller. A conical structure created using ply board (collected from waste material) for reserving the pet's food. A servomotor has been interfaced to control the outflow of the food through a PVC pipe connected to the bowl. The bowl is placed on a load cell to inspect the weight of food. The owner can assign the timing and quantity of food through a keyboard to supply food depending on the instantaneous weight of the food in the bowl. By using float sensor water level in the container has been monitored and refilled.

Keywords: Microcontroller, Load Cell, Servo Motor, IOT, Float Sensor

1. Introduction

In the present generation, almost all people want to keep a pet in their home as they believe that a pet in house can decrease daily stress, boredom and loneliness from daily life. But in a developing nation citizen has a very high-level activity that causes negligence to take care of pet regarding food and water supply in equal interval of time. They are engaged to various activities and get little time to monitor pet at house. To supply food to pet with adjustable quantity at predefined time has been an essential task in present scenario.

Automated pet feeder can replace manual pet feeding method into a modern one. There are some pet feeders [1-3] proposed with connectivity to the internet and hence monitoring is possible from remote location. The author proposed some additional features that can be added to convert the pet feeder into Smart Pet Feeder keeping the cost of realization within acceptable range for the consumer so that the demand of automated pet feeding systems may be made high. Smart Pet Care System [4] and Programmable Pet Feeder [5, 7] are two of those researches that have been found about automatic pet feeder. From a survey by veterinary doctor it is revealed that 56% of dogs and 60% of cats are suffering from obesity [6]. Lack of exercise and overeating are the main reasons for the pet obesity. Sometimes pet owner pours excessive amount of food to the bowl in frequent interval of time may affix pet's health. Hence controlled amount of food supply is essential for pet health.

Attention paid to our proposed prototype to maintain some unique features such as the budget for realization, efficiency, compactness, assigning time and quantity of food release.

To prevent the feeding problem, we introduce the Smart Pet Feeder a prototype that has been proposed for the same shall have high demand in the market for taking care of pet in the house. The proposed prototype has been designed to supply food to pet through preprogramed instruction assigned by the owner.

2. Circuit Design

The proposed prototype planned to design from scrap materials available in the college campus. A flow chart prepared with a vision that the user has to give the power supply to the Smart Pet Feeder followed by assignment of time interval and quantity of the food according to owner's choice. When the internal clock time will match to the user assigned time the servo motor will rotate and open the face of the PVC pipe and it will allow to supply the food through the connected pipe. If the time is not matched, the servo motor will remain static and wait for the user defined time. After that it will check if the weight of the supplying food touches the user assigned quantity. If it reaches the threshold value then the servo motor will rotate and close the open face of the PVC pipe to stop food supply. Otherwise the servo



motor remains at same condition to supply food. In this way the full process will be going on. A relevant flow chart (Fig. 1) shows these steps.

3. Circuit Diagram –

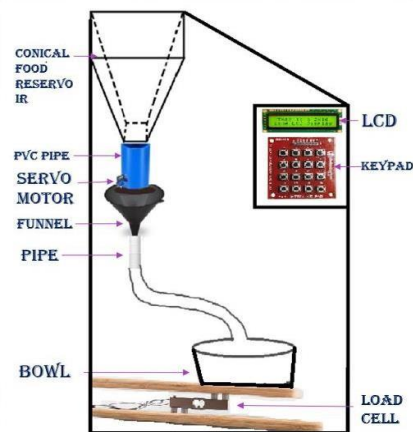


Figure 2: Schematic diagram of auto pet feeder

Conical structure created by using ply board to reserve the pet food (Fig. 2). A small PVC pipe is connected with the end part of the conical food reservoir. A servo motor is

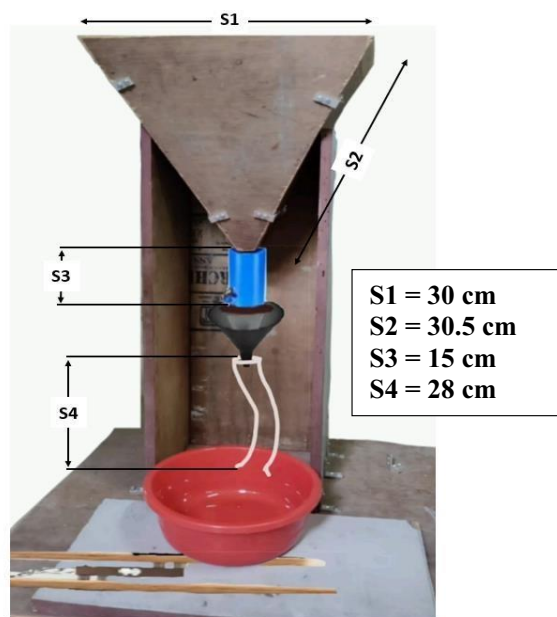


Figure 3: Smart Pet Feeder diagram with dimension

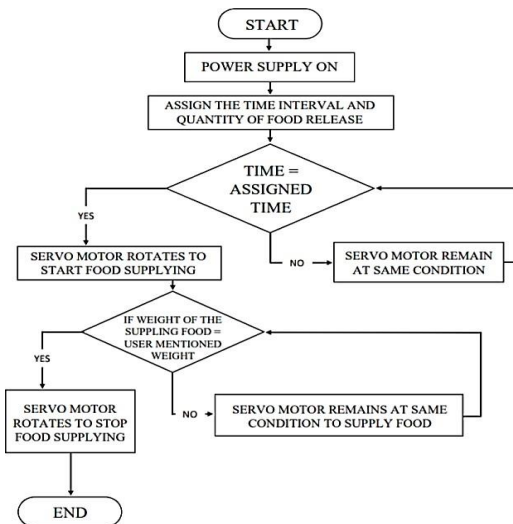


Figure 1: Flow Chart of smart pet feeder

installed on the pipe and a round disk is connected with the servo motor, this servo motor is used to control the flow of the food. There is a funnel under the PVC pipe. A 28cm connecting pipe is attached with the end part of the funnel. At the predefined time the motor will rotate, and the pet food will go to the plastic bowl through the funnel and the pipe. The bowl is just above the load cell. The load cell will help to measure the food on the bowl. A LCD display interfaced to display the time, weight and gap of the time, set by user. (Fig. 3) Keyboard will be used to set the quantity of food and time gap of supplying food. ATMEGA32 microcontroller plays the brain of the overall circuit operation. Before realization Atmel studio used for program simulation for effective output to be produced. There after binary code was loaded into the AVR development board for effective interfacing of the microcontroller with all other peripherals. The dimensions mentioned in the designed prototype (Fig. 3) proves the compactness of the same. Overall height of the designed prototype is less than three and half feet. All the connecting elements are the assembled items from the scrap yard of the institution.

4. Results and Discussion

Fig. 4 shows that the testing carried out on designed prototype. Initially owner can assign the number of time, amount of food can be supplied to the pet. Once the inputs provided from the key board the timer starts. There after timing value reaches the assigned value and the fixed quantity of food released for the pet. If the food is not consumed further release of food shall be restricted. Measurement of circuit voltages carried out for its safe working status.

The key benefits observed from the realization of the prototype is that

- I. The pets will get their food time in time without any delay,

- II. If the pet owner is not present then the owner doesn't have to worry about the food intake of his/her pet.
- III. Due to this device, no one has to come from outside to provide food to the pet. So, this will be also be a safety of house.
- IV. It's very easy to operate, no complexities involved in the process.
- V. Very low battery power required to operate this system.

Precautions to be maintained for uninterrupted power supply, to store sufficient amount of food before leaving the pet, proposed system required to be fixed with wall to avoid any damage from the pet side.

5. Conclusion:



Figure 4: Prototype working status

Auto pet feeder is the solution for those who love to keep pet in house but because of busy schedule they may not be able to provide food to their beloved pets at fixed time. This prototype can be used to release food by inputting the chosen time and weight. The time and weight both are adjustable and can be given many at once. When the time and weight are selected through keyboard, the stored food will automatically come through the pipe at that assigned time and will be collected in the bowl.

The load cell under the bowl will operate the preferred amount of the food. This project is completely made with wastage material, so it's also eco-friendly and handy. Thus, the proposed prototype is expected to have immense opportunity to serve the said purpose in present society, because in this pandemic situation lockdown is happening at any time, so many people can be stuck outside and not be able to come back home so that they can treat their pets and since we are putting attention to build this project at reduced cost, so that the affordability of the consumer shall be very high in the market.

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