



International Teaching Aid  
**Competition 2023**

Reconnoitering Innovative Ideas in Postnormal Times

**iTAC**

**2023**

**iTAC 2023**  
**INTERNATIONAL TEACHING AID COMPETITION**  
**E-PROCEEDINGS**

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## **PREFACE**

iTAC or International Teaching Aid Competition 2023 was a venue for academicians, researchers, industries, junior and young inventors to showcase their innovative ideas not only in the teaching and learning sphere but also in other numerous disciplines of study. This competition was organised by the Special Interest Group, Public Interest Centre of Excellence (SIG PICE) UiTM Kedah Branch, Malaysia. Its main aim was to promote the production of innovative ideas among academicians, students and also the public at large.

In accordance with the theme "Reconnoitering Innovative Ideas in Post-normal Times", the development of novel ideas from the perspectives of interdisciplinary innovations is more compelling today, especially in the post-covid 19 times. Post-pandemic initiatives are the most relevant in the current world to adapt to new ways of doing things and all these surely require networking and collaboration. Rising to the occasion, iTAC 2023 has managed to attract more than 267 participations for all categories. The staggering number of submissions has proven the relevance of this competition to the academic world and beyond in urging the culture of innovating ideas.

iTAC 2023 committee would like to thank all creative participants for showcasing their innovative ideas with us. As expected in any competition, there will be those who win and those who lose. Congratulations to all the award recipients (Diamond, Gold, Silver and Bronze) for their winning entries. Those who did not make the cut this year can always improve and join us again later.

It is hoped that iTAC 2023 has been a worthy platform for all participating innovators who have shown ingenious efforts in their products and ideas. This compilation of extended abstracts published as iTAC 2023 E-Proceedings contains insights into what current researchers, both experienced and novice, find important and relevant in the post-normal times.

Best regards,

**iTAC 2023 Committee**  
**Special Interest Group, Public Interest Centre of Excellence (SIG PICE)**  
**UiTM Kedah Branch**  
**Malaysia**

## THE DEVELOPMENT OF AUTOMATIC FISH FEEDER

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### ABSTRACT

An automatic fish feeder is an electronic device that will automatically feed the fish at a predetermined time especially when the owners are not nearby. Nowadays, many people start keeping fish as their pet either as a hobby or as therapy. However, fish owners who are very busy or away for a long time will have trouble in giving enough food for their fish. Therefore, this device will help fish lovers to feed their fish every day. In this work, the automatic fish feeder uses Arduino's microcontroller to set the programmed and servo motor to control the movement of the Archimedes screw attached, so that it will store and pour the fish food according to the programmed set. This automatic fish feeder container has been designed using Solid Work software and has been fabricated using 3D printing. The container comes with 5 parts which are the body, top cover, Arduino microcontroller's cover, Archimedes screw and the servo motor stand. This automatic fish feeder will start functioning immediately after the power source is connected. As for the result, the automatic fish feeder drops a certain amount of fish food from its storage into the aquarium. The amount of fish food can be set according to the size of the tank. For this project, the amount of fish food drops from the automatic fish feeder is an appropriate amount for

an aquarium of 2 feet in size and has been set to function three times a day which is every eight hours. However, if it is attached to a bigger tank, it can be set up longer so that more food will drop into the fish tank. Therefore, people can still ensure their fish foods are adequate even though they are too busy to manage it by themselves.

**Keywords:** automatic fish feeder, Arduino microcontroller

## INTRODUCTION

After the pandemic Covid-19, the number of people that keep fish as their pet were increasing drastically. This phenomenon can be proof by the increasing price of the ornamental fish all around the world. Many people want to keep fish as their pet or a therapy after a tiring day. Therefore, this automatic fish feeder is the best method to ensure that they will not missed to feed their fish.

The significance of this project are the automatic fish feeder are set to be functioning three times in every 24 hours. This feeder will start functioning as soon as it is connected to a power source and will repeat its function for every 8 hours. The project will be helpful and easy to use. The automatic fish feeder can hold the fish food up to 200g. Therefore, the owner will only have to restore the fish food once in a week. With this automatic fish feeder, the fish will never leave to starve and the fish health and growth will always be in a good condition with minimal care. This work are focusing on feeding the fish in an aquarium. However, if it is attached to a bigger tank, it can be set up longer so that more food will drop into the fish tank. Therefore, people can still ensure their fish foods are adequate even though they are too busy to manage it by themselves.

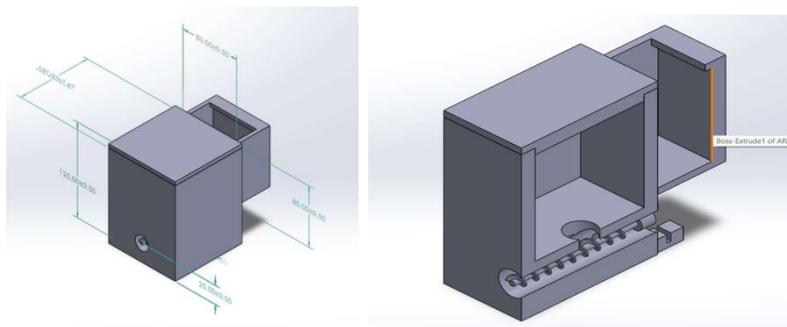
Automatic fish feeder no longer unfamiliar to people who likes to keep fish as their pet. The various concept of automatic fish feeder has given people nowadays many options to choose according to their needs or taste. David C. Smeltzer was the first person who create an automatic fish feeder on 4th April 1985. His first design was able to dispense various sizes of fish food over a wide range of dispensing volume with high degree accuracy. His creation can be adjustable to suit the weight which the amount of water needed are changeable to produce a dispensing action and at the same time adjust the vibration movement made by the fish feeder to differentiate the food amount given out. (M. N. Uddin et al., 2016)

However, as stated by Mohapatra, Sarkar, Sharma and Majhi (2009) and Noor, Hussian, Saaid, Ali and Zolkapli (2012), for most automatic fish feeder, it is not easy to control the amount of the fish food released. Too much fish food will pollute the water in the pond or the tank. Therefore, in this work, the automatic fish feeder uses Arduino's microcontroller to set the

programmed and servo motor to control the movement of the Archimedes screw attached, so that it will store and pour the fish food according to the programmed set.

## METHODOLOGY

### Design of the Automatic Fish Feeder

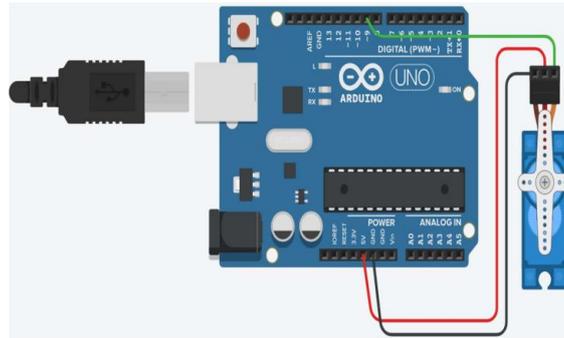


**Figure 1.** Design with dimensions and section view for automatic fish feeder

The automatic fish feeder design has been created by using Solid Work software as shown in Figure 1. The design are made simple for a stronger body structure and to cut cost. The automatic fish feeder come with 5 parts which are the body, top cover, Arduino microcontroller's cover, Archimedes screw and the servo motor stand. The size of the automatic fish feeder is (12cm x 10cm x 10cm). This project can store up to 200g of fish food which can be used for more than a week without any maintenance.

### Component Connection of the Automatic Fish Feeder

The automatic fish feeder will be controlled by Arduino UNO microcontroller. Figure 2 shows the connection of servo motor to the microcontroller's board. First, the servo motor will be attached to pin 9 on the Arduino microcontroller board so the coding can be functioning to control the servo motor through the Arduino microcontroller. Then, the servo motor has to be attached to a 5v pin and ground pin to connect the servo motor to Arduino microcontroller's circuit and for electrical connection.



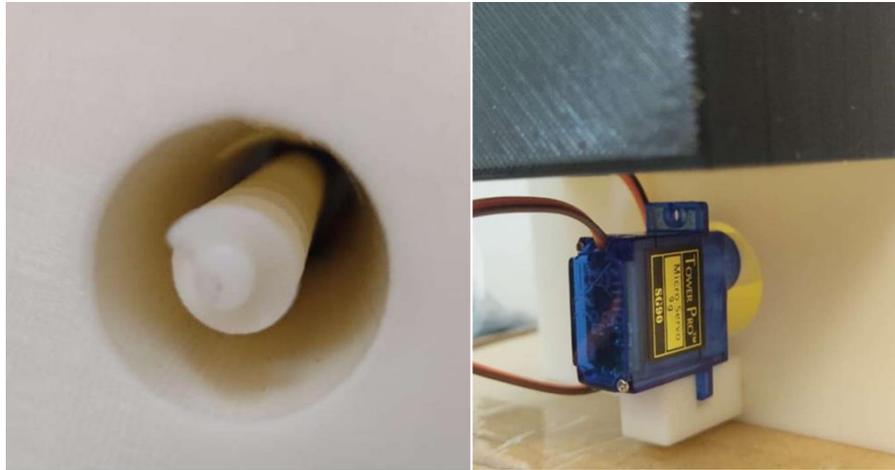
**Figure 2.** Schematic Diagram for Arduino microcontroller connection to other components

## RESULTS AND DISCUSSION

The final look of this automatic fish feeder are shown in Figure 3 and Figure 4. The body of the automatic fish feeder was built by using 3D printing machines with polylactic acid as the main ingredient for the infill material. Polylactic acid is a thermoplastic monomer derived from renewable organic source such as corn starch or sugar cane.



**Figure 3.** Top view of automatic fish feeder



**Figure 4.** Close up picture for Archimedes screw and servo motor SG90

This automatic fish feeder actually has been set to be functioning every 8 hours, but it is purposely been set to function for every 1 minutes for the performance test. This automatic fish feeder will start functioning immediately after the power source is connected. The automatic fish feeder's time can be easily set by reconnect the power source.

As for the result, the automatic fish feeder on average drops a certain amount of fish food from its storage into the fish tank as shown in the Figure 5. The amount of fish food drops from the automatic fish feeder is actually an appropriate amount of fish food for an aquarium with 2 feet size. However, if the amount of fish food is not enough for the fishes in the fink tank used, the time function setting can be set up longer than the existing time set.



**Figure 5.** The amount of fish food dropped after the automatic fish feeder start functioning

## CONCLUSION

The focus of this project was to develop an automatic fish feeder to keep the feeding time of pet fish and to test the performance of the automatic fish feeder. The development of the automatic fish feeder is working every 8 hours per day which means 3 times a day. The automatic fish feeder started functioning right after the power source connected to it. So, this project does not need a timer to adjust the time of work and it can easily set by turning off and on the automatic fish feeder. While functioning, the Archimedes screw that connected to the servo motor rotating clockwise and drops the fish foods into the tank. This automatic fish feeder also does not have any button to work manually since the objective of this project is to build and develop an automatic fish feeder. At last, this automatic fish feeder does not use battery for power supply to cut cost and to reduce environmental pollution with battery waste.

## ACKNOWLEDGEMENTS

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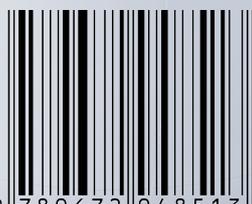


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