TEAM BINARY
FISH TANK MONITORING SYSTEM

25.02.2022

Figure 1 : https://archive.manylabs.org/file/project/fishTank/fish-tank-wide-1-1200.jpg

Sareefu Mohamed Sarraj – 190569J
M.A. Shanaaz Ahamed – 190023G

Contents

OVERVIEW

1. Project Background and Description

Fish and other aquatic animals need a balanced pH for survival of them. This pH value can make fish sick and even kill them. Therefore, we are proposing a system for fish tanks which monitors the value of pH using the pH sensor and alert the specific person using notification. There after we can add baking soda to raise the pH and add peat moss to lower the pH value. We also do check the turbidity of water using the camera and image processing. In addition to that we propose an automated feeding system at regular intervals.

2. Project Scope

This project will focus on developing a pH meter using an analog pH meter, conversion module and Arduino for pH monitoring. For turbidity monitoring, we use camera module and cover software parts.

This project will include,

1. pH monitoring system using Analog pH sensor, BNC connector which is connected to the raspberry pi 3 B+ and display the real time output to the LCD showing current pH value and the range of the suitable pH value. When the pH value changes out of the range the display will output a message saying that the pH out of range. We use a SIM800L module to communicate with mobile and send a message to the mobile of the person who owns the fish tank when the pH changes out of the range.
2. Turbidity checking system which uses a omni vision 5647 5MP camera module, image processing to check the turbidity and notify when to change the water using LCD, GSM modules to the owner of the fish tank.
3. Automatic feeding system which feed the fish at regular intervals using the servo motor, small container, ultrasonic sensor. The ultrasonic sensor is used to check the amount feed that is available and use the same notification system to communicate with the owner when the feed is low. Servo motor will operate at regular intervals using the time of raspberry pi which is connected to the internet as raspberry pi 3 B+ already have an in-built WIFI.

3. Implementation Plan

For building pH meter, we need,

- 1 x pH probe with cable and BNC connector. SKU_SEN0161 (15$ including shipping fee) (4500/= in tronic.lk)
- Raspberry PI - 3 B+ (11700/=) (microchip.lk)
- Power adapter 13W (2600/=) (microchip.lk)

For image processing we can use,

- 1 x Camera Module v1.3 5MP 1080p 720p for Raspberry Pi 3 and 2 – 1000/=
- (5MP Omni Vision 5647 Camera Module)

LCD display for,

- displaying pH value and important messages. (LCD1602 – 550/=)

for automatic feeding,

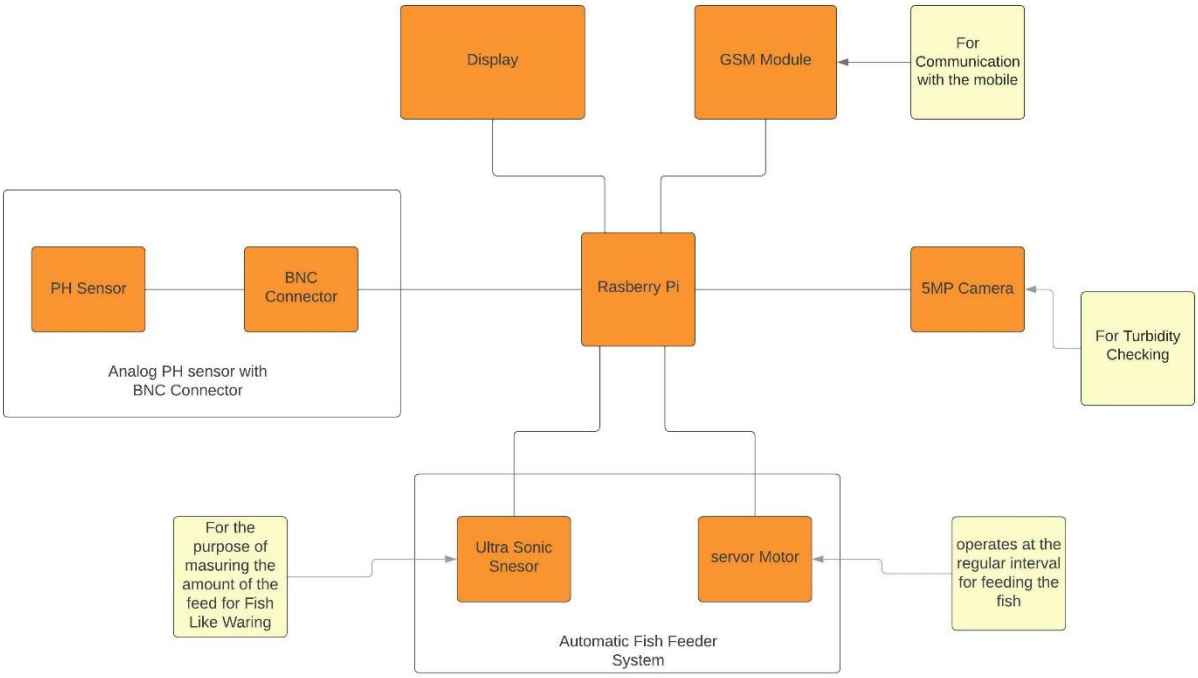
- Servo Motor (SG90 Servo - 9 GSM Mini/Micro Servo Motor - 410rs(tronic.lk))
- HY-SRF05 5-pin ultrasonic distance measuring sensor module (300/=)

GSM module – SIM800L module (1750/=) (microchip.lk)

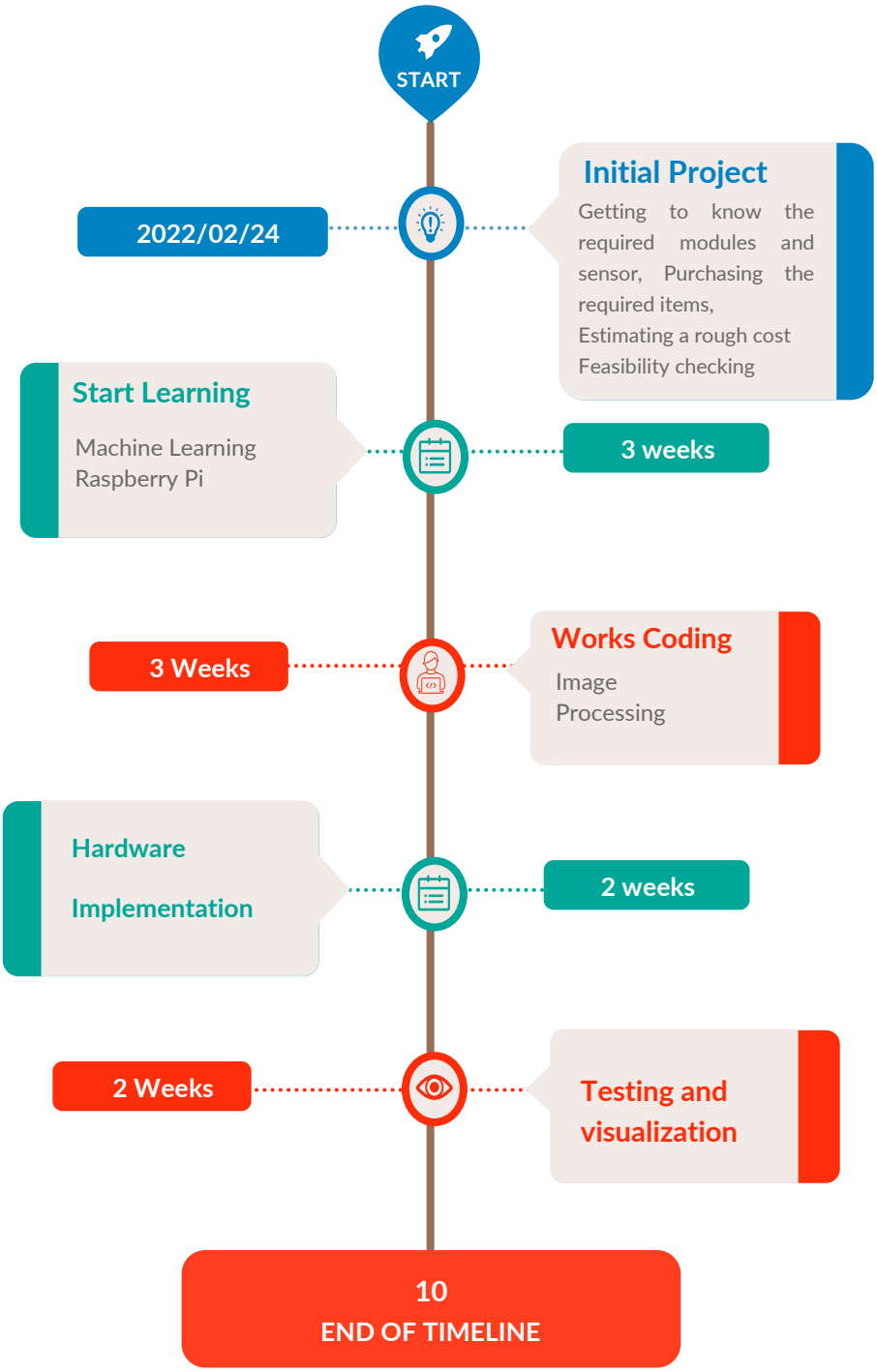
4. Budget Summary

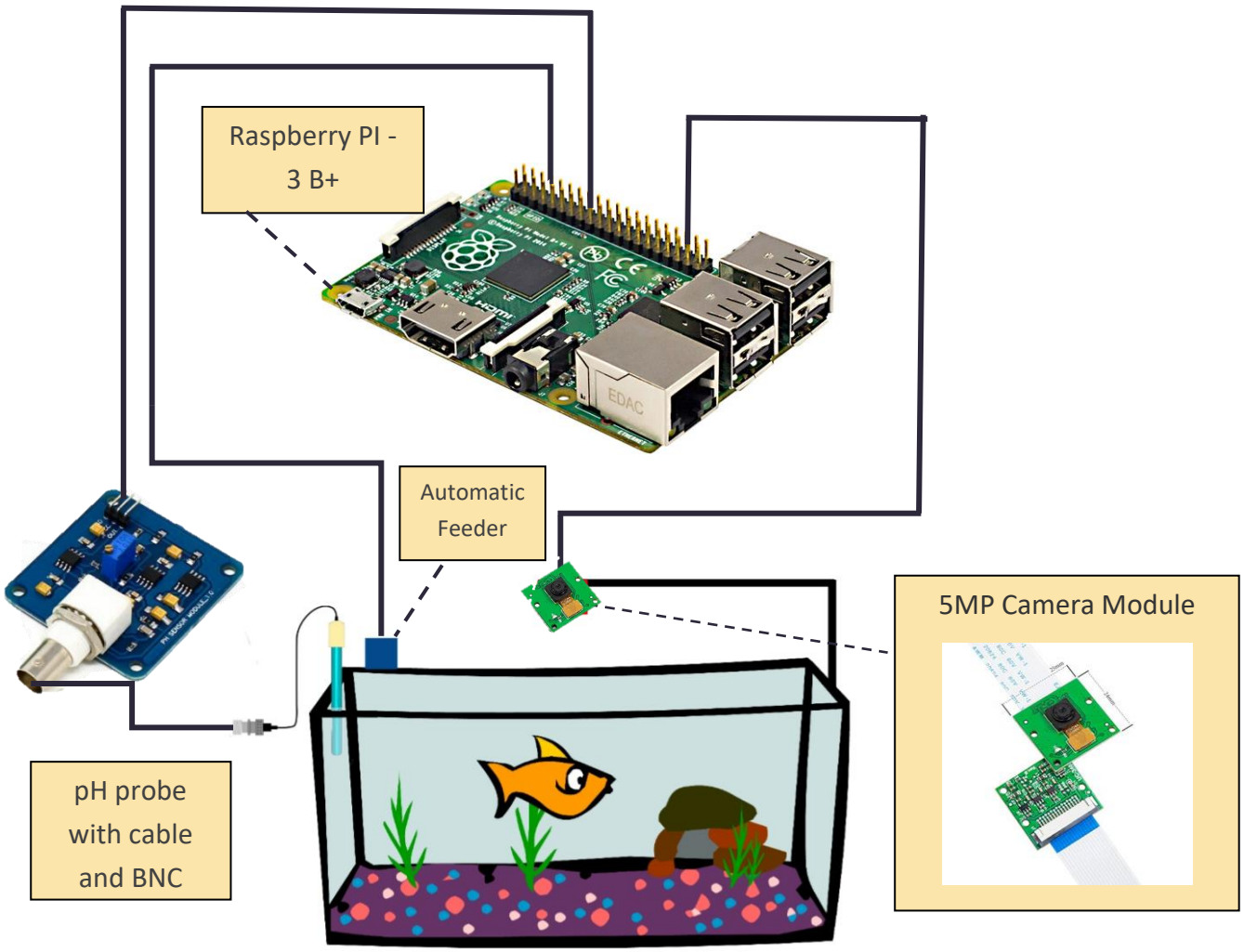
Module	Quantity		Price	Shop
pH probe with cable and BNC connector	1		Rs.4500	tronic.lk
Raspberry PI - 3 B+	1		Rs.11700	microchip.lk
Power adapter 13W for Raspberry PI - 3	1		Rs.2600	microchip.lk
5MP Omnivision 5647 Camera Module	1		Rs.1000	tronic.lk
LCD display - LCD1602	1		Rs.550	tronic.lk
SG90 Servo Motor	1		Rs.410	tronic.lk
HY-SRF05 5-pin ultrasonic	1		Rs.300	tronic.lk
GSM module	1		Rs.1750	microchip.lk
Total Price			**Rs.22810**	

5. Block Diagram



6. High-Level Timeline/Schedule





7. Conclusion

This Project will be a good solution for everyone who loves fishes and have a fish tank. They don't need any technical knowledge about the fish tank monitoring system but, only they have to plant the system and initialize it. In the busy schedule they can take care of this fish tank easily.