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# FISHMO

## SEMI-AUTOMATED AQUARIUM MONITORING SYSTEM

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SOFTWARE USER GUIDE  
REVISION 2

APRIL 9, 2015

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Computer Science 4ZP6 Capstone Project  
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Fall/Winter 2014-2015

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# 1 Introduction

Hello and thank you for purchasing your FISHMO unit! Contained in this manual is everything you need to get started with your new aquatic automation system, from installation, adding your first fish, and day-to-day maintenance. This manual assumes you do not have fish in your physical fish tank to ensure optimal compatibility with each fish in your tank.

## 1.1 Purpose

The purpose of this document is to present a detailed description and all required functionality of FISHMO, the Semi-Automated Aquarium Monitoring System. This document will explain the intended setup process, how to use your product, and optimal uses in order to get the most out of FISHMO SAAMS.

## 1.2 Scope

The FISHMO automated system is a monitoring system that will monitor a fish tank (small or large), or an aquarium. It will monitor the water temperature, and water flow. It will also provide a proper lighting and feeding schedule, and a micro-camera to provide real time video monitoring of your fish tank wirelessly. This system will be run on a Raspberry Pi which will connect to a web application, through a network card attached to the Pi, which will have full control on the FISHMO system. The web application will provide an easy to use GUI interface that will allow for customization and altering of the settings for the specific unit attached to the fish tank. The FISHMO automated system allows the user to have a greater control over the companions care. The system will give the user relevant knowledge about the current state of the tank from anywhere in the world, and will give the user the ability to change parameters constraints of the system to offer even greater control of their companions health.

## 1.3 Definitions, Acronyms, and Abbreviations

Term	Definition/Acronym
FISHMO SAAMS	FISHMO Semi-Automated Aquarium Monitoring System
Pi	The Raspberry Pi is a credit-card sized computer that plugs into your TV and a keyboard. It is a capable little computer which can be used in electronics projects, and for many of the things that your desktop PC does, like spreadsheets, word-processing and games.
User	A person who interacts with the FISHMO system
NOOBS	NOOBS (New Out Of the Box Software) is an easy operating system install manager for the Raspberry Pi.
GUI	Graphical User Interface
Camera Board	The Camera Board is a small PCB that connects to the CSI-2 camera port on the Raspberry Pi using a short ribbon cable. It provides connectivity for a camera capable of capturing still images or video recordings.
3D Printer	A process for making a physical object from a three-dimensional digital model, typically by laying down many successive thin layers of a material.

## 1.4 Revision History

Revision #	Revision Date	Description of Change	Author
0	February 24, 2015	Initial User Guide	All members
1	March 27, 2015	Edited screenshots and descriptions	All members
2	April 9, 2015	Made changes for final documentation	All members

## 2 Safety and Precautions

Prior to operating FISHMO SAAMS for the first time, please review the IMPORTANT SAFETY INFORMATION in this document.

For your safety, and to preserve life in your aquatic system, be sure to install the device before the addition of water and population of aquatic life. Furthermore, it is pertinent to check FISHMO SAAMS for faulty wiring, any shipping/other damage, etc.

### 2.1 Hardware Safety

Physical issues that could arise due to the abuse/misuse/faulty wiring of FISHMO SAAMS are: electric shock, death of aquatic life, serious injury of human life and even the loss of human life in extreme circumstances.

If you see that any of the wires attached to the FISHMO unit are frayed or broken, do not connect to power or if connected, unplug immediately. If this occurs, contact FISHMO support for more information.

For the safety of the aquatic life, do not install the FISHMO unit with any aquatic life in the tank.

For your safety, do not move any hardware while connected to power. Be sure the devices is grounded and surge protected.

### 2.2 Virtual Safety

When using the FISHMO SAAMS interactive web page, be sure to keep your passwords and personal information private. Do not share your FISHMO Online password or with anyone. Giving your password or Personal information to another person or company places your privacy at risk.

Change your password regularly and use a different password than you use for other websites. Make it difficult for others to guess your password by using a combination of letters and numbers in your password. If you think someone knows your password, change it right away.

Never share, disclose, or provide your card number or password to another party or website other than FISHMO SAAMS. FISHMO SAAMS will never send you an email requesting this information.

#### Changing Your Password:

Never save your username or password on a publicly accessed computer.

If using a publicly accessed computer such as at an internet caf or public library, change your password after completing your session. When selecting a password, choose a password that cannot be easily guessed by anyone else.

Use:

- An alpha-numeric combination
- A password more than six characters long

Don't use:

- A password you use for any other service
- Your name or a close relative's name
- Your birth date, telephone number or address, or those of a close relative

#### Install Security Updates

Most personal computers use the Microsoft Windows and Apple MacOS operating systems. The makers of these systems regularly issue security updates to protect against new and emerging threats. You should download and install security updates regularly or configure your operating system to automatically check for new updates.

#### Clear Your Browser's Cache

If you use a public or shared computer to access FISHMO SAAMS, it is vital that you sign off when you are finished. Once you have signed off, you should enhance your security by clearing the browser's cache. The cache maintains a copy of web pages that have been viewed recently.

## Use A Firewall

When your computer is connected to the Internet, it is vulnerable to attack. Although this is a problem for all types of Internet connections, DSL and cable modem connections are more vulnerable because they offer an "always on" capability. You can help protect your computer from attack by using a personal firewall. Personal firewalls can be software, hardware, or both, and create a barrier to attacks.

Microsoft Windows and Apple MacOS X both include automatically activated firewalls. If you are not sure your system has an activated firewall go to the appropriate site below to learn more.

**Microsoft Windows XP:** Configure the Internet Connection Firewall **Apple Mac OS X:** Enable MacOS 10.4 firewall protection

## Additional Tips

Use different passwords on different sites: The tendency has become to share one or two passwords across accounts or use very simple ones. By using a different password for each site, you can lower the chance of your password being compromised. Under the condition that one password is hacked, the integrity of all the other websites are still secure and out of harms way.

Never reuse your main email's password and ensure that this is the hardest password to crack: Most websites can be recovered through entering an email and therefore have their password reset . In the case that your main email is hacked the hacker will have access to all other websites connected to that email.

## 3 Process Overview

### 3.1 Process 1: Hardware Installation

This section will aid the user in the first and crucial step in the installation process. This process will cover the in depth physically installation of the FISHMO SAAMS to the aquarium or fish tank. This the setup of the Raspberry Pi unit, PCB and peripherals.

#### 3.1.1 Step 1: The Raspberry Pi initial unit setup

1. Confirm that there is a direct connection to the FISHMO unit through a micro USB(any generic micro USB port will work). The Raspberry Pi Must be given Wifi capability, this has to be done physically through inserting a USB wifi dongle, or connecting an ethernet cable into the Raspberry Pis USB and Ethernet ports respectively.
2. Make sure all peripheral devices wanted, are connected to the FISHMO unit. This includes connecting a USB camera into the USB slot of the Raspberry Pi. These devices, with exception of the camera come connected as one unit but can be detached to accommodate for the users individual needs.
3. Position the unit itself by mounting the Raspberry Pi device onto either the side of the tank using some sort of adhesive, mounting bracket, or even placing it within distance of the aquarium. This unit must be kept out of water
4. Position the PCB which acts as the intermediary between the Raspberry Pi unit and the peripheral devices within distance of the Raspberry Pi and the fish tank. This board must be kept out of water but still be within distance in order to reach all connected devices.

#### 3.1.2 Step 2: Setting up the peripheral devices

1. Before we begin, for this section you will need a DC power supply and wire cutters. In order to set up the LED strip, first using the wire cutters to cut the strip down to an appropriate length for your fish tank or aquarium. Make sure to cut the strip from the rear end so the connection between the Raspberry Pi and the LEDs is not severed. Then remove the backing to allow the adhesive to show. Slowly, using pressing apply the strip onto the fish tank in any manner desired Feel free to experiment and take the lights underwater as they are waterproof and offer flexibility in design styles. Placing the LED strip along the rim of the fish tank, either at the top or the bottom is recommended. Once the strip is placed, apply pressure and let the adhesive set. Lastly connect the DC power supply to a wall outlet nearby, and insert the connection into the LED power supply port.

2. In order to allow for correct, accurate water flow readings, the placement of the air pump and the water flow sensor is very important. Place the air pump in the fish tank allowing the water to flow into an open space. Allow for the area directly in front of the air pump for approximately 4 to be free, this includes any underwater decorations such as rocks or plantation. Once a location is deemed fit by the users discretion, then begin to place the water flow sensor in the tank. The position of the water flow sensor is relative to the placement of the water pump. The water flow sensor should be placed within the empty space allocated in front of the air pump, within 4. This will allow for direct current to be strong enough to be measured instantaneously by the sensor. The current will then flow through the sensor and continue to rotate the water within the tank accordingly.
3. The next set of devices to be set up is the heater and temperature sensor. Place the temperature sensor into the fish tank at have it submerged any desired location. The water temperature will all move uniformly so the placement of this device is not specific to any one location or area. Next place the heater itself into the fish tank or aquarium. Grip the heater firmly from the front and align the two suction cups on the back of the heater with the glass on the inside of the tank or aquarium. Firmly press the heater against the desired location and check for a firm grip on the glass. Release the grip and you should have a in place a submerged water heater.
4. Grab ahold of the USB camera, before placement keep in mind to proceed with caution and to avoid water as any interaction between the two can lead to camera malfunction. Optimally the intended purpose of the camera was to provide the user of a live view of the aquatic life, to accomplish this the position of the camera must facing the fish tank. It is recommended that the user mount the camera onto the rim of the fish tank or on a nearby ledge or surface in which the camera legs can grip.

### 3.2 Process 2: Software Installation

Within this step, we will cover the second half of the installation process. FISHMO has a two piece installation, the first being the physical installation and the second step the virtual installation. Note: The physical installation must be complete before attempting this process. This will cover in detail how to connect to FISHMO through the FISHMO unit and through your home network.

Connecting the FISHMO unit to the FISHMO website, Windows Users proceed to step 1, Macintosh users proceed to step 2.

1. In order for Windows users to connect the FISHMO unit to the website, begin by running the setup.exe file wizard found in the Windows Setup folder found in the main directory when first plugging in the Pi. This setup.exe file will set up all of the necessary components in order for the FISHMO unit to connect to the website. Be sure to follow the prompts given by the setup program.
2. In order for Macintosh users to connect the FISHMO unit to the website, begin by opening the setup.dmg image found in the Mac Setup folder found in the main directory when first plugging in the Pi. This setup.exe file will set up all of the necessary components in order for the FISHMO unit to connect to the website. Be sure to follow the prompts given by the setup program.

These setup wizards will allow for the FISHMO unit to send data to your user account. These wizards will:

- Ask for user account login and password to connect the device
  - **You must have a user account set up with FISHMO before running the setup wizard**
- Prompt you to set up the network information local to your home
- Open up ports on your router for information to be sent to the website

After running the setup wizard as shown and filling in the credentials for your FISHMO account, you will be able to see the registered product on your account ready for you to populate with the fish from the database.

### 3.3 Process 3: Populating Your Virtual Fishtank

Now that your FISHMO system is set up and connected you can now start adding fish to your virtual fish tank! The reason for this is so we can help you manage the fish in your tank and help you decide on what your next fishy

friend will be! After logging in you'll be on the Dashboard, your hub for all information regarding your virtual tank and your FISHMO unit. To begin with your system we'll begin by adding fish to your virtual tank.

For a visual reference, refer to Figure 1.

1. At the top left of the page on the menu bar you will find two options on either side of the FISHMO brand name. The first of these options is the Fish Database. Clicking this will open up the database slide-in menu. From here we list every single fish in the database in a convenient display.
2. To begin adding fish, simply click the check box in the bottom right hand corner of the fish card to put the fish into your tank. As you add fish you'll notice the colours of the each fish card changing. This let's you know if the fish is compatible with the other fish in your tank. Green is for compatible, Red is for incompatible.
3. Once youre done adding fish to your virtual tank you can close the side-menu and view the fish in your tank, which is displayed under your tank settings card.

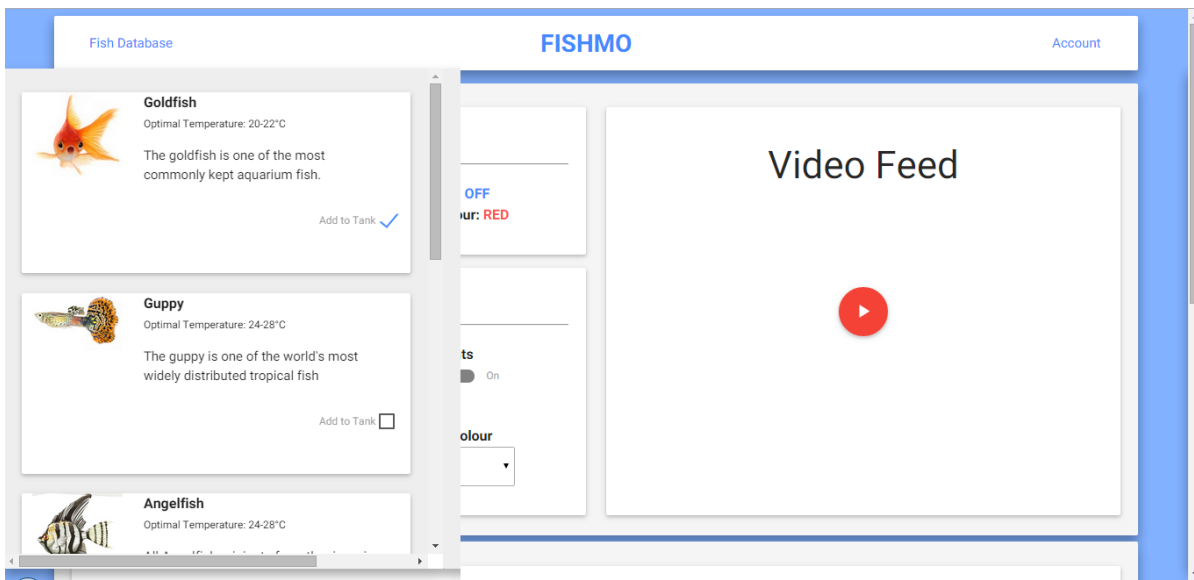


Figure 1: Adding fish from database into the fish tank

### 3.4 Process 4: Managing the Tank

The last instructive process in the FISHMO manual is using the FISHMO system to monitor and manage your tank. In this section we will cover how to use the FISHMO system's functionality in order to get the most out of your FISHMO. This will include using the FISHMO SAAMS to:

- Set and changing lighting conditions
- Increase/Decrease water temperature
- Enabling/Disabling water current
- View a live video stream
- Checking for optimal living conditions of the aquatic life
- Monitoring the tank water conditions

In order to perform any of the above actions, begin by opening a internet browser and going to [fishmo.ddns.net](http://fishmo.ddns.net), once there login and you should reach the main home page where all of the interactivity between the FISHMO system and the user will take place.

Refer to Figure 2 and 3 for a visual reference.

- **Setting and changing the lighting conditions:**
  - Flip the toggle switch under the label Lights: to the on or off position depending on the desired outcome.
  - To change the colour, select the colour by clicking on the corresponding colour box below.
- **To increase or decrease water temperature:**
  - Click and drag the slider to the right to increase the value of the temperature gauge. To decrease the temperature click drag the slider to the left to decrease the value. Simultaneously the desired value will show on the gauge itself to alert the user to the temperature being set (see Figure 3b).
- **To enable or disable the water flow:**
  - Flip the toggle switch under the label water current: to the on or off position depending on the desired outcome (see Figure 3b).
- **To view a live video stream:**
  - Direct your attention to the upper right hand corner of the main page where there will be a card with the live video stream of your tank embedded (see Figure 1).
- **Viewing optimal living conditions:**
  - Once all the fish living have been added to the your virtual fish tank there will be optimal living conditions will be generated. These conditions will be alerted on the bottom of the FISHMO main page alongside all the fish currently in the tank (see Figure 3a).
- **To monitor the tank water conditions:**
  - Find the labels “Temperature:”, “Water Flow Level:” and both lights settings on the left side of the FISHMO home page. The values of each corresponding reading will be displayed adjacent to the label. These values will be updated in real time and give you the most accurate reading possible (see Figure 3a).

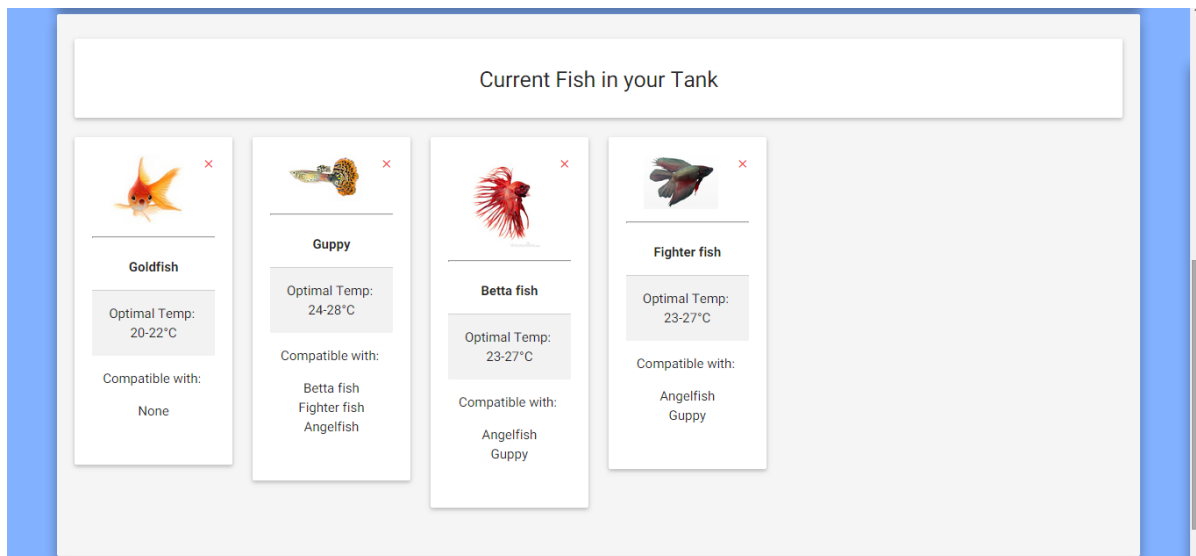


Figure 2: Example of the fish currently in your fish tank with their optimal readings



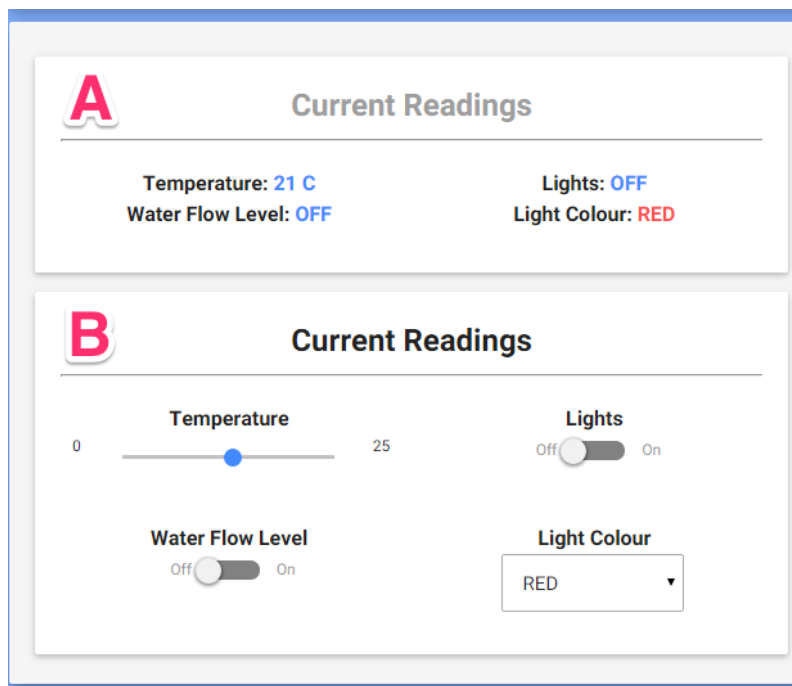


Figure 3: a) Menu that contains the current readings of the fishtank; b) Menu that has the options to change them

## 4 Maintenance

### Hardware Maintenance:

- Make sure that all submerged hardware is clear of debris in order to function properly
- Clean your tank regularly to avoid build-up of unwanted waste in the FISHMO components
- Clean the water pump, by running hot water through it, to remove unwanted buildup of waste
- Be sure to follow any and all descaling procedures when cleaning submerged hardware

### Hardware Upgrades:

- At your discretion, you are able to upgrade the peripheral devices for the FISHMO to newer models through independent retailers
- As an alternative, newer versions of the FISHMO will include updated peripherals as they are released

### Software Updates:

- The website, under fish tank settings in user settings, will prompt you with a notification when the FISHMO unit needs to be updated and will then proceed to update when you have confirmed
- The website will be updated as need and will not affect user experience besides feature changes which you will be notified of prior to release

## 5 FAQ (Frequently Asked Questions)

### Q: How can I change my password?

A: Login to the FISHMO website at [www.fishmo.ddns.net](http://www.fishmo.ddns.net). Once at the main account page, click on the account tab on the top right hand corner where you will be able to access all personal account info. Click on the password tab, and you will see the option to enter your old password and a new password. Once entering your passwords click the save button below and your password is changed.

**Q: What happens if I get locked out of my account?**

**A:** Submit a request via the login portal page of the website, called “Forgot Password?”, where you will receive an email containing a secure link to reset your password. If your registered email was incorrect, please contact us: [help@fishmo.ddns.net](mailto:help@fishmo.ddns.net)

**Q: Why isn’t my real-time data being updated?**

**A:** This is either caused by the PI not correctly connecting to our servers. This can be solved by unplugging and replugging the PI. If the issue persists refer to Step 1: “Physical installation” to reconnect your PI to the server.

**Q: Why cant I connect to the FISHMO website?**

**A:** First check to see if you are connected to the internet, if not connect and try again. If the issue persists check the page to see if there is a message saying the website is under maintenance, if it is, just wait patiently until it comes back online. Another case would be if the server is down for some reason, if this is the case please wait patiently.

**Q: What do i do, none of my features are working?**

**A:** Refer to Step 1: Physical installation and Step 2: “Virtual installation”, located in the installation manual to make sure these processes are completed correctly. Check for ripped wires and faulty connections. If you are still experiencing trouble contact us by phone or by email and we will personally aid in setting up your FISHMO system.

**Q: Can i use my FISHMO through mobile devices**

**A:** Yes, the system is designed to work through any device that can access the internet. Open any mobile browser and visit the FISHMO website. There is currently no mobile application, but expect a future release.

**Q: Can I monitor more than one tank?**

**A:** No, unfortunately the FISHMO System is designed to monitor one tank or aquarium. Given special request, the team here at FISHMO may be able to accommodate by integrating multiple tanks into one system.

**Q: How do I keep my system up to date?**

**A:** Visit the maintenance section in the user manual. Here will be a detailed description on how to keep your physical and virtual system up to date.

**Q: Still have a question?**

**A:** Send us an email here: [help@fishmo.ddns.net](mailto:help@fishmo.ddns.net)

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