

AquaFORCE: Realtime Multiplatform Mobile Development

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ABSTRACT

AquaFORCE has developed a suite of applications which allow users to proactively monitor aquariums via mobile platforms,.

Keywords

Realtime monitoring, mobile, capstone



1. INTRODUCTION

AquaFORCE solves the problem of users not being able to monitor and/or control their aquarium from their mobile phone. The existing solution only allows users to monitor and control their aquarium via a desktop browser located on their local network or requires users to be at the physical location of the tank when making changes and/or monitoring to the delicate environment. To solve this problem we created a multiplatform mobile application that allows the end user to control and monitor their tank from anywhere they have an internet connection.

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We have developed a multiplatform mobile aquarium management tool which allows user to monitor and control their aquarium in real time from anywhere in the world. Our product allows users monitor and control any accessory that is attached and compatible with the aquarium controller. Accessories range from pumps to heaters, lights, skimmers, chemical and food dispensers plus many more. The product can be used anywhere where the user has an internet connection.

Another key feature of our system is a web based tool which collects, stores and displays the data produced by the aquarium. This allows users to spot trends and anomalies that occur within the environment of the aquarium. We have three deliverables in our project: The Android Application, The iPhone Application and the Web Service.

The system shall:

send push alerts, when a criteria has been met defined by the user Yes, users can specify special conditions that that cause a push alert
display historical data based on the users input and options Yes key input data is recorded and can be displayed on the graphs
report feeds without relying on a third party server for connections Yes the App can connect straight to the controller
allow the user to turn on and off switches
allow the user to adjust lighting based on a 0-100% scale
support a range of different brand controllers Yes we support GHL, Digital Aquatics and Neptune Systems
give users a simple overview of parameters they wish to view most
report feeds without relying on a third party server Partially, the application must be open.
send push alerts to the phone based on specific error codes
display the information in a graphical way
be able to execute commands from the phone on the remote aquarium
run at set intervals
collect data from an aquarium controller
display data collected
warn users about the hazards of the system
prevent unauthorised changes to the settings of the aquarium
display graphs of records

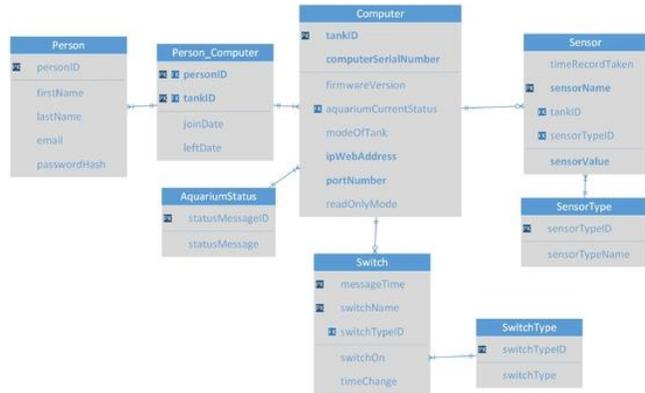
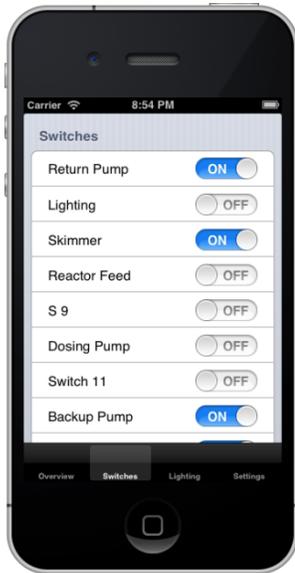


Figure 1: AquaFORCE data screen (top left), data structure (top right), real-time and historical data (lower left), system architecture (lower right)

1.3 Technical Highlights

Simulator – We built an Aquarium simulator that produces an XML feed that is the same format as the one produced by each Aquarium Controller. This enabled us to test the parsing of the simulator without access

Graphing – We were able to graph the data produced by the aquariums computers to make it easily understandable.

We wanted to have the most market share for our project because of how small the user-base is. We chose to make an iOS application because of the amount of people on the fish keeping forums asking for one. The web service was created to make a premium subscription service for the application, it also adds a lot of functionality to the application we had hoped to include in iteration one.

We have used three development platforms to create three mobile applications; Android, iOS and Windows Phone.

The AquaFORCE application has plenty of room to expand beyond its current feature set. If we are to continue work on this application we can add many more features such as:

Integrating the remote IP camera feature that we produced a proof of concept for. The idea behind the camera is that users will be able to remotely view their aquarium from within the application, to visually check on their fish. We want to be able to produce more types of graphs based on the data provided via the aquarium controller.

It would be great to offer support for a wider range of controller types and expand into monitor and controlling things such as water dispensing systems, pet monitoring etc.

AquaFORCE received the Award for best Technology in the Audacious Student Business Competition and were runners up in Technology at the Imagine Cup.