

Kong Grow



The premiere, remote greenhouse monitoring software

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The Kong Grow Team

A team of highly dedicated
computer scientists and engineers
passionate about creating **the best**
greenhouse technologies!



Charles Mezhir

Front-end



Tyler Valentine

Front-end



Bader Albader

Hardware



Garrett Senor

Middle



Jacob Tran

Back-end



Overview

“ We are producing a product to monitor and communicate useful data within a greenhouse environment in order better maintain ideal growing conditions. The product will use a webpage to display real-time and historical data in order to facilitate a healthy growing environment and better manage resources. “



Project objective

KongGrow will be the premiere temperature and humidity monitoring software accessible to amateur and professional growers. Its web-based design will provide an affordable and user friendly approach to maintaining and optimizing greenhouse environments as well as maximizing profits through efficient resource management.

Expected Tools



Project Tracker - Trello



VCS repository - GitHub



Database - MySQL



Testing tool - PyUnit



Hardware - Raspberry Pi 3, DHT22 sensor



IDE - IntelliJ, Sublime



Framework - Node.js



Deployment Environment - Raspbian OS

Tools Used



MySQL Workbench - database design and implementation - rating:

5



Slack - communication - rating:



GitHub - version control - rating:



Trello - project management - rating:

4



Google Drive - SaaS for real time collaboration - rating:



Raspberry Pi/ DHT22 sensor - hardware used to record data - rating:

5



Python - used to program the Raspberry Pi - rating:

5



Node.js - linking the database and front end - rating:

2



HTML/CSS- create an intuitive GUI for users - rating:

5



Target audience

Botanists who want to monitor the temperature and humidity of their greenhouse, in real time, to minimize losses due to under-managed variables



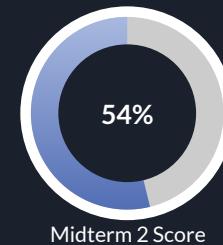
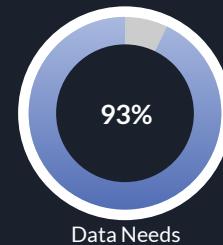


Persona 01



Jenny Writer

Jenny is a smart and savvy technology user but she's just starting out in the field of home growing. She wants a product that she can access from all of her devices that will make her transition into horticulture as easy and enjoyable as possible. After receiving her Kong Grow package she creates an account and attempts to log in. upon entering her credentials and hitting the login button she is immediately taken to the data page which gives her all the information she needs to manage her greenhouse. The intuitive nature of the interface gives her a newfound confidence in her growing career. With Kong Grow, making the most of her greenthumb is going to be easy!

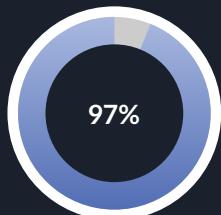




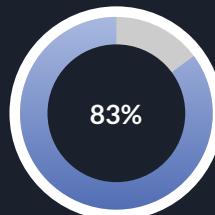
Persona 02

Miguel Sanchez

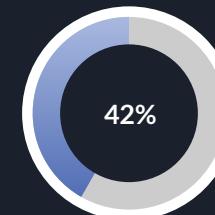
User Miguel is untrusting of technology by nature but is good with his hands and has been growing plants for years. He is dubious of Kong Grow's ability to improve his grow results but decides to buy the product due to the potential of the software and the low price. He wants to make sure that the hardware he ordered from our website is working properly and that the results are being displayed accurately online. He gets a digital thermometer at the local hardware store and takes measurements in his greenhouse at regular intervals to be compared with the data that is being displayed on our website. After careful review he finds the real-time data displayed on the sight matches his expectations based on his own measurements. Peace of mind is achieved!



Hurt Factor



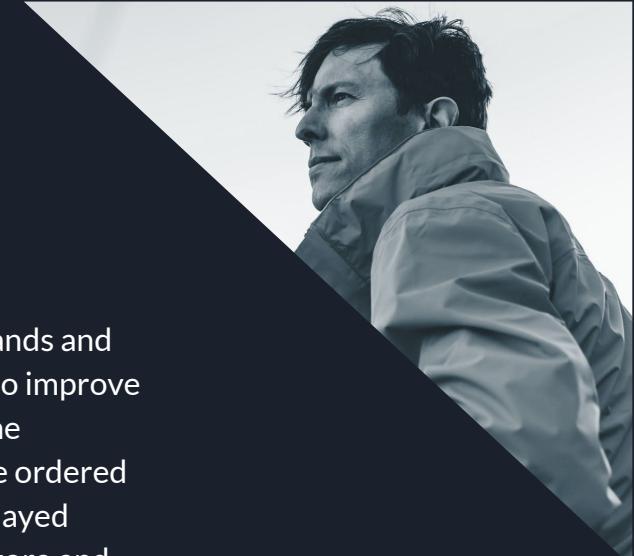
Karate Skills



Motivation Level



Trust Level After
Using Kong Grow!



Issues and Roadblocks

Issue	Resolution	Outcome
Connecting DB to Web Page	Crash Course in NodeJS	We might have finished!
Managing Scope	Limited our scope to include relevant information	Decided two in one sensors for temperature and humidity
Sensor Precision	Resolved difference in actual vs sensor readings using an offset	There was no real difference between actual and sensor reading data, so we used raw sensor data
Undocumented HTML Templates	Cut out unnecessary code and performed extensive trial and error testing	Streamlined initial code considerably and achieved desired style

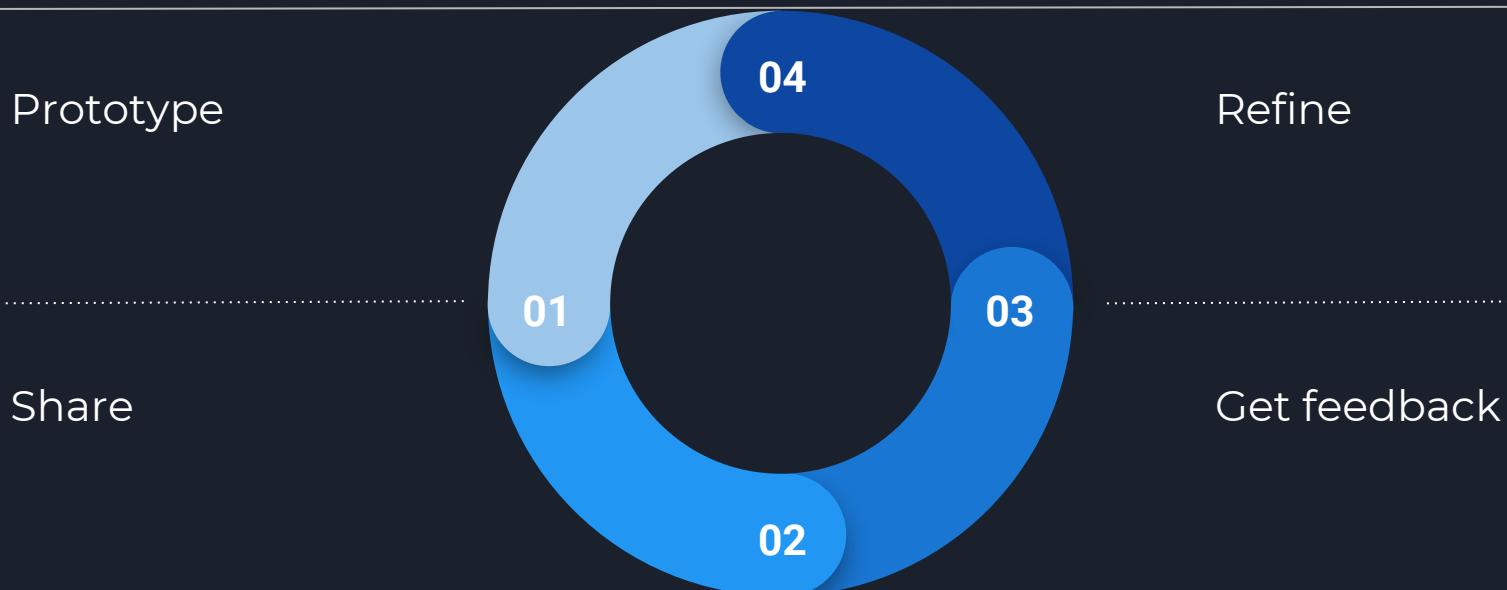
Market Trends - Demand for Temperature and Humidity Monitoring Systems

In 2012, Colorado legalized recreational Marijuana by passing Amendment 64. This created an opportunity to exploit a new market with a 'growing' user base.





Methodology (Agile)

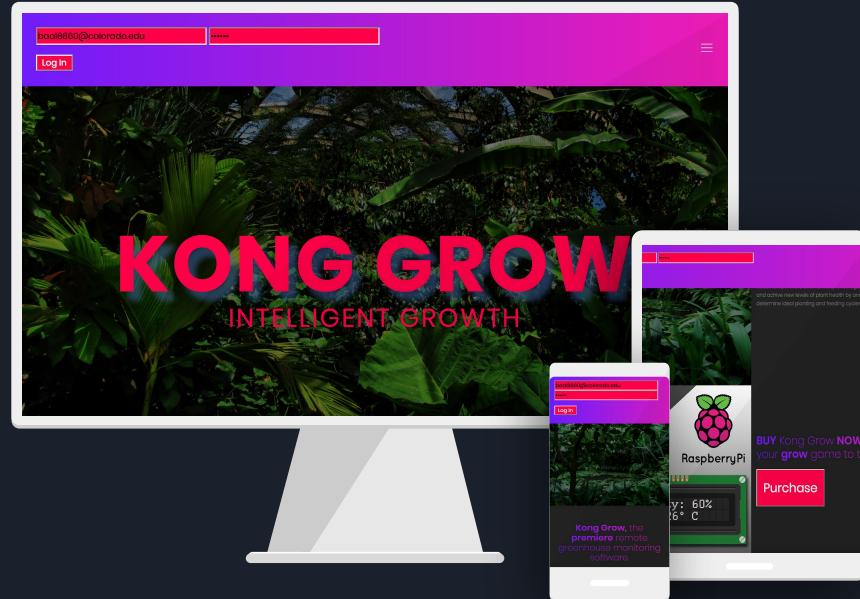


Introducing: Kong Grow

Multiplatform Capabilities

Kong grow is designed to adapt to any device the user might access

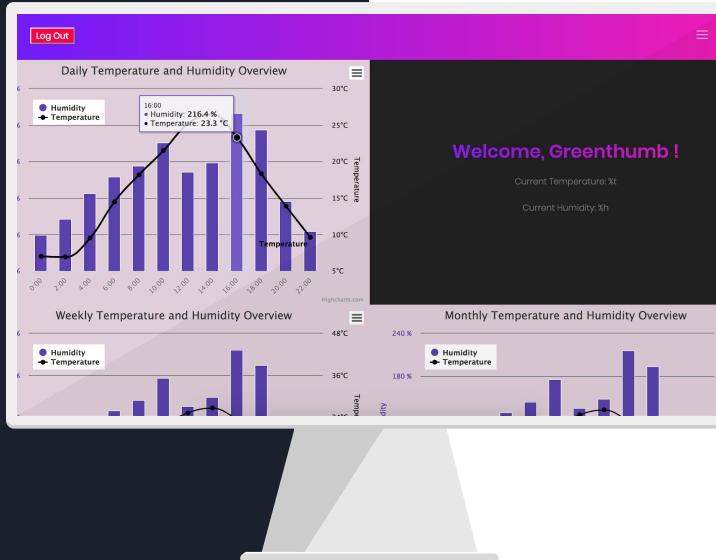
From Desktop to mobile Kong grow allows users to interact with their growing data wherever they are





Frontend on Desktop

A clean,
streamlined
presentation of
data on your
desktop
computer



← COLORS!

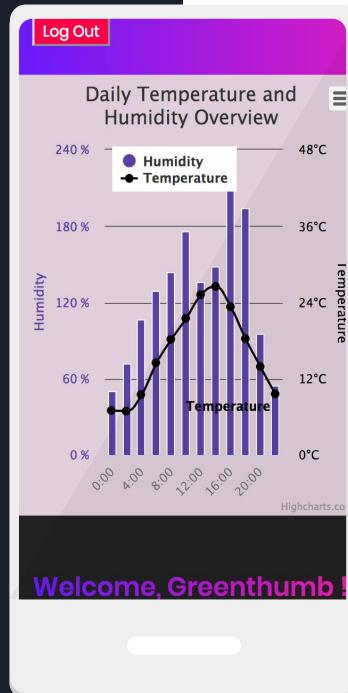
← GRAPHS!

← WORDS!

MUCH WOW!!!

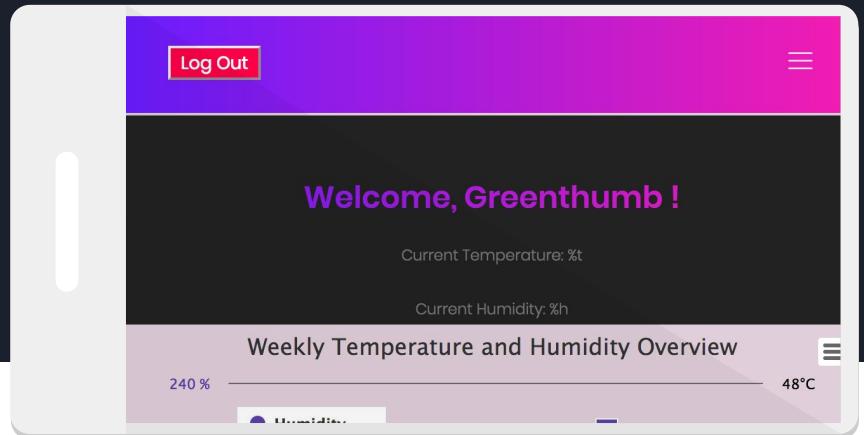
Frontend on mobile

Kong Grow is designed to provide data to the user wherever they are. Mobile integration is a primary feature



Spotlight on landscape view on mobile

Tested and stable on all mobile platforms, including tablets.





Middle layer

The middle layer of this program is designed to allow for communication between the database and the web page the user views

Utilizes node.js





Middle Layer

Modular Route system

Login route

Data route

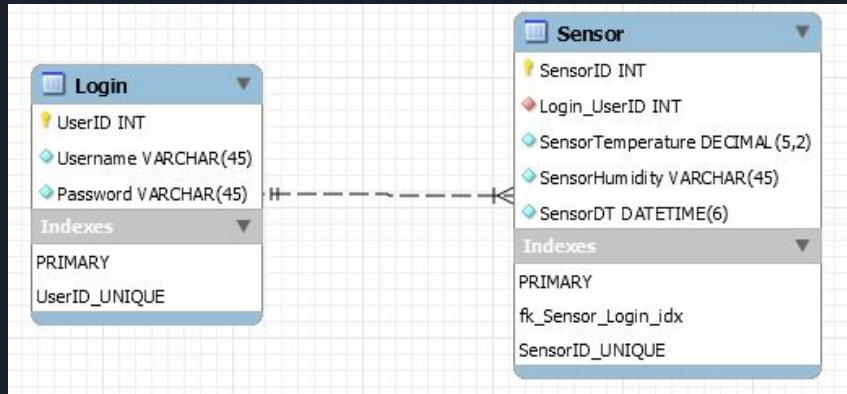
Hardware Demo!



Let's see this bad boy in action!

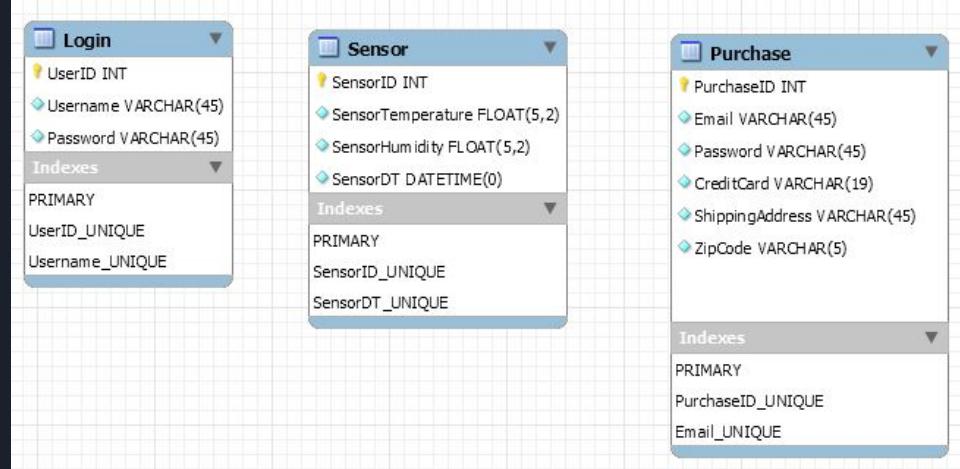
Back-end

Here is the first iteration of the database design. We then realized that we needed to change the database as our product evolved



Back-end

Developing a simple data model allowed us to remain within scope while still managing the appropriate data



We used surrogate keys to store each entry uniquely for each table, such as UserID, SensorID, and PurchaseID.

Hardware Setup

Raspberry Pi 3.0 Model B

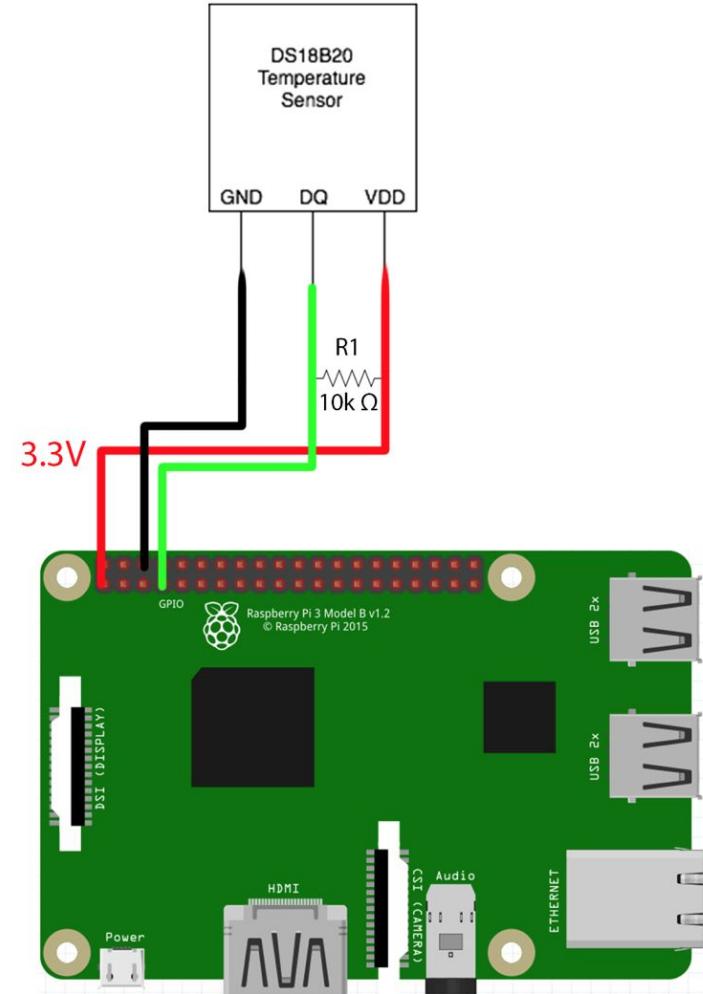
16GB Micro SD ~ Recommended

Raspbian OS

Adafruit DHT22

10 k Ω Pullup Resistor

Python



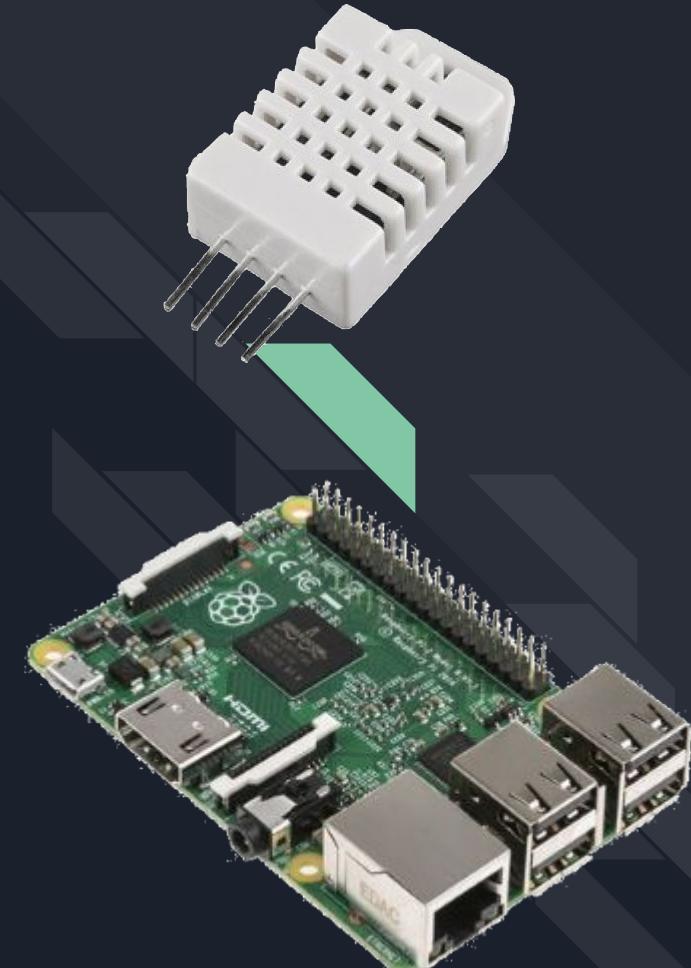


Why Adafruit-DHT22?

$\pm 2\%$
 $\pm 0.5^\circ\text{C}$

Why Raspberry Pi?

The Raspberry Pi, as simple as it is functional.



Project timeline

	JUN 04	JUN 11	JUN 21	JUN 26	JUL 03	JUL 05
Group Formation	First step was finding group members that would lead to a fun and successful project	The group had to decide on a project that would be feasible given the timeframe but also challenging. Project management tools were decided on and configured	Hardware was gathered and initial iterations of the website and database were created	General website format was finalized. Database was completed and NodeJS took over main focus.	Small style changes were made to finish the website. Node.js continued to occupy most of the team's time. Work on the presentation began.	Integration between hardware, database, Node.js, and html was finalized. Presentation was prepared, practiced and performed!
Project Creation						
Initial Iteration						
Second Sprint						
Home Stretch						
Presentation						

Thank you!

Where's my ice cream :)

