Extra Easy Eggs

Team Members: Samuel Nicklaus, Sam Loecke, Luke Farmer, Cole Arduser

Why?

- Easy automatic tracking of egg laying
- Allow user to optimize egg production by controlling temperature and light exposure
- Inform the user when their eggs are ready to pick up

Video

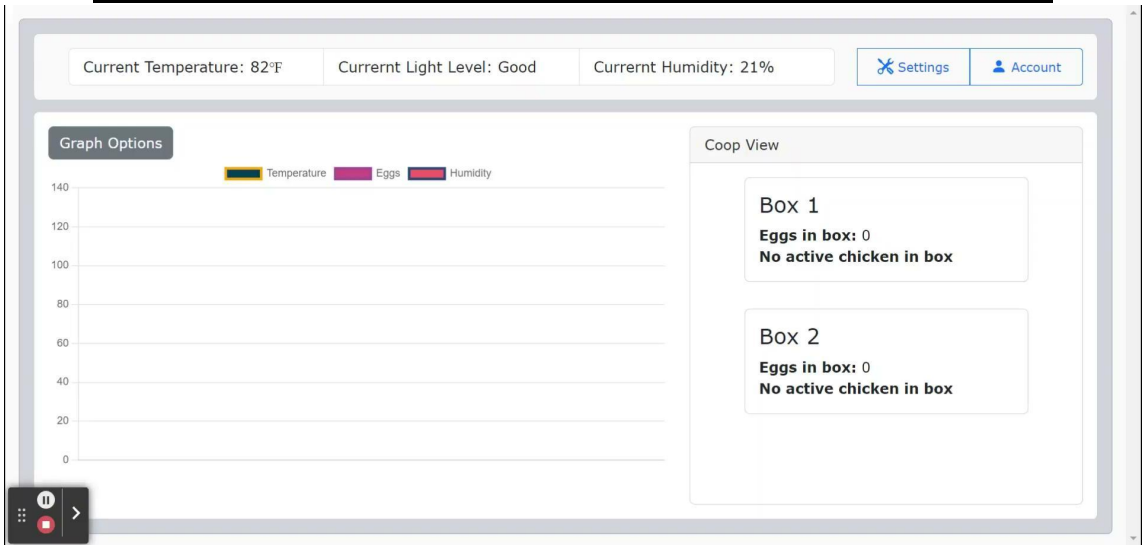
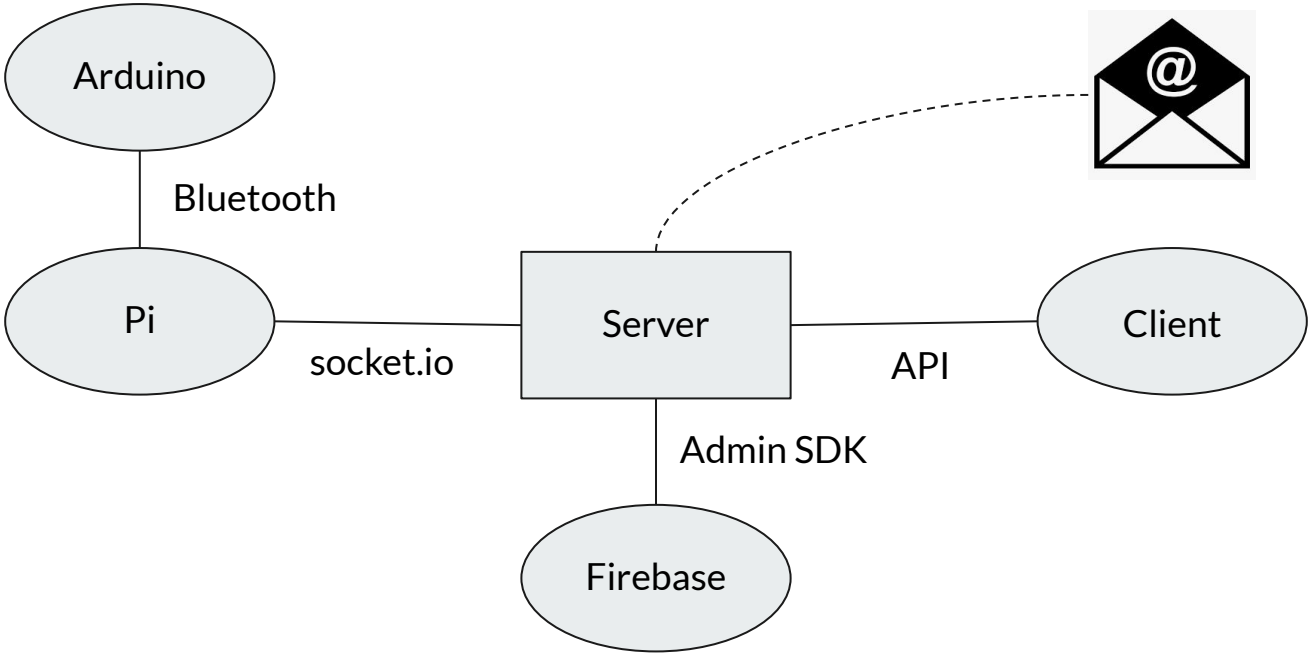
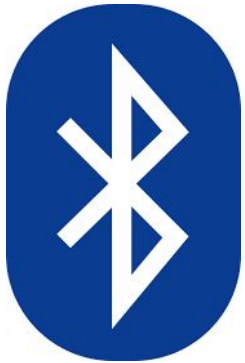

Current Temperature: 82°F
Currernt Light Level: Good
Currernt Humidity: 21%
Settings
Account
Graph Options
Temperature
Eggs
Humidity
140
120
100
80
60
40
20
0
Coop View
Box 1
Eggs in box: 0
No active chicken in box
Box 2
Eggs in box: 0
No active chicken in box

Diagram of Completed System

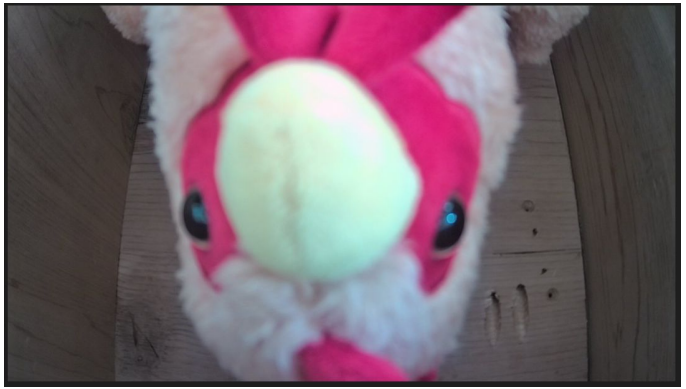


Raspberry Pi and Arduino

- Arduino sends temperature, humidity and light data to Pi over bluetooth
- Pi controls the lights when requested from server or automatically
- Pi takes a picture via webcam and sends it to the server through socket.io along with the other data



Server



- Receives data from the pi
- Teachable machine model makes prediction
- Based on the prediction, data is sent to the database and pi
- If an egg is predicted emails are sent to users to notify them
- Web app can make API requests to get data, update the database, and send commands to the pi
- Performs calculations on data for graphing

Glitch

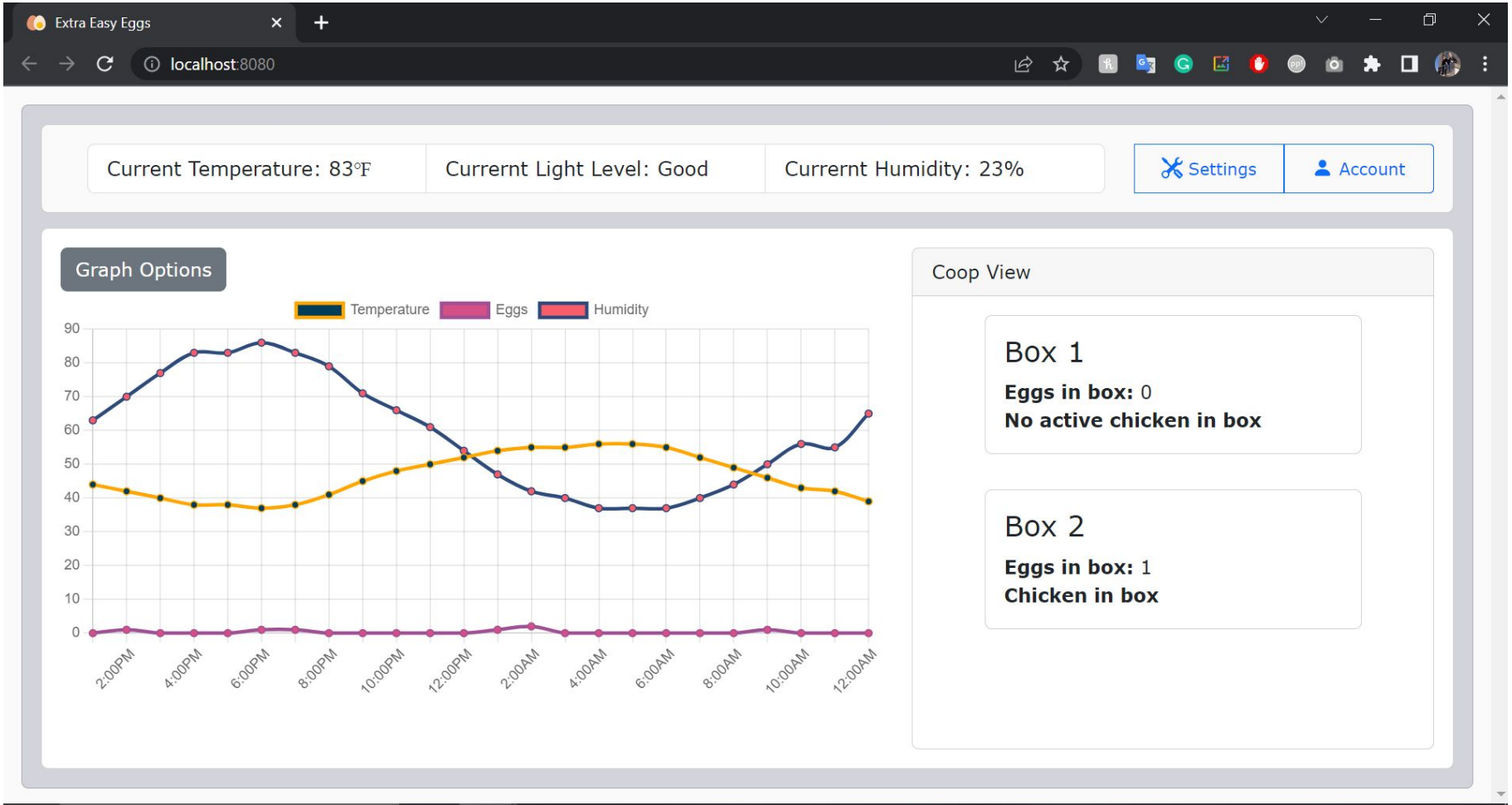
```
DATA RECEIVED FROM PI:
        | CoopID: 1           | BoxID: 2          | NumberOfBoxes: 2 |
        | Temperature: 24.68  | Humidity: 24.67   | Light: 1         |

RUNNING PREDICTION MODEL:
        | BoxID: 2                | Old Prediction:  2Egg |
        | New Prediction: Chicken | Confidence:  0.9999300241470337 |
CHICKEN ENTERED
```

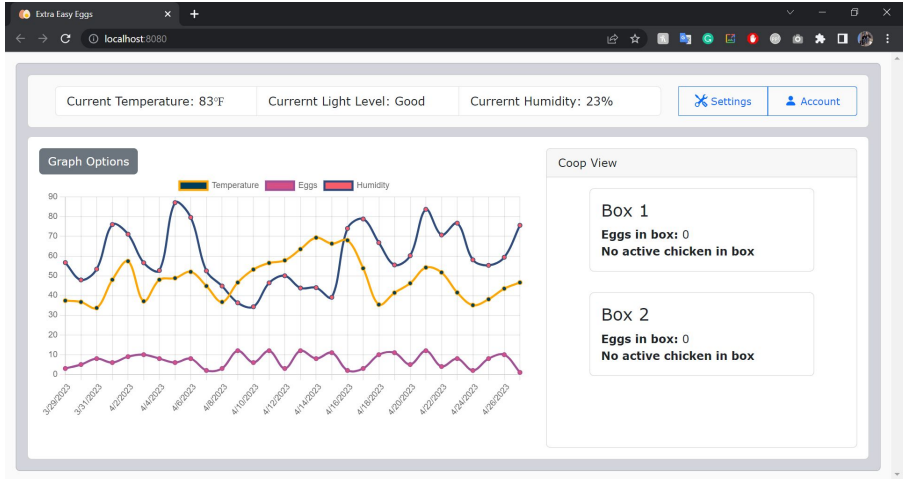
Database

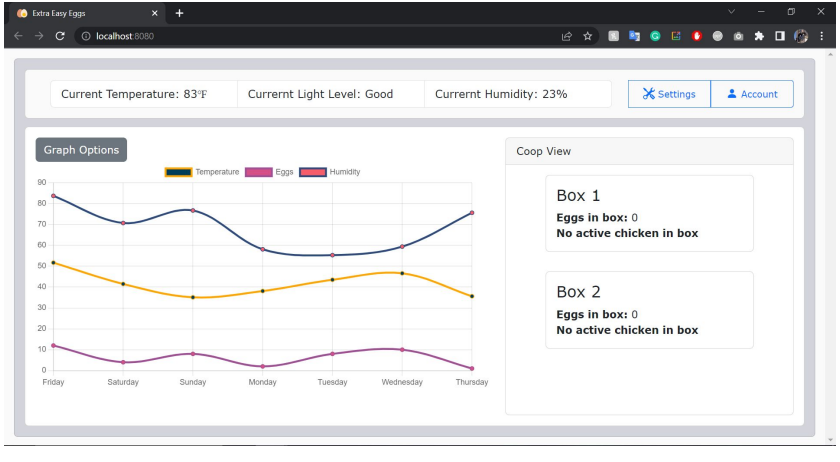
- Hosted on FireBase
- Accessed by APIs
- 4 Main Tables
    - User - Emails and names of valid users
    - Settings - Current settings for coop (Temperature Thresholds, AutoLight, Main Light Brightness)
    - Box - Consists of sub tables for each box that log: date, humidity, light, number of eggs, temperature
    - Chicken - Logs the enter and exit time of chickens as well as the coop and box numbers

Front End

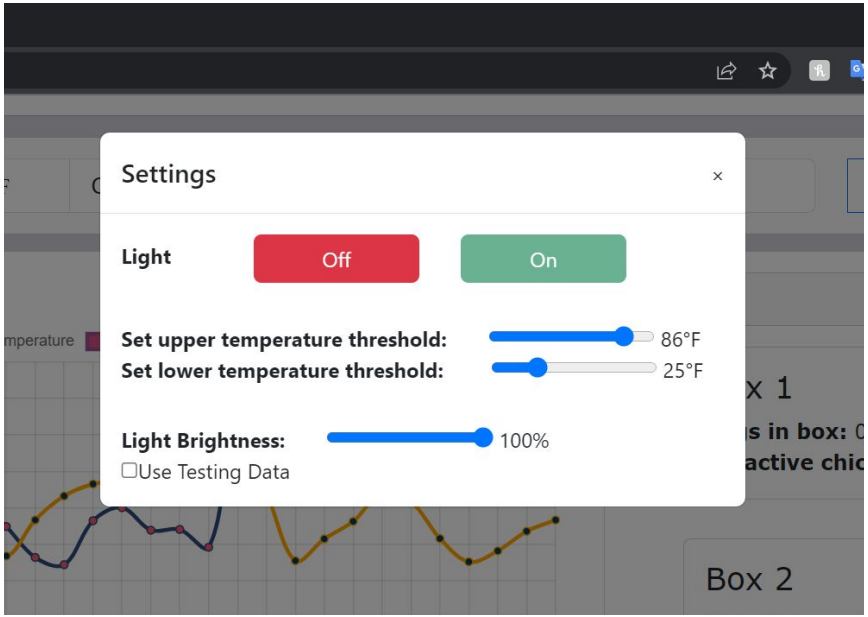

Extra Easy Eggs
localhost:8080
Current Temperature: 83°F
Currernt Light Level: Good
Currernt Humidity: 23%
Settings
Account
Graph Options
Temperature
Eggs
Humidity
90
80
70
60
50
40
30
20
10
0
2:00PM
4:00PM
6:00PM
8:00PM
10:00PM
12:00PM
2:00AM
4:00AM
6:00AM
8:00AM
10:00AM
12:00AM
Coop View
Box 1
Eggs in box: 0
No active chicken in box
Box 2
Eggs in box: 1
Chicken in box

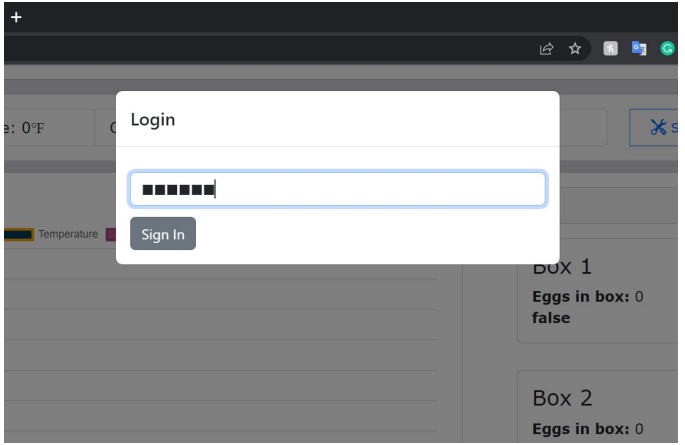
Front End

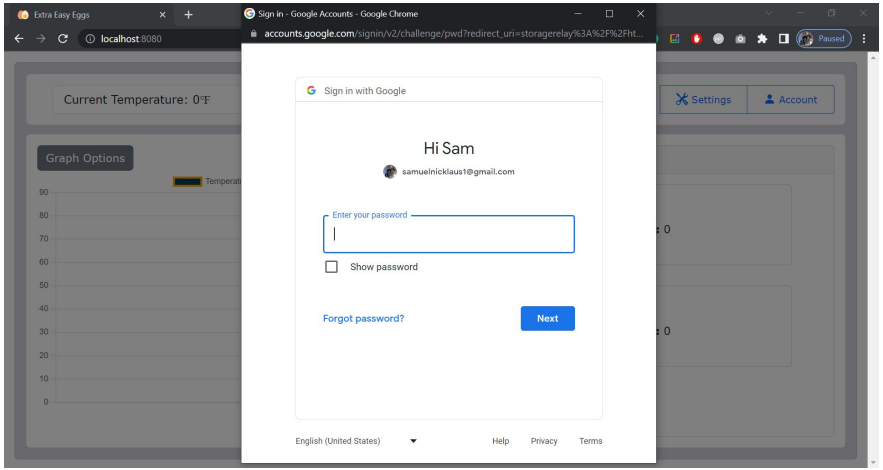

Extra Easy Eggs
localhost:8080
Current Temperature: 83°F
Currernt Light Level: Good
Currernt Humidity: 23%
Settings
Account
Graph Options
Temperature
Eggs
Humidity
Coop View
Box 1
Eggs in box: 0
No active chicken in box
Box 2
Eggs in box: 0
No active chicken in box


Extra Easy Eggs
localhost:8080
Current Temperature: 83°F
Currernt Light Level: Good
Currernt Humidity: 23%
Settings
Account
Graph Options
Temperature
Eggs
Humidity
Friday
Saturday
Sunday
Monday
Tuesday
Wednesday
Thursday
Coop View
Box 1
Eggs in box: 0
No active chicken in box
Box 2
Eggs in box: 0
No active chicken in box

Front End


Settings
Light
Off
On
Set upper temperature threshold:
86°F
Set lower temperature threshold:
25°F
Light Brightness:
100%
Use Testing Data
Box 2


Login
Sign In
Box 1
Eggs in box: 0
false
Box 2
Eggs in box: 0


Sign in - Google Accounts - Google Chrome
accounts.google.com/signin/v2/challenge/pwd?redirect_uri=storagerelay%3A%2F%2Fht...
Sign in with Google
Hi Sam
samuelnicklaus1@gmail.com
Enter your password
Show password
Forgot password?
Next
English (United States)
Help
Privacy
Terms
Current Temperature: 0°F
Graph Options
Settings
Account

Security

- Front End Authentication with Google Sign in
- Each Coop has a Token that must be entered to Sign in as well
- All API calls include an authorization header to make sure the user requesting is valid
- Server connects to Firebase using Admin SDK
- Socket.io communication between pi and server requires a header with valid coop ID

Importance

- Eggs are expensive
- Ethical care of the chickens
- Maximize egg production

Difficulties

- Connecting everything
  - Pi to Server
  - Model in Server
  - Front End to Server
  - Server to Database
- Dropping Pi
- Too many reads to the database
- Database data calculations

Questions?