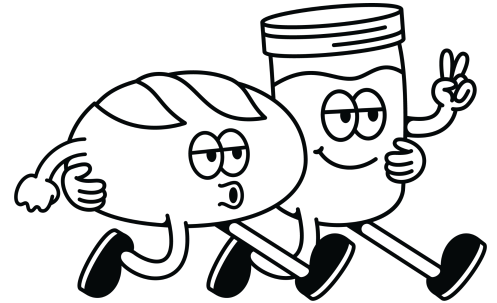


Breadwinner

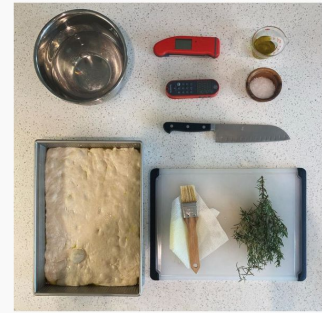
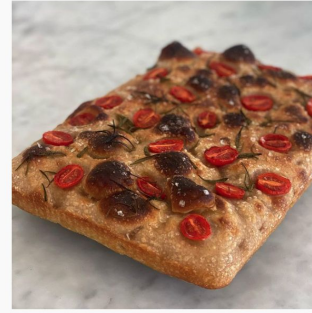
A hardware driven community for sourdough.



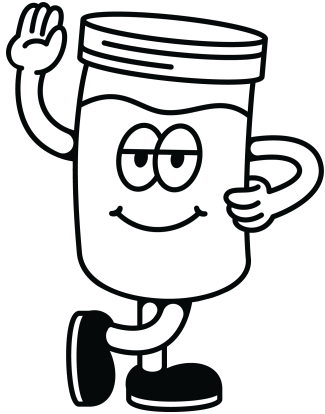
Creative Commons → **Kickstarter** → **Y Combinator** → **Sourdough**
2005 2009 2016 2018

↑
first sourdough loaf

I like to Bake



Why you should try sourdough



- It's how everyone ate bread up until the 20th century
 - It's way **way** more fulfilling than buying bread
 - It's something your entire family and friends will love
 - Maintaining a starter is like having a pet that you eat
 - Did I mention how excited your friends and family will be?
 - Fermentation is beautiful
-



reddit

r/Sourdough

Search

Free

Posts

Wiki

457

Printed by u/ahes1 1 year ago

I built a device that tracks the "development" of the starter while I'm at work. The graph shows how the volume of the starter changes over time. I was wondering if other people would also find it useful :)

78 Comments Award Share Save Hide Report

99% Upvoted

This thread is archived

New comments cannot be posted and votes cannot be cast

SORT BY: TOP

ClavellB 1 year ago

My dude kick starter that baby yesterday!

121 Give Award Share Report Save

Huafhaus_HuafPric 1 year ago

1 second this

21 Give Award Share Report Save

haxion 1 year ago

A motion has been passed and seconded. I call it to a vote.

All in favor by the usual sign of Aye?

About Community

r/Sourdough

Want to learn about sourdough? Love homemade bread? Ask for sourdough advice, share knowledge/tips/recipes, have discussions, and post your bread pictures

141k Members249 Online

Created Dec 8, 2010

Joined

Create Post

COMMUNITY OPTIONS

r/Sourdough Rules

1. Be polite & respectful

2. No submitting irrelevant content (off topic, memes, etc.)

3. No spamming

4. No self promotion

Submission Guidelines

Please provide a description of your process, ingredients, and/or a link to the recipe when you post. This is strongly encouraged if your post has a red flag (discussion or a great loaf (help or feedback)). This makes it easier for others to help and replicate your bakes.

Moderators

Message the mods

u/wormed

u/bagibagily

u/ini_k_sinn

u/RedDense

u/roothedonor

u/eggychick78

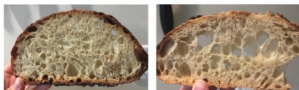
u/edindies

JUSTIN LAM

Blog Archives About Contact

Monitoring the Fermentation of Sourdough Starter with Computer Vision

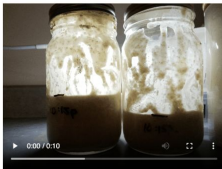
Posted in Jan 26, 2018 · 15 minutes · 22 comments · [Permalink](#)



Bread, the quintessence of life. People have survived for centuries off this staple consisting only of flour, water, salt, and yeast. Try consuming all these ingredients separately, and you'll be in for a digestive surprise. However, mix them together and let time do its thing, and the result is the release of profound flavour, texture, and nutrients that were previously locked away. Despite it being relatively easy to turn dough into something that looks and feels like bread, the challenge is in squeezing every possible ounce of flavour and texture (using only those four ingredients) to achieve the embodiment of a true loaf of bread. The secret to artisanal bread is all in the fermentation. A baker's skill is in their ability to manage and control the fermentation process, which is usually achieved through countless months and/or years of trial and error.

But what if there was a better way to understand what happens during the fermentation process?

In this blog post, we dive into the world of wild yeast (commonly known as sourdough starter) by tracking its growth through timelapses, automated image analysis, and cool graph animations. Read on to find out more!



Timelapse taken over ~20 hours at 5 minute intervals. Shown: Two sourdough starters with different feeding ratios.



Image analysis for tracking growth of the above timelapse.

The Backstory

Two key components in making artisanal bread are time and fermentation. If you can afford a long, slow rise, you will be rewarded with a texture like no other, and flavours that are both complex and subtle. Most bakeries unfortunately do not have this luxury (hence it's a business after all), so commercial instant dry yeast is used to expedite the fermentation such that it reaches the desired loaf volume at a reasonable schedule. With bread risen with instant dry yeast, it will definitely resemble visual qualities of bread, but the texture and taste will not be comparable to bread that uses wild yeast.

The quest for achieving the perfect loaf is an arduous one. It can take upwards of 12 hours from

The Backstory
The Development
Setting Up The Timelapse
Taking The Timelapses
The Analysis
The Results
The Discussion
The Conclusion
Further Reading

twilio / sound.io

Watch 3 Star 61 Fork 5

Code Issues Pull requests Actions Projects Wiki Security Insights

master	1 branch	0 tags	Go to file	Add file	Code
cmsunu28 Merge pull request #3 from aholmes... #771c7f1 on Apr 28, 2020 20 commits					
enclosure	added all stls				12 months ago
img	updated readme but no links				12 months ago
nbioot-sourdough-monitor	added license				12 months ago
glightbox	with in-progress instructions and enclosure info				12 months ago
LICENSE	added license				12 months ago
README.md	Add a helpful link for fixing DFU on Windows 10.				12 months ago

README.md

sound.io: An internet connected sourdough starter data monitor



Build an internet connected fitness tracker for your loaf

A sourdough starter is a little yeast-driven pet that eats flour and water and makes sourdough. More and more people are keeping these delightful critters in their houses, feeding them when they start to look sluggish and baking bread with them every few days.

With Twilio's Narrowband IoT Developer Kit, we can build a little monitor that helps us keep track of our starter's temperature, humidity, and rise.

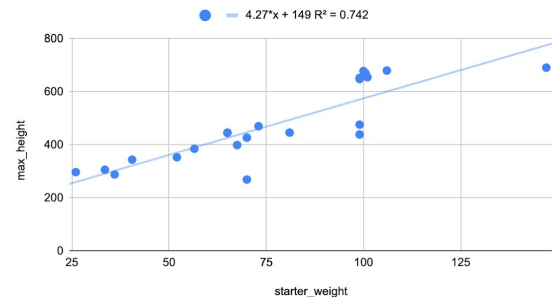
Why Narrowband?

Twilio's Narrowband IoT dev kit happens to have some great sensors we can use to get started, and it's also designed for constant, low-power connectivity, which is what I want for this particular product. Cellular connectivity also means we don't have to do any setup or fight with our Wi-Fi routers.

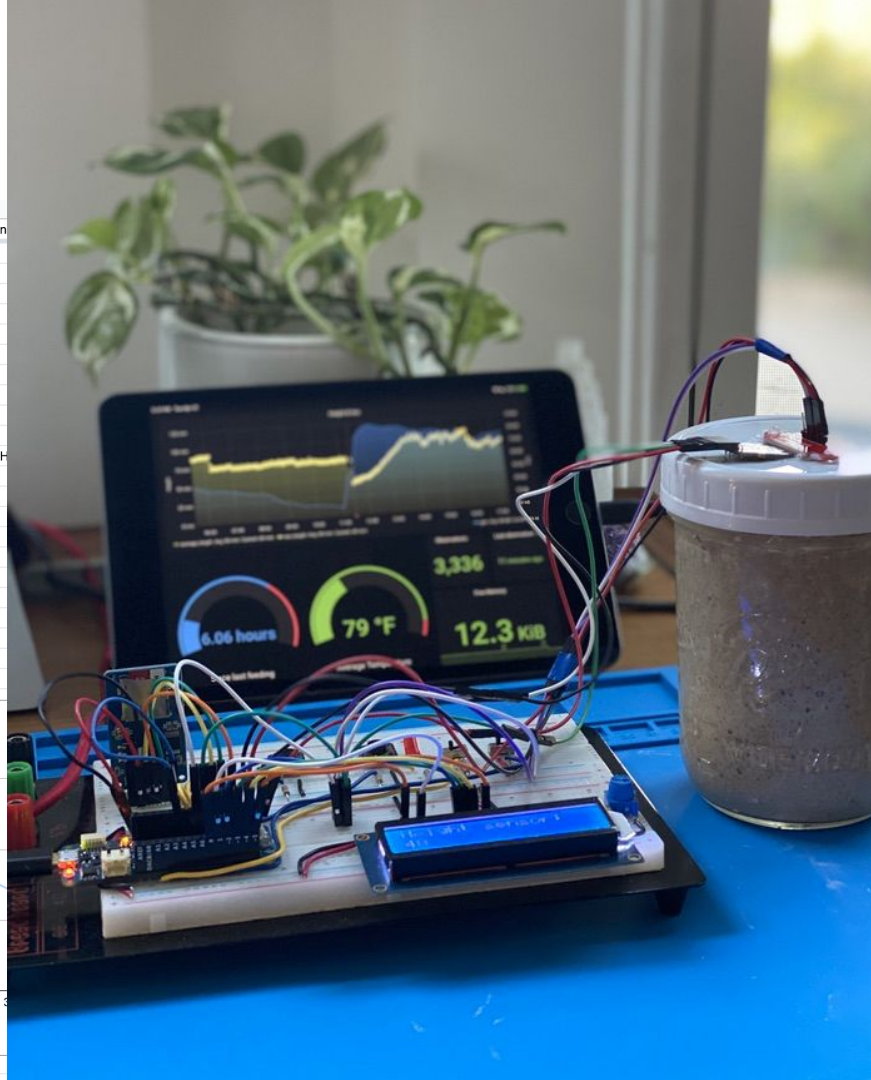
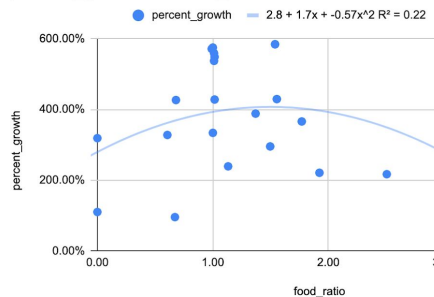
Early Days

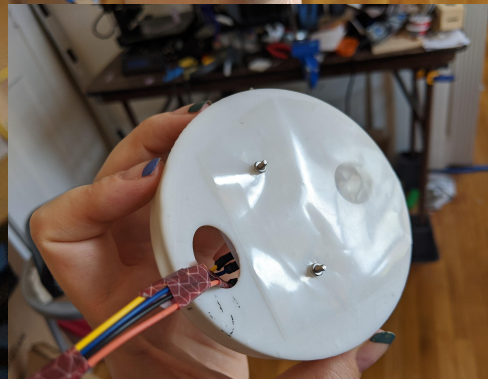
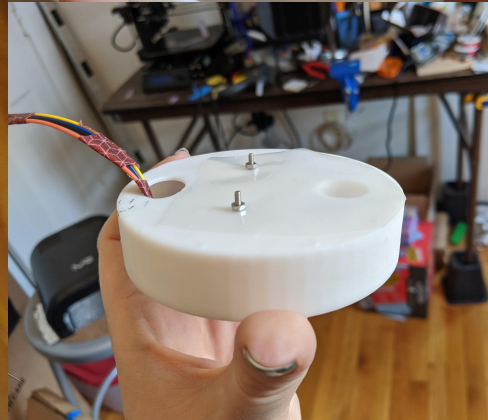
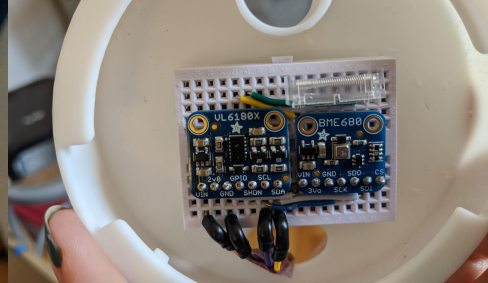
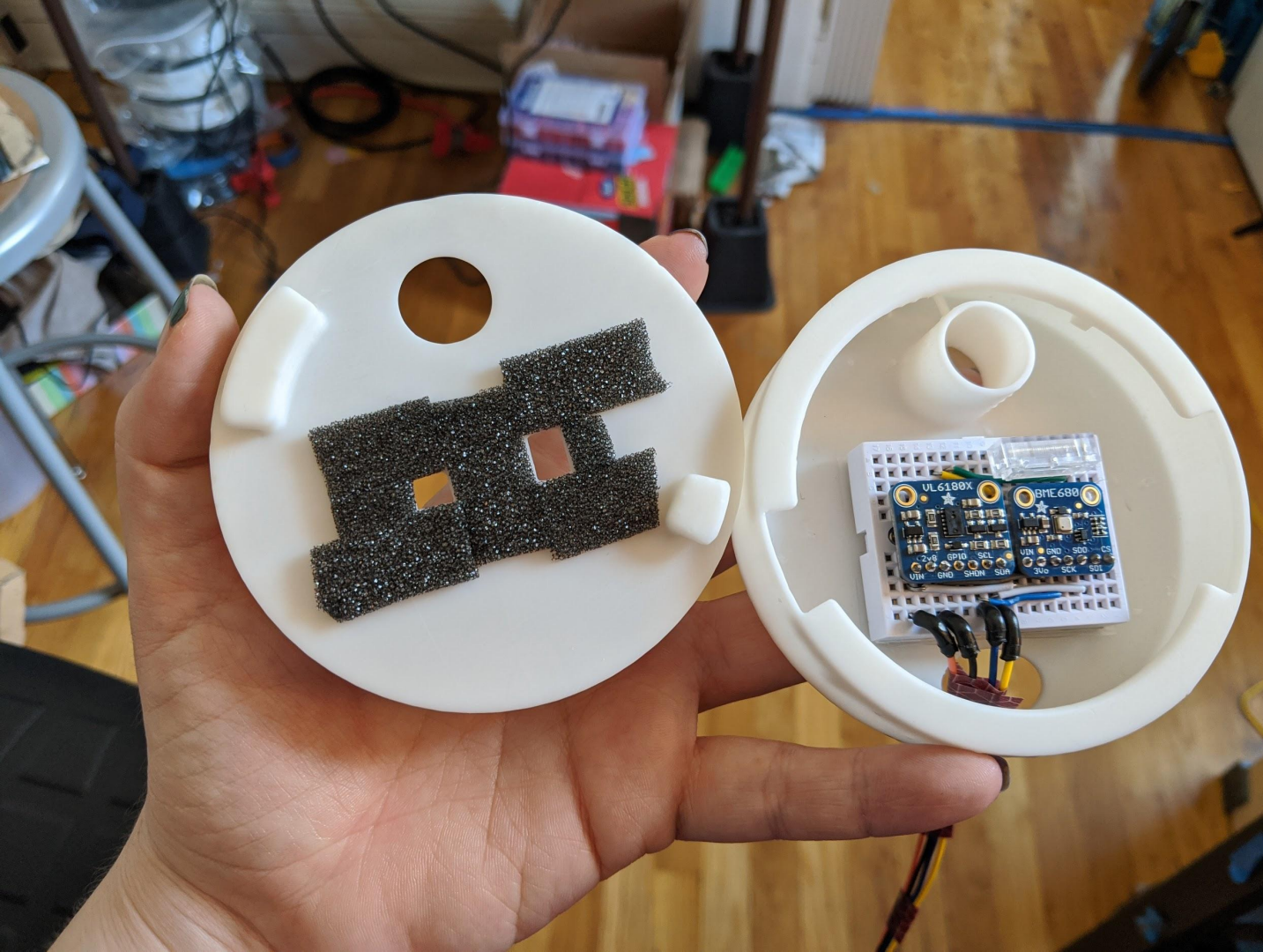
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	
feedings	fed_at	min_height	max_height	distance	pre_feeding_i	post_fe	jar_weight	starter_v	food_weig	food_rai	adjusted_he	percent_gr	projected	error	diff_time	n
12	2020-03-18 0:28:30	195	439	244	351		252	99	100.5	1.02	57	428.07%	517.93	-78.93	19:12:36.000	
13	2020-03-19 17:15:00	202	306	104	286		252	33.5	101	3.01	64	162.50%	316.85	-10.85	16:46:30.000	
14	2020-03-20 9:36:08	205	353	148	304		252	52	100	1.92	67	220.90%	373.64	-20.64	16:21:08.000	
15	2020-03-20 11:26:00	191	385	194	308.5		252	57	100	1.77	53	366.04%	387.46	-2.45	01:50:01.000	
16	2020-03-20 10:56:40	187	297	110	278	378	252	26	100	3.85	49	224.49%	293.82	3.18	23:30:40.000	
17	2020-03-21 22:41:30	196	445	249	317		252	65	101	1.55	58	429.31%	413.55	31.45	11:44:44.000	
18	2020-03-22 6:56:11	183	446	263	317	413	252	65	100	1.54	45	584.44%	413.55	32.45	08:14:38.000	
19	2020-03-23 2:15:22	203	344	141	292.5		252	41	101.5	2.51	65	216.92%	338.34	5.67	19:19:11.000	
20	2020-03-23 17:39:40	204	399	195	319.5	418	252	68	101	1.50	66	295.45%	421.23	-22.23	15:24:25.000	
21	2020-03-24 22:08:50	206	470	264	325		252	73	100	1.37	68	388.24%	438.11	31.89	04:29:08.000	
22	2020-03-25 22:46:30	243	691	448	399		252	147	100	0.68	105	426.67%	665.29	25.71	00:37:39.000	H
23	2020-03-26 21:47:40	205	269	64			252	70	47	0.67	67	95.52%	428.90	-159.90	23:01:07.000	
24	2020-03-27 11:25:40	208	288	77	288		252	36		0.00	70	110.00%	324.52	-36.52	13:38:00.000	
25	2020-03-28 2:19:41	207	427	220	322		252	70		0.00	69	318.84%	428.90	-1.90	14:54:00.000	
26	2020-03-29 21:37:30	230	680	220	358	472	252	106	120	1.13	92	239.13%	539.42	140.58	19:17:49.000	
27	2020-03-30 9:19:32	217	476	259	351	413	252	99	60	0.61	79	327.85%	517.93	-41.93	11:42:02.000	
28	2020-03-31 8:28:54	218	648	430	351	449	252	99	100	1.01	80	537.50%	517.93	130.07	23:09:22.000	
29	2020-04-01 7:57:51	215	655	440	353	451	252	101	100	0.99	77	571.43%	524.07	130.93	23:28:57.000	
30	2020-04-02 8:45:46	216	652	436	351		252	99	100	1.01	78	558.97%	517.93	134.07	00:47:57.000	
31	2020-04-03 8:29:19	220	670	450	352.5	451.5	252	101	102	1.01	82	548.78%	522.54	147.47	23:43:31.000	
34	2020-04-04 21:26:30	209	446	237	330		252	81	81	1.00	71	333.80%	462.67	-16.67	12:57:11.000	
35	2020-04-06 8:56:00	218	678	460	355		252	100	100	1.00	80	575.00%	521.00	157.00	11:29:30.000	

starter_weight vs. max_height



percent_growth vs. food_ratio







Breadwinner



Brendan
April 5th, 2021

No Knead Beginner Sourdough Bread

What went well?

Everything! This is maybe the best crumb I've ever had, super fluffy. [Read more](#)

Brendan's bake rating

Crumb
★★★★★
Crust
★★★★★
Taste
★★★★★

View Brendan's bake

70% hydration 53% unbleached all purpose flour 29% unbleached white bread flour



1 baker has made this

I want to bake this



Justin
April 4th, 2021

Broa De Milho

What went well?

This cornbread looks beautiful when it comes out of the oven. The thick crispy c... [Read more](#)

Justin's bake rating

Crumb
★★★★☆
Crust
★★★★★
Taste
★★★★☆

View Justin's bake



Fred Benenson

Log new Bake

Create Starter

6 Bakes

1 Starter



Brendan
April 5th, 2021



No Knead Beginner Sourdough Bread

[Recipe Source](#)

Here's how Brendan rated their bake:

Crumb
★★★★★
Crust
★★★★★
Taste
★★★★★

What went well?

Everything! This is maybe the best crumb I've ever had, super fluffy.

What didn't?

Maybe leave it in the oven for two or three more mins

Other notes

First bake in my new house!



Yeast Likely to Succeed
Born July 26th, 2020
150% Hydration level

Ingredient	Weight	Bakers %
Starter	180g	19%
Unbleached All Purpose Flour	500g	53%
Whole Wheat Flour	175g	18%
Unbleached White 273g Bread Flour	29g	
Water	660g	70%
Salt	18g	2%
Hydration		70%

Bake gallery




Browse Recipes

Tags

- active dry yeast
- bagel
- baguette
- biscuits
- buns
- butter
- buttermilk
- challah
- chocolate
- cookie
- corn flour
- crumpets
- dessert
- discard
- egg
- flatbread
- focaccia
- gluten-free
- herbs
- honey
- instant yeast
- milk
- multigrain
- no knead
- pancakes
- pizza
- portuguese
- potato bread
- rye
- rice bread
- sandwich bread
- scones
- seeds
- soda bread
- vegan
- white
- whole wheat
- whole grain

Recipes




A Simple Focaccia

by **Maurizio**


Recipe Source

🕒 19 hrs 15 mins

sourdoughfocacciaveganherbs

**6 bakers have made this**

Bake this




My Best Sourdough Recipe

by **Maurizio**

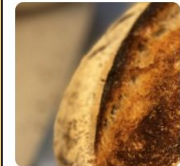
Recipe Source

🕒 25 hrs 20 mins

sourdoughbreadwhole wheatveganevainhigh hydration

**3 bakers have made this**

Bake this




Tartine's Country Bread

by **Tartine Bakery**

Recipe Source

🕒 48 hrs

sourdoughbreadwhole wheatveganevain

**5 bakers have made this**

Bake this

Create a new bake

← Create a recipe, instead?

No Knead Beginner Sourdough Bread by **Joshua Weissman** [view recipe](#)

Change recipe

What kind of yeast or starter did you use?

Breadberry (fka Tim) ▾

If you changed how you baked the No Knead Beginner Sourdough Bread recipe you can reflect those modifications in the settings below.

Loaves and Weight

Total Dough Weight

How many?

Weight per loaf

1806grams

1

25%25%1806g

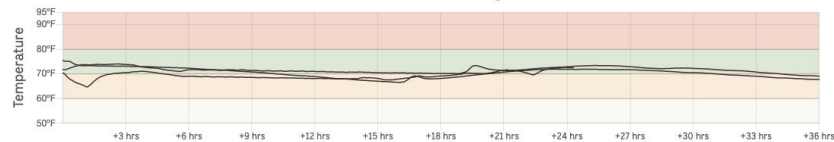
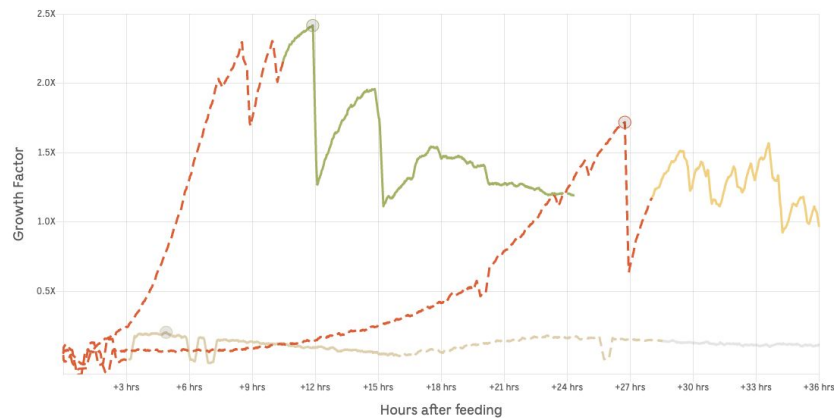
Ingredients

Ingredient	Weight		Bakers %	
Starter	180 grams		19%	
<input type="checkbox"/> Ingredient is flour				
Unbleached All Purpose Flour	500 grams		53%	
<input checked="" type="checkbox"/> Ingredient is flour				
Whole Wheat Flour	175 grams		18%	
<input checked="" type="checkbox"/> Ingredient is flour				
Unbleached White Bread Flour	273 grams		29%	
<input checked="" type="checkbox"/> Ingredient is flour				
Water	660 grams		70%	
<input type="checkbox"/> Ingredient is flour				
Salt	18 grams		2%	
<input type="checkbox"/> Ingredient is flour				

Add new ingredient

Reset

Starter Growth



	Feeding Date	Max Height	Time to Ripeness	Average Temp	Notes
Feeding #14	09 Mar 01:09 29 days ago	2.42X	9:01	69.27°	<input type="text"/> save note
Feeding #12	25 Feb 20:38 about 1 month ago	1.72X	26:55	71.67°	<input type="text"/> save note
Feeding #11	23 Feb 23:28 about 1 month ago	0.20X	3:05	70.46°	<input type="text"/> save note



Breadberry (fka Tim)

Birtherd on February 1st, 2018

100% hydration level

Mostly rye.

Edit Starter

Last feeding
28 days ago

Breadberry (fka Tim) has been used in:

6 bakes

View Bakes

Total feedings: 13

Average Rise: 1.40X

Average Time to Ripeness: 9:20

Current Status: Active

Hibernate

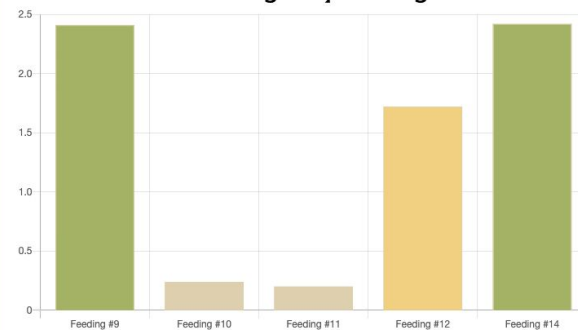
Temperature



Current Height



Max Height by Feeding



Search or jump to...

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breadwinner-life / community-hardware

Private

Unwatch1Star0Fork0

CodeIssuesPull requestsActionsProjectsSecurityInsightsSettings

maincommunity-hardware / firmware.ino

Go to file

fredbenenson Create firmware.ino

Latest commit 84da9f1 now

History

1 contributor

740 Lines (605 sloc)17.6 KB

RawBlame

```
1 #include <Arduino.h>
2 #include <WiFi.h>
3 #include <WiFiMulti.h>
4 #include <HTTPClient.h>
5
6 #include <DNSServer.h>
7 #include <WebServer.h>
8 #include <WiFiManager.h>
9
10 #include <Adafruit_NeoPixel.h>
11
12 #include <SPI.h>
13 #include <SD.h>
14
15 #include <ArduinoHttpClient.h>
16 #include <ArduinoJson.h>
17
18 #include <Time.h>
19 #include <TimeLib.h>
20 #include <WiFiUdp.h>
21
22 // VL6180 Sensor Drivers
23 #include <Wire.h>
24 #include "Adafruit_VL6180X.h"
25
26 Adafruit_VL6180X vl = Adafruit_VL6180X();
27
28 // MCP9808 Sensor Drivers
29 #include <Adafruit_Sensor.h>
30 #include "Adafruit_MCP9808.h"
31
32 Adafruit_MCP9808 tempSensor = Adafruit_MCP9808();
33
34 String tempOffset;
35
36 /* WiFi Setup */
37 #include "constants.h"
38 int wifiStatus = WL_IDLE_STATUS;
39 WiFiClient wifi;
40
41 HttpClient client = HttpClient(wifi, API_ENDPOINT, API_PORT);
42
43 /* Sensor & LED & Button Setup */
44 int feedingButtonPin = 14;
45 int recordingSwitchPin = 32;
46
```

breadwinner-life / hardware

Private

Unwatch4Unstar2Fork0

CodeIssuesPull requestsActionsProjectsSecurityInsightsSettings

masterhardware / LICENSE

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fredbenenson Create LICENSE

Latest commit d94e5fe 12 minutes ago

History

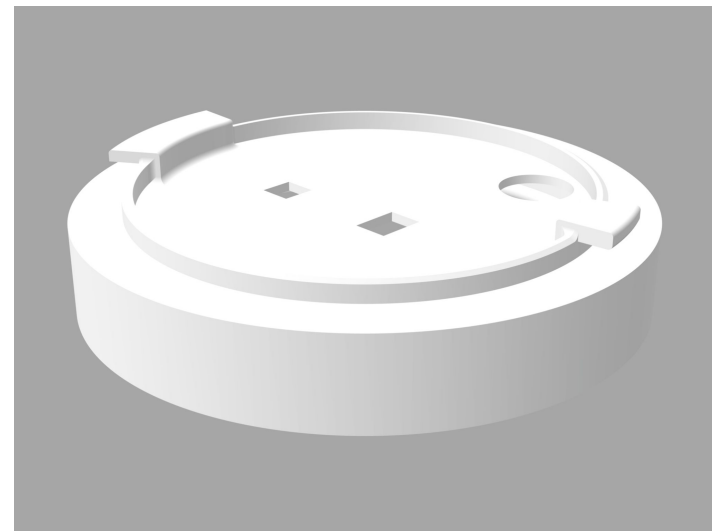
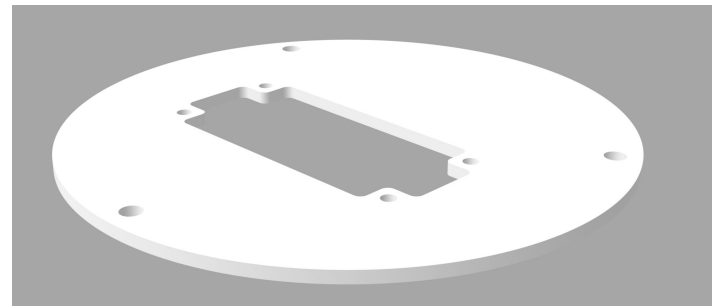
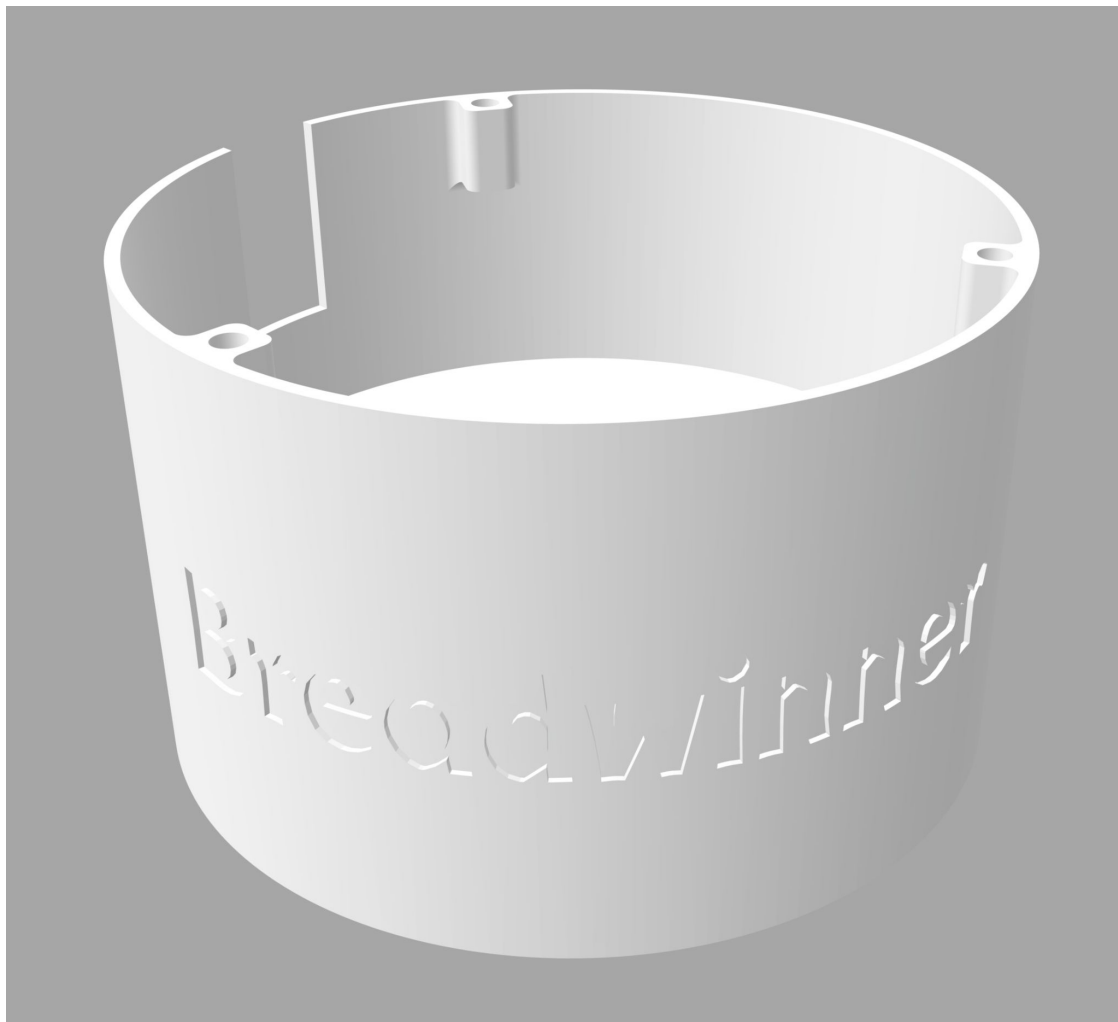
1 contributor

674 Lines (553 sloc)34.3 KB

RawBlame

```
1 GNU GENERAL PUBLIC LICENSE
2 Version 3, 29 June 2007
3
4 Copyright (C) 2007 Free Software Foundation, Inc. <https://fsf.org/>
5 Everyone is permitted to copy and distribute verbatim copies
6 of this license document, but changing it is not allowed.
7
8 Preamble
9
10 The GNU General Public License is a free, copyleft license for
11 software and other kinds of works.
12
13 The licenses for most software and other practical works are designed
14 to take away your freedom to share and change the works. By contrast,
15 the GNU General Public License is intended to guarantee your freedom to
16 share and change all versions of a program—to make sure it remains free
17 software for all its users. We, the Free Software Foundation, use the
18 GNU General Public License for most of our software; it applies also to
19 any other work released this way by its authors. You can apply it to
20 your programs, too.
21
22 When we speak of free software, we are referring to freedom, not
23 price. Our General Public Licenses are designed to make sure that you
24 have the freedom to distribute copies of free software (and charge for
25 them if you wish), that you receive source code or can get it if you
26 want it, that you can change the software or use pieces of it in new
27 free programs, and that you know you can do these things.
28
29 To protect your rights, we need to prevent others from denying you
30 these rights or asking you to surrender the rights. Therefore, you have
31 certain responsibilities if you distribute copies of the software, or if
32 you modify it: responsibilities to respect the freedom of others.
33
34 For example, if you distribute copies of such a program, whether
35 gratis or for a fee, you must pass on to the recipients the same
36 freedoms that you received. You must make sure that they, too, receive
37 or can get the source code. And you must show them these terms so they
38 know their rights.
39
40 Developers that use the GNU GPL protect your rights with two steps:
41 (1) assert copyright on the software, and (2) offer you this License
42 giving you legal permission to copy, distribute and/or modify it.
43
44
```

<https://github.com/breadwinner-life/community-hardware>



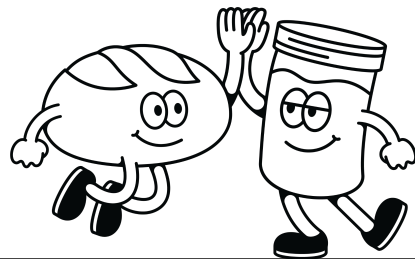
Sarah Pavis / [Measure Twice Labs](#)

Current Breadwinner BOM

- Feather Huzzah ESP32
 - Sensor - Time of Flight VL6180
 - Sensor - Temperature MCP9808
 - Feather Adalogger
 - 8gb Sandisk SD Card
 - Feather Proto
 - Long Female Headers - Feather
 - Short Male Headers - Feather
 - Neopixel breakout (5 pack)
 - Male/Male Jumper Wires
 - Buttons
-

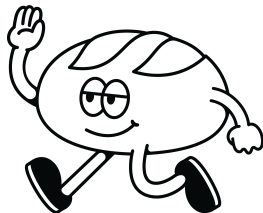
What this is

- A contribution back to the community that inspired me
- Some insight into how I've been building Breadwinner
- A cry for help writing firmware



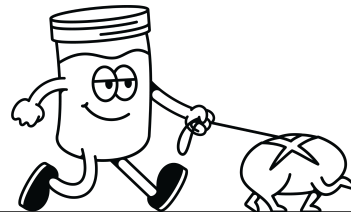
What this isn't

- Good Code That I Am Proud Of (it just works)
- Anything close to final or production code
- A “true” client for Breadwinner (no API access, yet)
- Very well documented



Help

- Let me know if you try this at home
- If you do, we can talk about API access



Data? Data.

There's a lot of interesting questions we can begin to ask and answer when we have lots of data from starters.

- Your starter's performance relative to the rest of the community (e.g. your starter is in the 98% for growth)
 - Correlate location and temperature with performance
 - Identify clusters & starters based on speed
 - Use bake ratings for “ground truth” on starter performance
-

Thank you

<https://github.com/breadwinner-life/community-hardware>

[@tryBreadwinner](#)

Questions? Answers?

Drop me a line: fred@breadwinner.life

