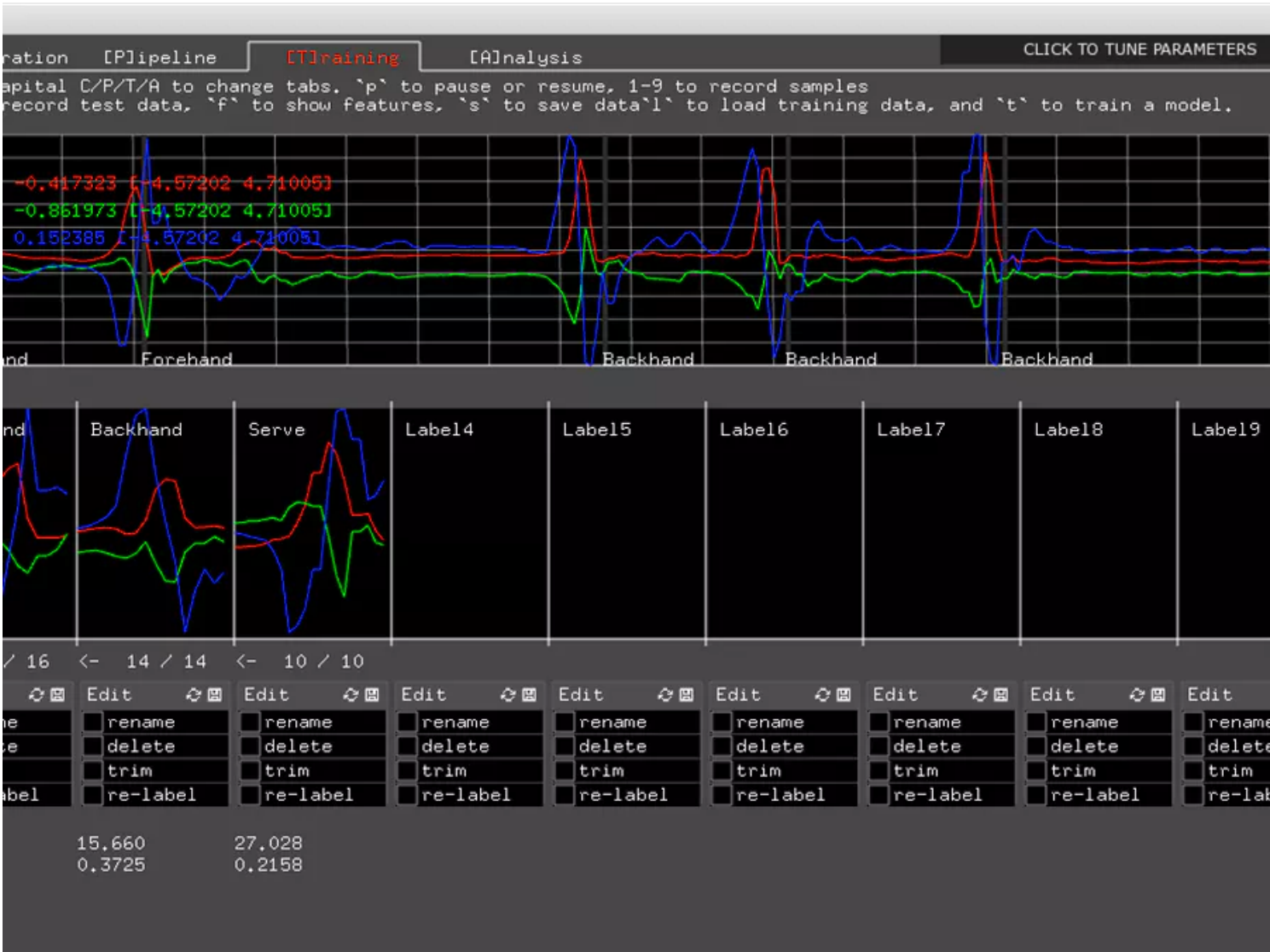


Gesture Recognition Using Accelerometer and ESP

Made by mellis (/mellis) - Published in Adafruit (/adafruit), Arduino (/arduino), Intel (/intel), and SparkFun (/sparkfun)



ABOUT THIS PROJECT

The ESP system make it easy to recognize gestures you make using an accelerometer.

🔗 [remote control \(/projects/tags/remote+control\)](#) 🔗 [machine learning \(/projects/tags/machine+learning\)](#) 🔗 [gestures \(/projects/tags/gestures\)](#)

PROJECT INFO

| | |
|------------|--|
| Type | Full instructions provided |
| Difficulty | Intermediate (/projects?difficulty=intermediate) |
| Published | May 20, 2016 |
| License | CC BY-SA (http://creativecommons.org/licenses/by-sa/4.0) |

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THINGS USED IN THIS PROJECT

Hardware components:

| | | | | | |
|---|---|---|---|---|---|
|  | <p>Arduino 101 & Genuino 101 (/arduino/products/arduino-101-genuino-101)</p> <p>Includes a built-in accelerometer, so no additional components or circuitry is required.</p> | × | 1 | (https://store.arduino.cc/product/GBX00005) |  |
|  | <p>Arduino UNO & Genuino UNO (/arduino/products/arduino-uno-genuino-uno)</p> <p>You can use an Arduino Uno (or other Arduino) instead of the Arduino 101, but you'll need an accelerometer, too.</p> | × | 1 | (https://store.arduino.cc/product/GBX00066) |  |
|  | <p>Adafruit Analog Accelerometer: ADXL335 (/adafruit/products/analog-accelerometer-adxl335)</p> <p>Use this (or the SparkFun equivalent) if you're using an Arduino other than the Arduino 101 (which has an accelerometer built-in).</p> | × | 1 | (http://www.adafruit.com/product/163) |  |
|  | <p>SparkFun Triple Axis Accelerometer Breakout - ADXL335 (/sparkfun/products/sparkfun-triple-axis-accelerometer-breakout-adxl335)</p> <p>Use this (or the Adafruit equivalent) if you're using an Arduino other than the Arduino 101 (which has an accelerometer built-in).</p> | × | 1 | (https://www.sparkfun.com/products/9269) |  |

STORY

Overview

This tutorial shows you how to incorporate basic gesture recognition into your Arduino projects using the ESP system (https://github.com/damellis/ESP). For example, you might recognize different tennis gestures like a forehand, backhand, and serve; elements of a dance routine; weight-lifting gestures; etc. The gestures are sensed using an accelerometer and sent to the ESP application running on your computer. ESP uses a simple machine learning algorithm to match the live accelerometer data to recorded examples of different gestures, sending a message back to the Arduino when it recognizes a gesture similar to one of the examples. The system only recognizes individual occurrences of discrete gestures; it doesn't provide information about how the gesture is performed. Still, it can be used for a wide range of interactive applications.

Download the ESP gesture recognition application:

[Read more](#)

- Mac: ESP-Gestures-Mac-20161028.zip (https://github.com/damellis/ESP/releases/download/20161028/ESP-)

CODE

Arduino ADXL335 Code

This code reads from an ADXL335 connected to an Arduino: the X-axis pin of the accelerometer should be connected to pin A5 of the Arduino, the Y-axis to A4, and the Z-axis to A3. Readings are sent over the serial (USB) port at 9600 baud, as tab-separated, newline-terminated ASCII data.



ADXL335 by [mellis](#)

OPEN CODE

ADXL335.ino

ReadMe.adoc

```
1  .n = A2;
2  .n = A1;
3  .n = A0;
4
5  se are only used if you're plugging the ADXL335 (on the
6  fruit breakout board) directly into the analog input pins
7  our Arduino. See comment below.
8  pin = A5;
9  tpin = A4;
10 pin = A3;
11
12 ▾ setup() {
13   l.begin(9600);
14
15   comment the following lines if you're using an ADXL335 on an
16   adafruit breakout board (https://www.adafruit.com/products/163)
17   and want to plug it directly into (and power it from) the analog
```

Arduino 101 Accelerometer Code

Reads accelerometer data from the built-in accelerometer on an Arduino 101. The readings are sent over the serial (USB) port at 9600 as newline-terminated, tab-separated ASCII data.

Arduino101_Accelerometer by mellis

[OPEN CODE](#)

Arduino101_Accelerometer

ReadMe.adoc

```

1  #include "CurieIMU.h"
2
3  int x, y, az;
4
5  void setup() {
6    Serial.begin(9600);
7    Serial.println("CurieIMU");
8
9    CurieIMU.begin();
10
11    CurieIMU.testConnection() {
12      Serial.println("CurieImu connection failed");
13    }
14
15    CurieIMU.setAccelerometerRange(8);
16
17

```

CREDITS



mellis (/mellis)

(/mellis)

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Thanks to **Ben Zhang** (<https://www.benzhang.name>), **Bjoern Hartmann** (<http://www.cs.berkeley.edu/~bjoern/>), **Nick Gillian** (<http://nickgillian.com/grt/>), and **Audrey Leung** (<http://audreyl.me>).

REPLICATIONS

Did you replicate this project? Share it!

 I made one

Love this project? Think it could be improved? Tell us what you think!

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COMMENTS

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(/stddev) **agustin genoud (/stddev)**
8 months ago

Hi! this is great! I'm using it right now to test a few arm movements, trying to see how the system reacts and learn from them, but everything works perfect!

Can I ask you for place to search this kind of techniques? something like the wiki you posted, which was very useful, best!



(/BatinAM) **Alexey Batin (/BatinAM)**
7 months ago

Hi from E-Kat, Russia!

Really, good example. Thanks for help of understanding...

Regards,

Alexey Batin.



(/Shiva_B) **Shiva_B (/Shiva_B)**
4 months ago

Lucky that i found this application. Thanks to the developer. But i am facing problems with the app. it doesnt seem to get readings from my UNO board, since i dont see any graph. initially, it was showing 0xc000007b failed to start error. i installed Visual Studio Community 2015, which fixed the error. i am using Windows 10
Plees can i get some help?



(/elfalto) **elfalto (/elfalto)**
2 months ago

Hi! Super interesting project! I'd love to try it but keep having problems. I have an adxl335 on an Arduino Uno and use the first code example. The Arduino IDE Serial-Plotter and Monitor put out the correct values, but the ESP Gestures app somehow can't receive the data. When I try to start the calibration by pressing 1 an error occurs.

I have no idea what could be wrong because the error occurs on Windows 8.1 as well as Mac OS X 10.12.1 with different Arduinos (UNO and Wifi). The Windows PC has Visual Studio 2015 installed.

Any ideas? I'd really appreciate it!



(/RichAndMeaningful) **RichAndMeaningful (/RichAndMeaningful)**
23 days ago

Any updates on this? I'm having the same problem.

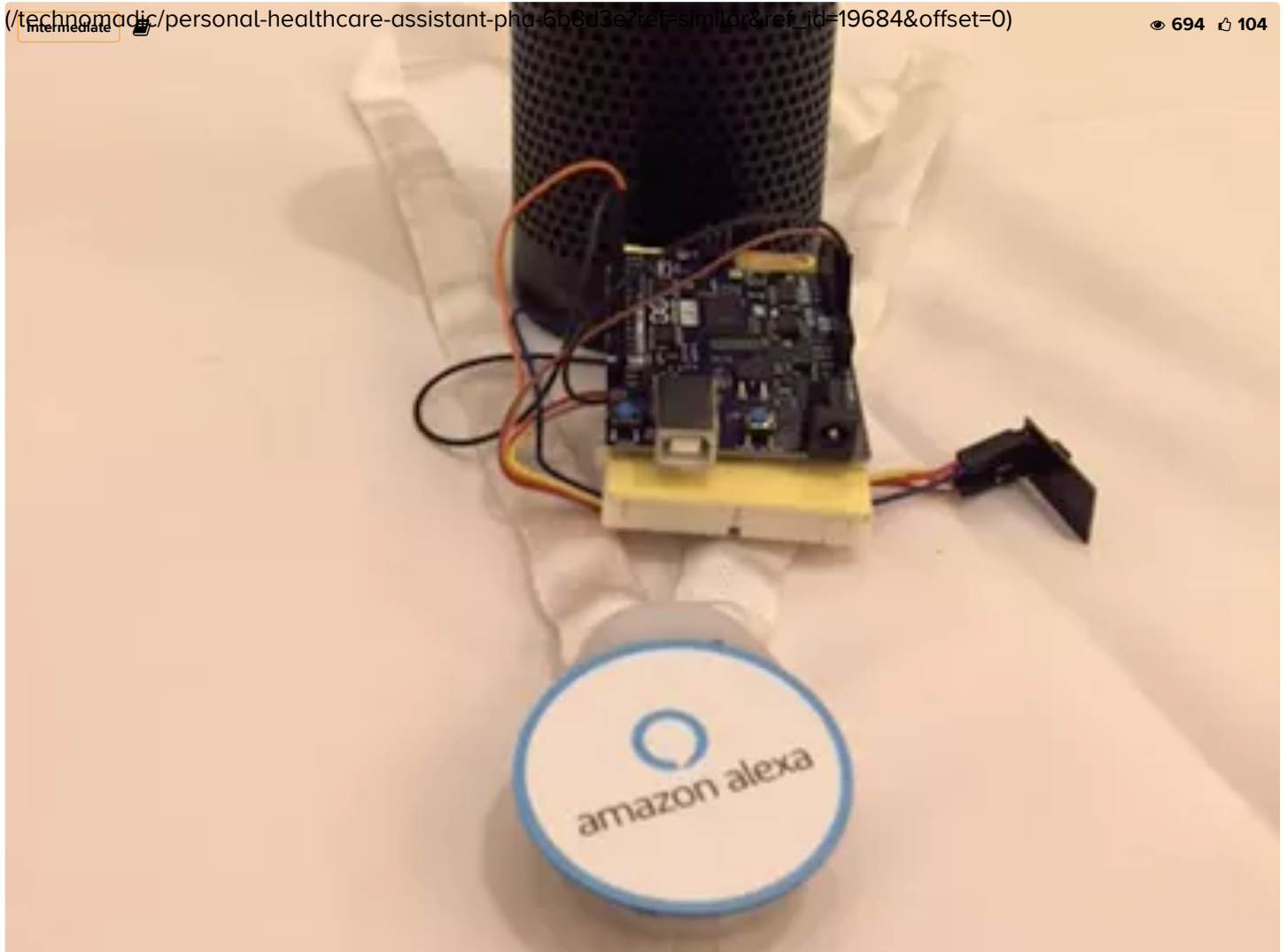
When I press 1, I get a message saying "ESP.exe has stopped working". I'm running Windows 10 and I downloaded the Windows Zip provided in the directions.



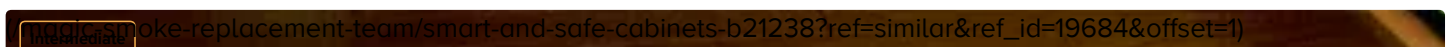
(/anmol-singhal) **Anmol Singhal (/anmol-singhal)**
13 days ago

the esp gesture software provided does not work despite following all the given instructions. tried all the given versions windows mac and Linux. NO one works.

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Intermediate

62 2

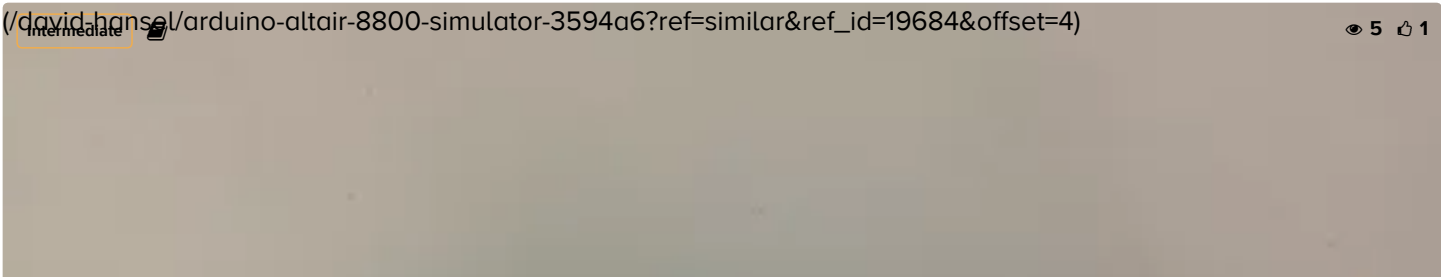




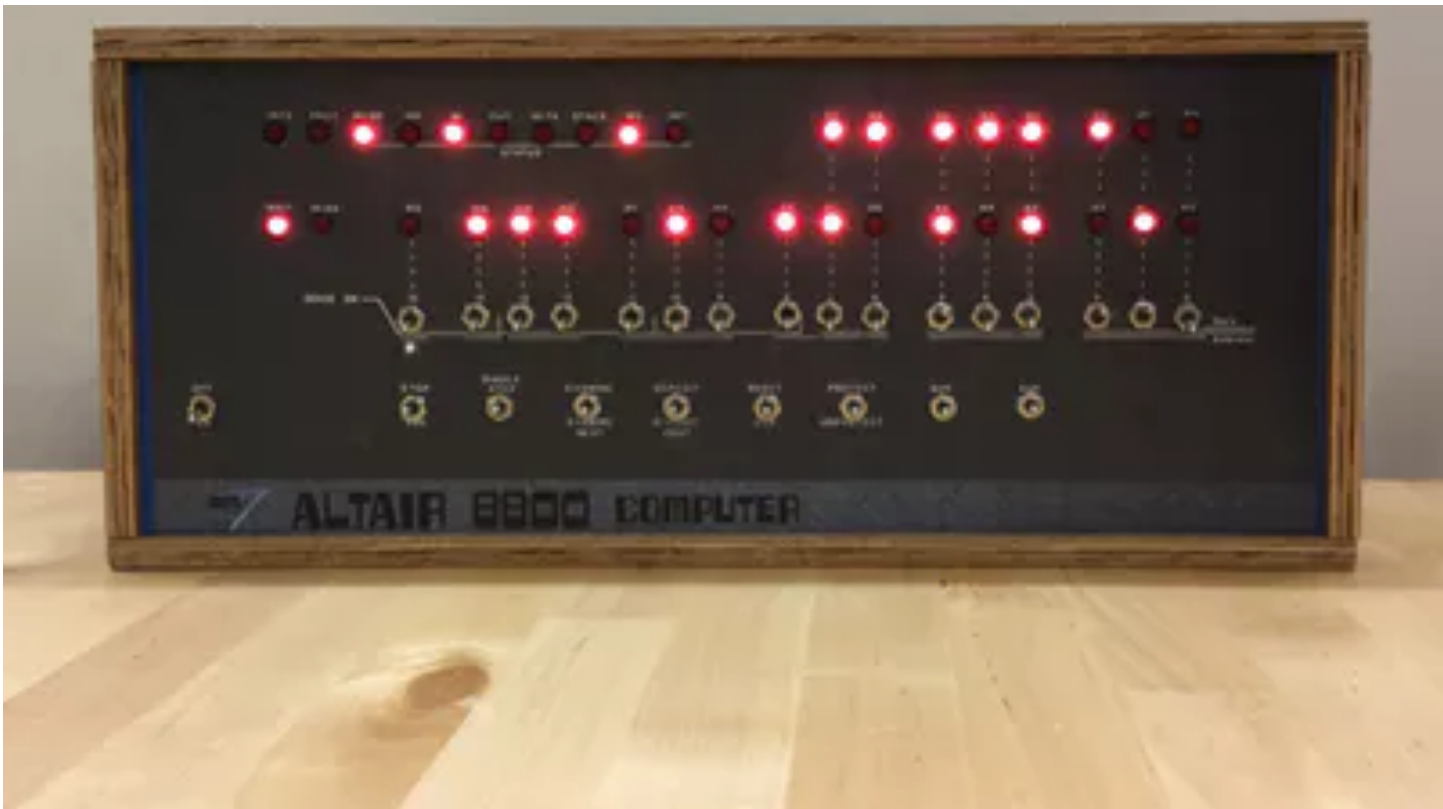
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