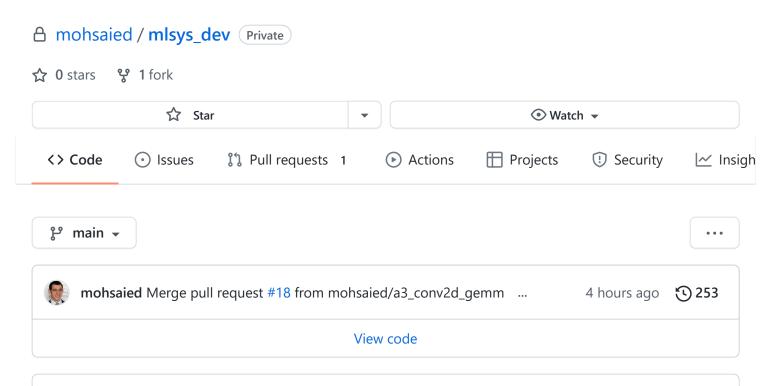
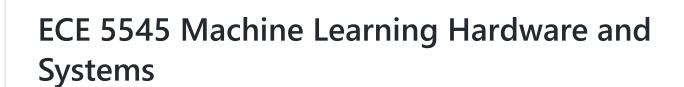
$\equiv$ 

README.md





# Course Development Repo.

# Procedure for adding *finalized* files to main:

- Branch from dev into a new staging branch names with each feature. For example if
  the training script is ready, we can call the new branch stage\_train. Keep only the
  files that are ready to be added to main.
- Clean up files in the staging branch (e.g. stage\_train) from any unnecessary comments or imports.
- Test the file thoroughly and set all the default values to the best ones we found, and the ones we think students should use in their final code (our model solution).
- Add instructions and sections within the file (remember this will be used in colab) to explain what's going on to the students.
- [Important] Create a pull request where I will leave comments and ask questions about each file before adding it to main. I will also use this time to go test each file and add any missing instructions, notes, figures to make the lab handouts complete.

0

- After all comments are resolved, I will merge the staging branch (e.g. stage\_train) with main, then we can move on to the next file.
- Note: we can have multiple branches and multiple pull requests going on in parallel.
- Another Note: Please do not commit anything to main without this procedure.
   Normally there is branch protection to reject commits to a final (release) branch, but I am using a free github account and apparently it's not supported.

## Releases

No releases published Create a new release

## **Packages**

No packages published Publish your first package

### Contributors 4



Lrhelling



mohsaied Mohamed S. Abdelfattah



Allan518 Allan Zhang



ZhanqiuHu

## Languages

Jupyter Notebook 95.7%

• **Python** 4.3%



<> Code Issues **1** Pull requests 1 Actions Projects Security ✓ Insigh

Edit <> Code ▼ Jump to bottom

# Course review #19

mohsaied merged 13 commits into main from course\_review [ 5 hours ago **№** Merged

Conversation 0 Commits 13

Checks 0

Files changed 9

Allan518 commented 9 days ago

#### @mohsaied

While creating the new md file, I also created a dedicated folder "image" to store all image resources, I moved the RoofLine Plot image to this newly created image folder as well for consistency One suggestion I have is to make our folder name and file name more intuitive so when user navigate the github, they have an good idea by its name. For example: Change folder name from a2 to "Course Notebooks"; change file name from a2.md to "assignment\_2\_keyword\_spotting\_with\_microcontrollers", etc

 $\odot$ 

# Allan518 added 13 commits 9 days ago

Arduino Nano 33 BLE Tutorial.md ... 9b68b2f

Update arduino nano 33 ble tutorial.md b0e9b04

Create serial monitor.png 3d59fc5

Add images to be used at MD files 0cb23db

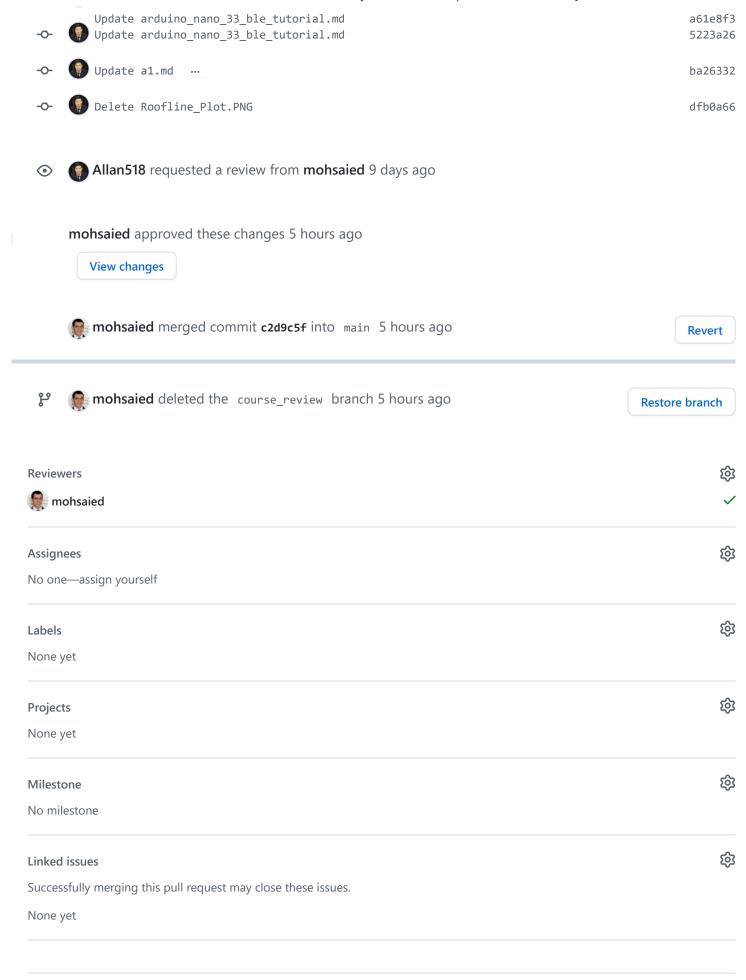
Move image files under the same folder 7d5d95d

🌑 Update arduino nano 33 ble tutorial.md 5279486

Delete open\_micro\_speech.png.png b313c85

Delete left\_arrow.png.png 7345b71

Add files via upload 5c3f49b



### 2 participants





# ↑ mohsaied / mlsys\_dev (Private)

# Course review #19

Merged ) mohsaied merged 13 commits into main from course\_review 📮 5 hours ago

Conversation 0 Commits 13 Checks 0 Files changed 9

File filter ▼ Conversations ▼ Jump to ▼ 🕄 ▼

```
2 assignment_handouts/a1.md
44
                                                  44
                                                  45
45
       ## 2. Roofline Plots
                                                         ## 2. Roofline Plots
46
       46
                                                         47
         <img src= "./Roofline Plot.PNG"</pre>
                                                  47
                                                           <img src= "./images/Roofline_Plot.png"</pre>
       height="300" class="center" />
                                                         height="300" class="center" />
48
                                                  48
       49
                                                  49
                                                  50
50
       Do online research or coding to complete
                                                         Do online research or coding to complete
       the following graphs. We have provided
                                                         the following graphs. We have provided
       starter code and additional guidance in
                                                         starter code and additional guidance in
       the Roofline Plot Notebook.
                                                         the Roofline Plot Notebook.
```

```
+ Open the micro_speech sketch under
       Examples -> Arduino TensorFlowLite ->
       micro_speech.
 9
     + 
10
         <img src=</pre>
       "./images/open_micro_speech.png"
       height="400" class="left" />
11
     + 
12
13
     + #### Step 2
14
    + Connect your board. Then compile and
       upload the code to your board by clicking
       the arrow on the top left of the screen.
       Alternatively, you can verify your code
       first by clicking the check mark then the
       arrow.
15
     + 
16
         <img src= "./images/left_arrow.png"</pre>
       height="100" class="left" />
17
     + 
18
     + Try saying yes, no, and any other words to
       see if the program correctly identifies
       the words you are saying as "yes", "no",
       "unknown", or "silence".
19
20
     + #### Step 3
21
    + After the code is successfully uploaded to
       your board, open the Serial Monitor by
       clicking the icon on the top right. You
       may need to reconnect your port.
22
    + 
23
         <img src=</pre>
       "./images/serial_monitor_icon.png"
       height="100" class="left" />
24
     + 
25
     + + 
26
     + <img src= "./images/serial_monitor.png"</pre>
       height="300" class="left" />
27
     + 
28
     + If your board is not responsive enough,
       you can lower its detection threshold.
       Locate the file recognize_commands.h. On
       line 135, you will see where the
       detection_threshold parameter is set. If
       you lower the value, your board will
       become more responsive, but it will also
```

have a higher false positive rate. You will need to recompile after adjustment. 29 30 + #### Step 4 31 + Find the file micro\_features\_model.cpp under the same directory with the micro\_speech.ino file. You will see a variable named g\_model. Once you have finished running the model\_conversion notebook, you will have a file in .cpp format. Open or print out the file in your terminal using "cat". You will find a dictionary of bytes for your own model, and also an integer indicating the length of your model. Replace the default g\_model with your own model, and g\_model\_len with your own model's length. Make sure the variable types are still the same: const unsigned char g\_model and const int g model int. 32 + 33 <img src= "./images/model\_top.png"</pre> height="300" class="left" /> 34 + 35 + 36 <img src= "./images/model\_bottom.png"</pre> height="100" class="left" /> 37 + 38 39 40 41 42 + #### Step 5 43 + Our model requires some additional op resolvers than the default model provided in the micro\_speech example. Therefore, we need to modify the op resolver part in micro\_speech.ino as follows: 44 45 + static tflite::MicroMutableOpResolver<6> micro\_op\_resolver(error\_reporter); 46 (micro op resolver.AddFullyConnected() != kTfLiteOk) { 47 return; 48 }

```
12/23/21, 6:29 PM
```

```
if (micro_op_resolver.AddSoftmax() !=
       kTfLiteOk) {
50
           return;
51
52
         if (micro_op_resolver.AddReshape() !=
       kTfLiteOk) {
53
           return;
54
55
         if (micro_op_resolver.AddConv2D() !=
       kTfLiteOk) {
56
           return;
57
         if (micro_op_resolver.AddTranspose() !=
58
       kTfLiteOk) {
59
           return;
60
61
         if (micro_op_resolver.AddPad() !=
       kTfLiteOk) {
62
           return;
63
64
65
66
     + #### Step 6
67
     + Upload your model to the board using the
       same process in Step 2.
```

```
    → 0 ■■■■ assignment_handouts/Roofline_Plot.PNG → assignment_handouts/images/Roofline_Plot.png □

    File renamed without changes.
```

```
→ BIN +20.5 KB assignment_handouts/images/left_arrow.png □

Binary file not shown.
```

```
→ BIN +20.3 KB assignment_handouts/images/model_bottom.png

□

Binary file not shown.
```

```
→ BIN +106 KB assignment_handouts/images/model_top.png □

Binary file not shown.
```

→ BIN +823 KB assignment_handouts/images/open_micro_speech.png □
Binary file not shown.
_
→ BIN +239 KB assignment_handouts/images/serial_monitor.png  □
Binary file not shown.
→ BIN +7.31 KB assignment_handouts/images/serial_monitor_icon.png  □
Binary file not shown.