

TP6

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Faculty of Information and Communication
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Course : PMH

To Mr. Shiam Beehary

Task 1

1. The app is first being tested then a dataset is created in teachable



The screenshot shows a Flutter mobile application running on an iPhone X simulator. The app's title is "Plant Recogniser". The main screen displays a large blue button with the text "Please pick a photo". Below the button, it says "This app can only access the photos you select". There are two tabs at the bottom: "Photos" (selected) and "Albums". A camera icon is present, and below it, the message "No photos or videos".

On the left, there is an integrated development environment (IDE) showing the code for "main.dart". The code includes a copyright notice and the main application logic:

```
Click here to ask BlackBox to help you code faster!
// Copyright (c) 2022 Kodoco LLC

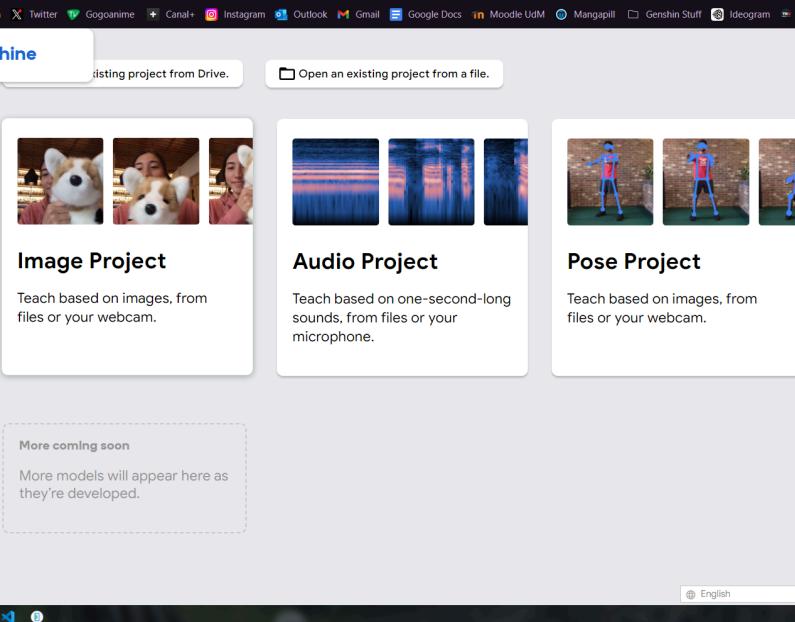
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// in the Software without restriction, including without limitation the rights
// to use, copy, modify, merge, publish, distribute, sublicense, and/or sell
// copies of the Software, and to permit persons to whom the Software is
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// Software in any work that is designed, intended, or marketed for pedagogical
// or instructional purposes related to programming, coding,
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// AUTHORS OR COPYRIGHT HOLDERS BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER
// LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM,
// OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS IN
// THE SOFTWARE.

import 'package:flutter/material.dart';
import 'app.dart';

void main() async {
  WidgetsFlutterBinding.ensureInitialized();
  runApp(const MainApp());
}
```

The terminal window at the bottom shows the build process:

```
"Install Android SDK Platform 31 (revision: 1)" complete.
"Install Android SDK Platform 31 (revision: 1)" finished.
Parameter format not correct -
✓ Built build/app/outputs/flutter-apk/app-debug.apk.
Connecting to VM Service at ws://127.0.0.1:59088/UDPTngkBqY-/ws
I/flutter ( 5737): Start loading of classifier with labels at assets/labels.txt, model at model_unquant.tflite
D/EGL_emulation( 5737): app_time_stats: avg=76253.45ms min=10.92ms max=228482.55ms count=3
```

The screenshot shows the Teachable Machine web interface. On the left, there is a sidebar with various icons. The main area features three projects:

- Image Project**: Teach based on images, from files or your webcam.
- Audio Project**: Teach based on one-second-long sounds, from files or your microphone.
- Pose Project**: Teach based on images, from files or your webcam.

A dashed box at the bottom left contains the text "More coming soon" and "More models will appear here as they're developed."

≡ Teachable Machine

Rose

File

Choose images from your files, or drag & drop here

Import images from Google Drive

Images will be cropped to square

3 Image Samples

Daisy

Add Image Samples:

Webcam Upload

Lily

Add Image Samples:

Webcam Upload

Training

Train Model

Advanced

Preview

Export Model

You must train a model on the left before you can preview it here.

≡ Teachable Machine

Rose

497 Image Samples

Webcam Upload

Daisy

501 Image Samples

Webcam Upload

Dandelion

646 Image Samples

Webcam Upload

Tulip

607 Image Samples

Webcam Upload

Training

Model Trained

Advanced

Preview

Export Model

Input ON File

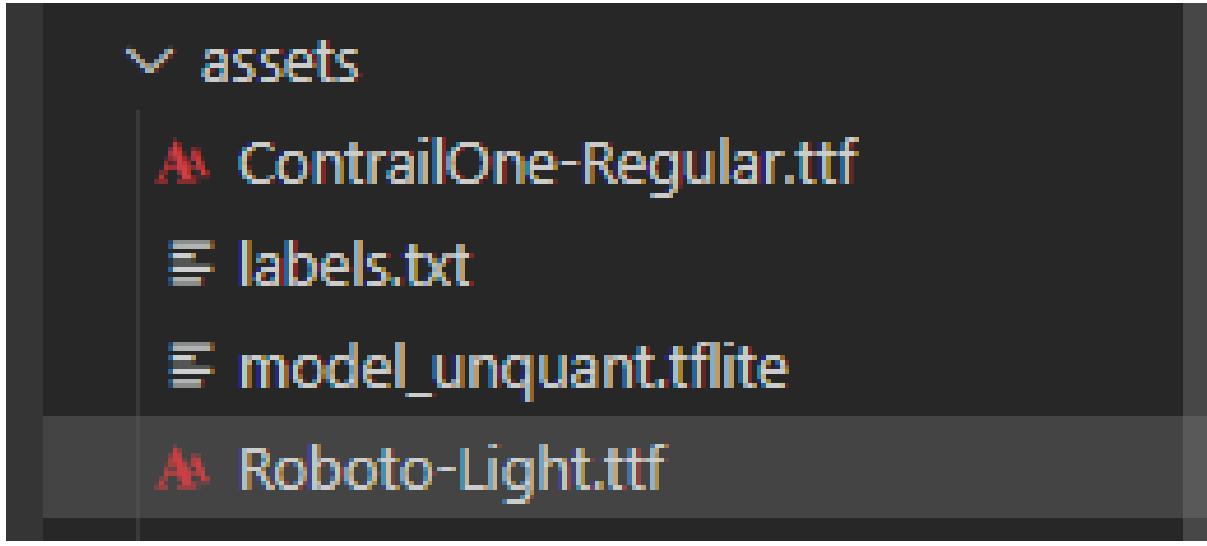
Choose images from your files, or drag & drop here

Import images from Google Drive

Output

Rose	100%
Daisy	0%
Dand...	0%
Tulip	0%
Sunfl...	0%

2. The models were moved to the assets folder



4. The code is modified to be able to use ML and classifiers are imported

```
analysis_options.yaml  pubspec.yaml

pubspec.yaml
16 # instructional purposes related to programming, coding, application development,
17 # or information technology. Permission for such use, copying, modification,
18 # merger, publication, distribution, sublicensing, creation of derivative works,
19 # or sale is expressly withheld.
20
21 # THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR
22 # IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY,
23 # FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE
24 # AUTHORS OR COPYRIGHT HOLDERS BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER
25 # LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM,
26 # OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS IN
27 # THE SOFTWARE.
28
29 name: plantrecogniser
30 description: Plant Recogniser in Flutter using TensorFlow Lite
31 publish_to: 'none'
32
33 version: 1.0.0+1
34
35 environment:
36   | sdk: ">2.17.0 <3.0.0"
37
38 dependencies:
39   flutter:
40     | sdk: flutter
41   image_picker: ^0.8.6
42   collection: ^1.16.0
43   image: ^3.2.2
44   tfLite_flutter: ^0.9.0
45   tfLite_flutter_helper: ^0.3.1
46
47
48 + Code Suggestions
49
50 dev_dependencies:
51   flutter_lints: ^2.0.1
52   flutter_test:
53     | sdk: flutter
54
55
56 COMMENTS TERMINAL OUTPUT DEBUG CONSOLE PORTS SEARCH ERROR
57 D/EGL_emulation( 5737): app_time_stats: avg=76253.45ms min=10.92ms max=228482.55ms count=3
58 D/CompatibilityChangeReporter( 5737): Compat change Id reported: 76294732, UID 10191; state: ENABLED
59 D/EGL_emulation( 5737): app_time_stats: avg=168275.52ms min=3.51ms max=1177856.88ms count=7
60 D/EGL_emulation( 5737): app_time_stats: avg=1892.32ms min=1892.32ms max=1892.32ms count=1
61 D/EGL_emulation( 5737): app_time_stats: avg=126.56ms min=4.07ms max=1369.08ms count=12
62 D/EGL_emulation( 5737): app_time_stats: avg=1592.11ms min=1592.11ms max=1592.11ms count=1
63 E/OpenGLRenderer( 5737): Unable to match the desired swap behavior.
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```

The screenshot shows a development environment with the following components:

- Code Editor:** The main window displays the `classifier.dart` file. It contains Dart code for a classifier class, including imports for `foundation.dart`, `image.dart`, `classifier_category.dart`, `classifier_model.dart`, and `tflite_flutter_helper.dart`. There are two unused import warnings: `'package:tflite_flutter_helper/tflite_flutter_helper.dart'` and `'package:tflite_flutter_helper/tflite_flutter_helper.dart'`.
- Terminal:** Below the code editor is a terminal window showing build logs. It includes memory usage statistics (e.g., 0 1591k, 32 1591k, 100 1591k), a warning about a subdirectory conflict, and a question asking if the user wants to overwrite a file.
- File Browser:** A sidebar on the right shows the project structure, including files like `pubspec.yaml`, `classifier.dart`, and `main.dart`.
- Bottom Bar:** Includes tabs for Comment, Code, Comment Chat, Blackbox, Java Error, and Search Error. It also shows the current file (`classifier.dart`), line number (Line 36), column (Col 1), spaces (Spaces: 2), encoding (UTF-8), and file type (LF).

```

lib > classifier > classifier.dart > ...
8   // furnished to do so, subject to the following conditions:
9
10  // The above copyright notice and this permission notice shall be included in
11  // all copies or substantial portions of the Software.
12
13  // Notwithstanding the foregoing, you may not use, copy, modify, merge, publish,
14  // distribute, sublicense, create a derivative work, and/or sell copies of the
15  // Software in any work that is designed, intended, or marketed for pedagogical
16  // or instructional purposes related to programming, coding,
17  // application development, or information technology. Permission for such use,
18  // copying, modification, merger, publication, distribution, sublicensing,
19  // creation of derivative works, or sale is expressly withheld.
20
21  // THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR
22  // IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY,
23  // FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE
24  // AUTHORS OR COPYRIGHT HOLDERS BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER
25  // LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM,
26  // OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS IN
27  // THE SOFTWARE.
28
29  import 'package:flutter/foundation.dart';
30  import 'package:image/image.dart';
31
32  import 'classifier_category.dart';
33  import 'classifier_model.dart';
34
35  import 'package:tflite_flutter_helper/tflite_flutter_helper.dart'; Unused import: 'package:tflite_flutter_helper/tflite_flutter_helper.dart'. Try removing the import directive.
36
37  typedef ClassifierLabels = List<String>;
38
39  Comment Code
40  class Classifier {
41    final ClassifierLabels labels; The value of the field 'labels' isn't used. Try removing the field, or using it.
42    final ClassifierModel model; The value of the field 'model' isn't used. Try removing the field, or using it.
43
44    Classifier.((
45      required ClassifierLabels labels,
46      required ClassifierModel model,
47
48    )
49
50    {
51      super();
52      this.labels = labels;
53      this.model = model;
54    }
55
56    void dispose() {
57      model.dispose();
58    }
59
60    ClassifierCategory predict(Image image) {
61      debugPrint(
62        'Image: ${image.width}x${image.height}, '
63        'size: ${image.length} bytes',
64      );
65
66      // TODO: _preProcessInput TODO: _preProcessInput
67      // TODO: run TF_Lite TODO: run TF_Lite
68      // TODO: _postProcessOutput TODO: _postProcessOutput
69
70      return ClassifierCategory('Unknown', 0);
71    }
72
73    static Future<ClassifierLabel> loadLabels(String labelsFileName) async {
74      // #
75      final rawLabels = await FileUtil.loadLabels(labelsFileName);
76
77      // #
78      final labels = rawLabels
79          .map((label) => label.substring(label.indexOf(' ')).trim())
80          .toList();
81
82      debugPrint('Labels: $labels');
83      return labels;
84    }
85  }
86
87
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```

5. Then the image processing is worked on

```

139     debugPrint("Top category: $topResult");
140
141     return topResult;
142   }
143
144   List<ClassifierCategory> _postProcessOutput(TensorBuffer outputBuffer) {
145     final probabilityProcessor = TensorProcessorBuilder().build();
146
147     probabilityProcessor.process(outputBuffer);
148
149     final labelledResult = TensorLabel.fromList(_labels, outputBuffer);
150
151     final categoryList = <ClassifierCategory>[];
152     labelledResult.getMapWithFloatValue().forEach((key, value) {
153       final category = ClassifierCategory(key, value);
154       categoryList.add(category);
155       debugPrint('label: ${category.label}, score: ${category.score}');
156     });
157     categoryList.sort((a, b) => (b.score > a.score ? 1 : -1));
158
159     return categoryList;
160   }
161
162   TensorImage _preProcessInput(Image image) {
163     // #
164     final inputTensor = TensorImage(_model.inputType);
165     inputTensor.loadImage(image);
166
167     // #
168     final minLength = min(inputTensor.height, inputTensor.width);
169     final cropOp = ResizeWithCropOrPadOp(minLength, minLength);
170
171     // #
172     final shapeLength = _model.inputShape[1];
173     final resizeOp = ResizeOp(shapeLength, shapeLength, ResizeMethod.BILINEAR);
174
175     // #
176     final normalizeOp = NormalizeOp(127.5, 127.5);
177
178   }
179
180   void main() {
181     runApp(MaterialApp(
182       title: 'Plant Recogniser',
183       home: HomeScreen(),
184     ));
185   }
186 }

```

COMMENTS TERMINAL **OUTPUT** DEBUG CONSOLE PORTS SEARCH ERROR

> ~ OUTPUT

```

D:\Flutter\packages\flutter\lib\src\material\bottom_navigation_bar_theme.dart:5:8: Error: Dart library 'dart:ui' is not available on this platform.
import 'dart:ui' show lerpDouble;
           ^

```

[Done] exited with code=254 in 14.316 seconds

File Comment Code Code Chat Blackbox Java Error Search Error Ln 1, Col 1 Spaces:2 UTF-8 LF () Dart Blackbox Pixel_3a_API_34_extension_level_7_x86_64 (android-x64 emulator) Colorize: 0 variables Colorize

File Edit Selection View Go Run Terminal Help

EXPLORER plant_recogniser.dart lib/widget analysis_options.yaml pubspec.yaml classifier.dart lib/classifier classifier_model.dart lib/classifier_model.dart main.dart lib/main.dart

STARTER dart_tool vscode launch.json settings.json android assets ContraOne-Regular.ttf labels.txt model_unquant.tflite Roboto-Light.ttf SquadraOne-Regular.ttf build ios flutter-plugins flutter-plugins-dependencies analysis_options.yaml install.flutter LICENSE libpubspec.lock pubspec.yaml

PROBLEMS

BUILD FAILED in 13s

Exception: Gradle task assembleDebug failed with exit code 1

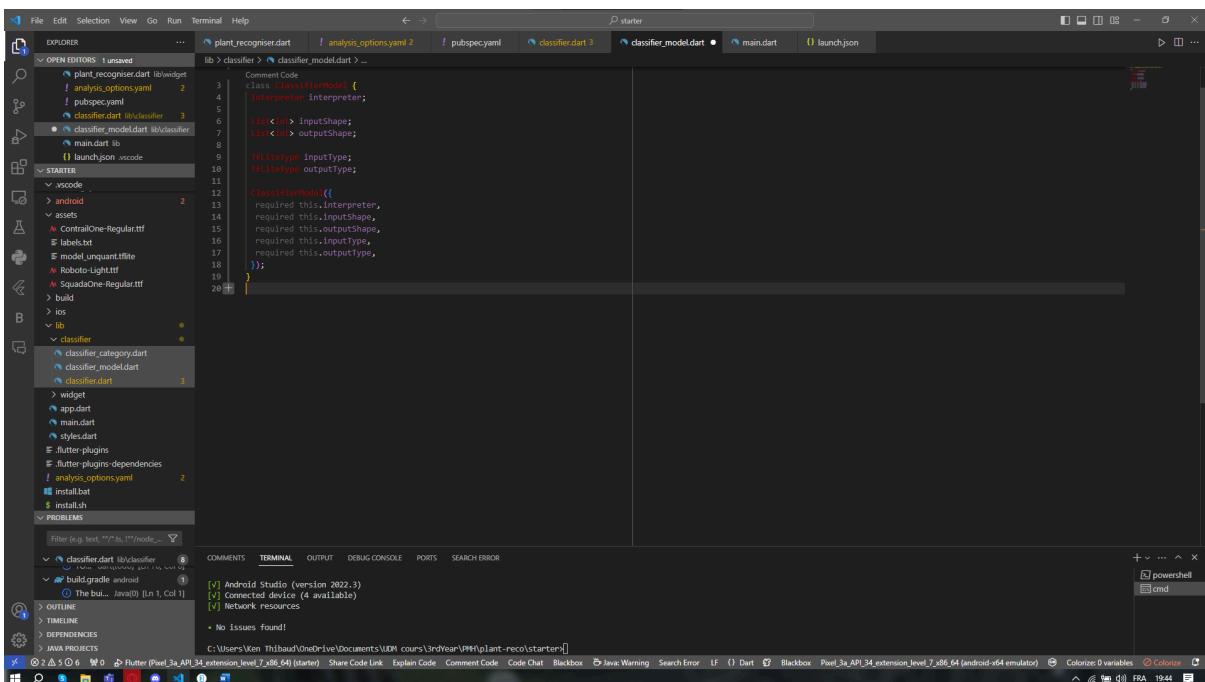
Comments TERMINAL OUTPUT DEBUG CONSOLE PORTS SEARCH ERROR

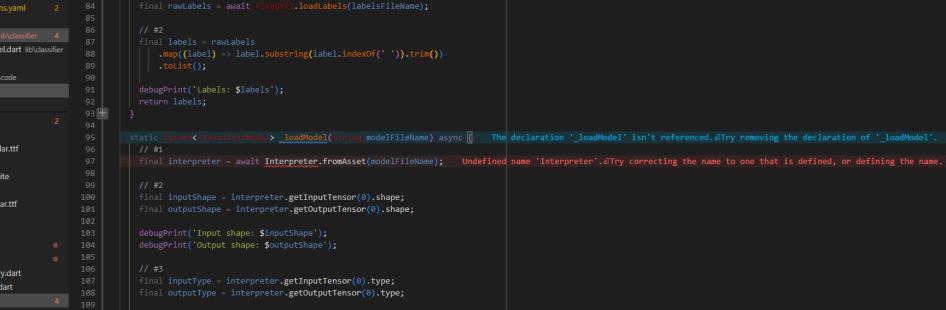
Recent

Dart (Pixel_3a_API_34_e)

```
1 static Future<ClassifierLabels> _loadLabels(String labelsFileName) async {
2     // #1
3     final rawLabels = await FileUtil.loadLabels(labelsFileName);
4
5     // #2
6     final labels = rawLabels
7         .map((label) => label.substring(label.indexOf(' ')).trim())
8         .toList();
9
10    debugPrint('Labels: $labels');
11    return labels;
12 }
13 }
```

6. Tens or Flow is then imported in the file





```
// #1
final rawLabels = await FileUtil.loadLabels(labelsFileName);

// #2
final labels = rawLabels
    .map((label) => label.substring(label.indexOf(' ')).trim())
    .toList();

debugPrint("Labels: $labels");

return labels;
}

static Future<ClassifierModel> _loadModel(String modelFileName) async {
    // #1
    final interpreter = await Interpreter.fromAsset(modelFileName); The declaration '_loadModel' isn't referenced. Consider removing the declaration of '_loadModel'.
    // #2
    final inputShape = interpreter.getInputTensor(0).shape;
    final outputShape = interpreter.getOutputTensor(0).shape;

    debugPrint("Input shape: $inputShape");
    debugPrint("Output shape: $outputShape");

    // #3
    final inputType = interpreter.getInputTensor(0).type;
    final outputType = interpreter.getOutputTensor(0).type;

    debugPrint("Input type: $inputType");
    debugPrint("Output type: $outputType");

    return ClassifierModel(
        interpreter: interpreter,
        inputShape: inputShape,
        outputShape: outputShape,
        inputType: inputType,
        outputType: outputType,
    );
}
```

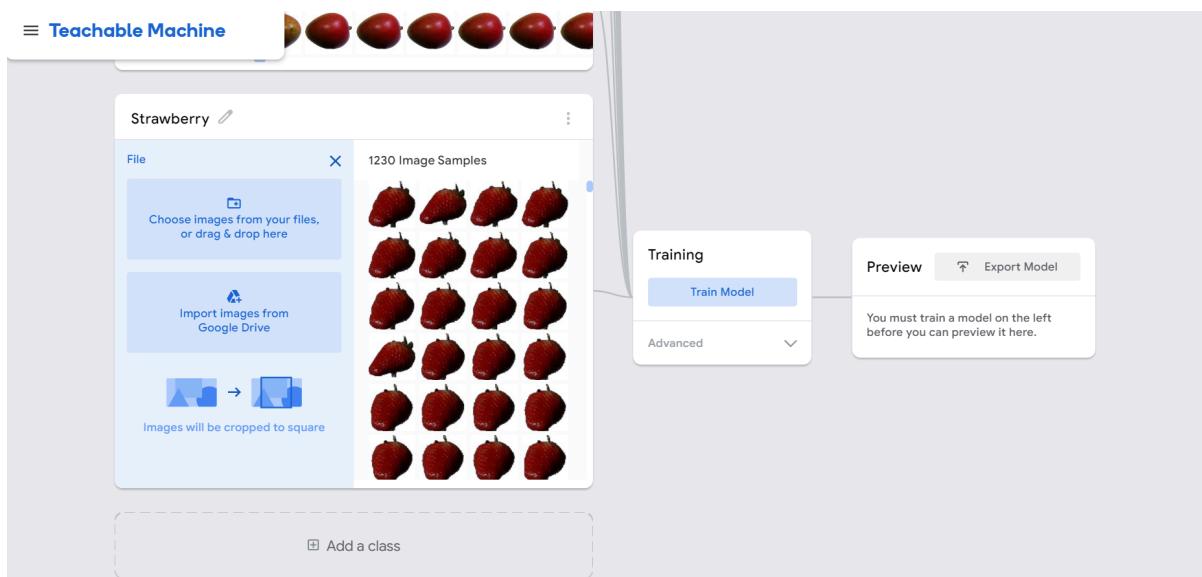
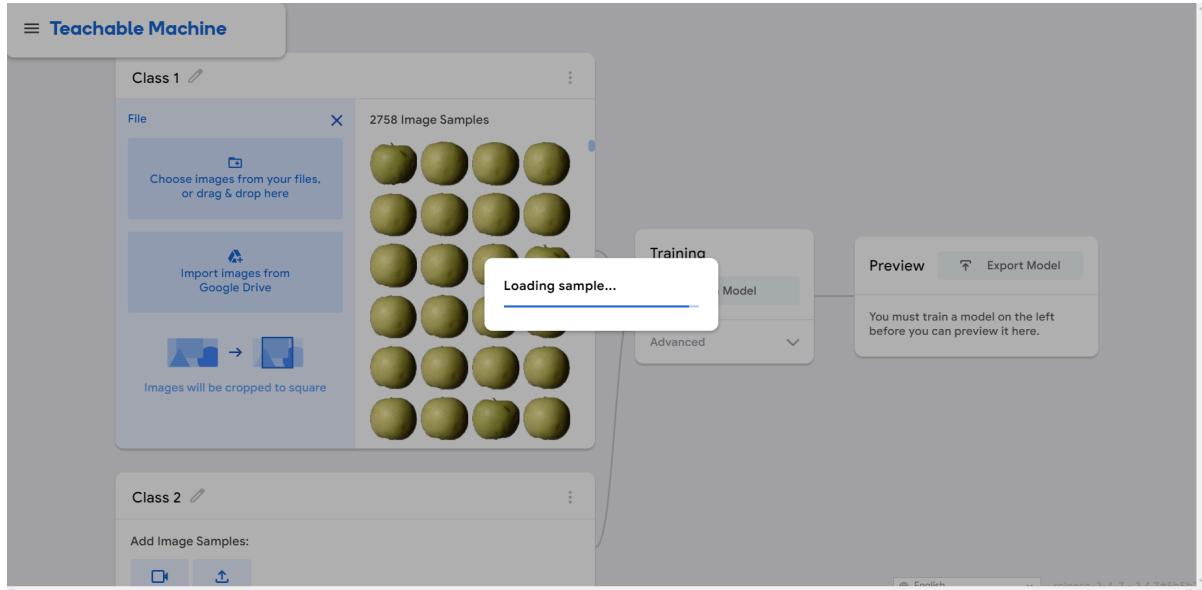
Task 2 and Task 3

The same manipulations done in task 1 are done but first the data has to be imported in teachable machine

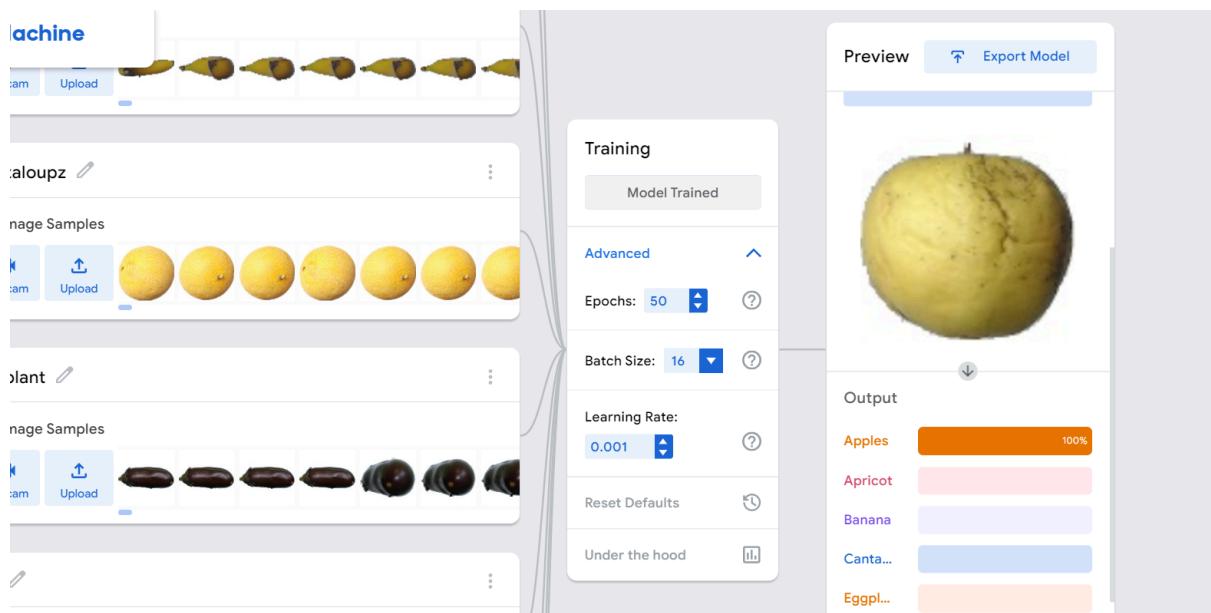
A screenshot of a web browser showing the Kaggle website. The URL is www.kaggle.com/datasets/moltean/fruits. The page displays the 'Fruits-360' dataset, which contains 90380 images of 131 fruits and vegetables. The dataset was updated 2 years ago by MIHAI OLTEAN. It has 2834 notebooks and a total size of 1 GB. A preview image shows various fruits like apples and pears. The sidebar on the left includes options for Create, Home, Competitions, Datasets (selected), Models, Code, Discussions, Learn, and More. A message at the bottom of the page informs users about cookie usage.

A screenshot of a web browser showing the Teachable Machine website. The URL is teachablemachine.withgoogle.com/train. The page displays a 'New Image Project' dialog box with two main options: 'Standard image model' and 'Embedded image model'. The 'Standard image model' is described as 'Best for most uses' and supports 224x224px color images, export to TensorFlow, TFLite, and TF.js, and a model size of around 5mb. The 'Embedded image model' is described as 'Best for microcontrollers' and supports 96x96px greyscale images, export to TFLite for Microcontrollers, TFLite, and TF.js, and a model size of around 500kb. Below the dialog box, there are three project categories: 'Image Project', 'Audio Project', and 'Pose Project'. The 'Image Project' category is described as teaching based on images from files or webcam. The 'Audio Project' category is described as teaching based on one-second-long sounds from files or microphone. The 'Pose Project' category is described as teaching based on images from files or webcam. The background of the browser window shows other tabs and a Windows taskbar.

The samples are then added into the teachable machine and the sample are then trained



Then the model is tested with the samples which is then exported



Export your model to use it in projects.

[Tensorflow.js](#) [Tensorflow](#) [Tensorflow Lite](#)

Export your model:

[Upload \(shareable link\)](#) [Download](#) [Upload my model](#)

Your sharable link:

```
https://teachablemachine.withgoogle.com/models/[...]
```

When you upload your model, Teachable Machine hosts it at this link. (FAQ: [Who can use my model?](#))

Code snippets to use your model:

[Javascript](#) [p5.js](#) [Contribute on Github](#)

Learn more about how to use the code snippet on [github](#).

```
<div>Teachable Machine Image Model</div>
<button type="button" onclick="init()">Start</button>
<div id="webcam-container"></div>
<div id="label-container"></div>
<script src="https://cdn.jsdelivr.net/npm/@tensorflow/tfjs@latest/dist/tf.min.js"></script>
<script src="https://cdn.jsdelivr.net/npm/@teachablemachine/image@latest/dist/teachablemachine-image.min.js"></script>
<script type="text/javascript">
  // More API functions here:
  // https://github.com/googlecreativelab/teachablemachine-community/tree/master/libraries/image
```

[Copy](#)