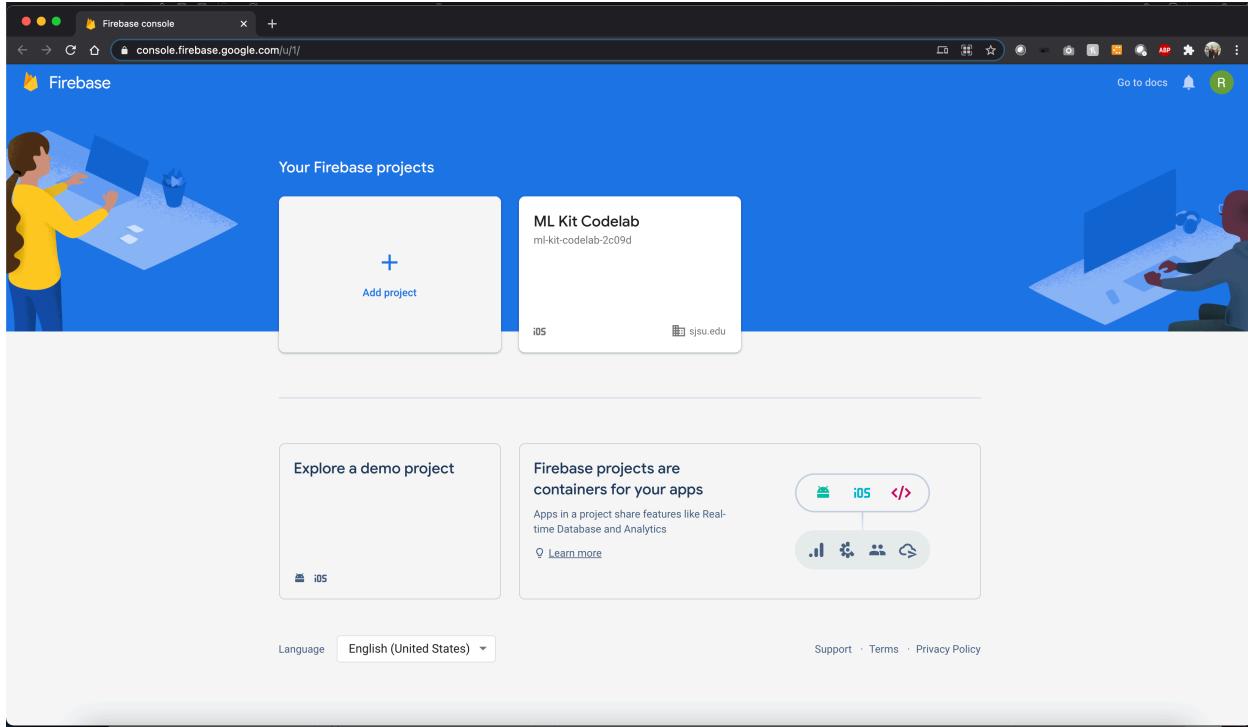


End2End deployment of a vision model using AutoML to mobile device

Create Firebase console Project



Setup the iOS app

The screenshot shows the 'ML Kit Codelab - Project settings' page in the Firebase console. The left sidebar has sections like Dashboard, Realtime, Events, Conversions, Audiences, Funnels, Custom Definitions, Latest Release, Retention, DebugView, Engage, Predictions, A/B Testing, Cloud Messaging, In-App Messaging, Remote Config, Dynamic Links, AdMob, and Extensions. The main area has tabs for 'ML Kit Codelab' and 'Project settings'. Under 'Project settings', there are fields for Project name ('ML Kit Codelab'), Project ID ('ml-kit-codelab-2c09d'), Project number ('620073577264'), Default GCP resource location ('Not yet selected'), Parent org/folder in GCP ('sjsu.edu'), and Web API Key ('No Web API Key for this project'). Below this is a 'Public settings' section with Public-facing name ('project-620073577264') and Support email ('Not configured'). The 'Your apps' section shows an 'iOS apps' entry for 'com.google.firebaseio.codelab.mlkit...'. It includes a 'SDK setup and configuration' note about reconfiguring the Firebase SDKs, a 'See SDK instructions' button, a 'GoogleService-Info.plist' download link, and an 'Add app' button. There's also an 'App ID' link at the bottom.

ML Kit Codelab – Machine Learning

console.firebaseio.google.com/u/1/project/ml-kit-codelab-2c09d/ml/automl

Firebase

Project Overview

Build

- Authentication
- Cloud Firestore
- Realtime Database
- Storage
- Hosting
- Functions
- Machine Learning

Release & Monitor

Analytics

- Dashboard
- Realtime
- Events
- Conversions
- Audiences
- Funnel
- Extensions

Spark Free \$0/month Upgrade

https://cloud.google.com/automl/ui/vision/overview

Machine Learning

APIs Custom AutoML

Train high-quality custom machine learning models with minimum effort and machine learning expertise

AutoML Vision Edge model training is now only available in the Google Cloud console.
[Learn more](#)

Get started with Cloud AutoML



Flowers – Vision – CMPE258DL

console.cloud.google.com/vision/datasets/CN7986861810013700096/import?authuser=1&project=cmpe258dl

Upgrade your account to avoid a break in service (\$89.79 credit and 64 days left in your trial).

Google Cloud Platform CMPE258DL

Vision

Dashboard

Datasets

Models

Flowers

LABEL STATS EXPORT DATA

IMPORT IMAGES TRAIN EVALUATE TEST & USE

Select files to import

To build a custom model, you first need to import a set of images to train it. Each image should be categorized with a label. (Labels are essential for telling the model how to identify an image.)

- Each label should have at least 100 images for best results.

Upload images from your computer
 Select a CSV file on Cloud Storage

Upload images from your computer

Supports JPG, PNG, GIF, BMP ICO, ZIP Maximum 500 files per upload. Uploaded files will be stored on Cloud Storage.

SELECT FILES

gs:// Destination on Cloud Storage BROWSE

CONTINUE

Select folder

flowers

flower_photos-2021-02-21T08:03:45.300Z.zip

SELECT CANCEL

Flowers – Vision – CMPE258DL

console.cloud.google.com/vision/datasets/CN7986861810013700096/images?authuser=1&project=cmpe258dl

Upgrade your account to avoid a break in service (\$89.79 credit and 84 days left in your trial).

LEARN MORE UPGRADE

Google Cloud Platform CMPE258DL

Vision Flowers LABEL STATS EXPORT DATA

Dashboard Datasets Models

IMPORT IMAGES TRAIN EVALUATE TEST & USE

All images 1,000 Filter images Select all

Labeled 1,000

Unlabeled 0

Filter labels +

daisy 200

dandelion 200

roses 200

sunflowers 200

tulips 200

ADD NEW LABEL

Single-Label Classification

Images per page: 50 1 – 50 of many

https://console.cloud.google.com/vision/datasets/CN7986861810013700096/images?authuser=1&project=cmpe258dl

Flowers – Vision – CMPE258DL

console.cloud.google.com/vision/datasets/CN7986861810013700096/train?authuser=1&project=cmpe258dl

Upgrade your account to avoid a break in service (\$89.79 credit and 84 days left in your trial).

LEARN MORE UPGRADE

Google Cloud Platform CMPE258DL

Vision Flowers LABEL STATS EXPORT DATA

Dashboard Datasets Models

IMPORT IMAGES TRAIN EVALUATE TEST & USE

Single-Label Classification

Models TRAIN NEW MODEL

Flowers_mobile_model1

Average precision 0.992

Precision* 97.89%

Recall* 93%

* Using a score threshold of 0.5

Model ID ICN8664954270363156480

Created Feb 21, 2021, 12:21:50 AM

Base model None

Data 1,000 images

Model type Mobile Best Trade-Off

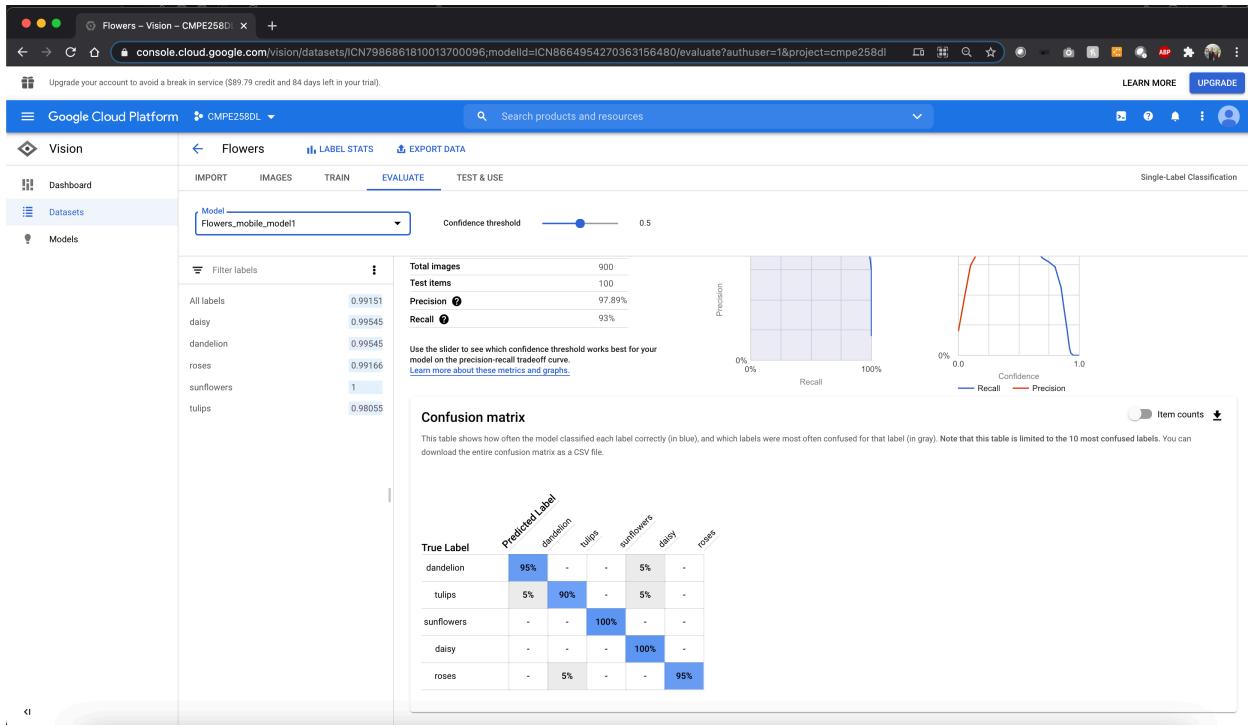
Train cost 0.929 node hours

Deployment state Not deployed

SEE FULL EVALUATION

RESUME TRAINING

https://console.cloud.google.com/vision/datasets/CN7986861810013700096/train?authuser=1&project=cmpe258dl



```
sudo gem install -n /usr/local/bin cocoapods
```

Fixing cocoapods installation issue

<https://stackoverflow.com/questions/20939568/error-error-installing-cocoapods-error-failed-to-build-gem-native-extension>

The screenshot shows a Mac OS X desktop with a browser window open to the Firebase console at <https://console.firebaseio.google.com/u/0/project/ml-kit-codelab-2c09d/overview>. The browser title bar says "Add Firebase to your iOS app". To the right of the browser is a terminal window titled "ragurs -- bash -- 186x47" with the command "cd mlkit-automl" entered. The terminal output shows the process of installing CocoaPods dependencies for the MLKitImageLabelingAutoML project. It includes steps for downloading pods from GitHub, installing frameworks like FirebaseCore, and integrating the client project. The terminal also displays a warning about deprecated dependencies and a note to close current Xcode sessions.

```
LICENSE           android          ios
(base) RAGURS-M-CSKF:automl-vision-edge-in-mlkit-master ragurs$ cd ios
(base) RAGURS-M-CSKF:ios ragurs$ ls
mlkit-automl.xcodeproj
(base) RAGURS-M-CSKF:ios ragurs$ cd mlkit-automl/
(base) RAGURS-M-CSKF:mlkit-automl ragurs$ pod install
Analyzing dependencies
Downloading dependencies
Downloaded `cocapods` from `https://github.com/CocoaPods/Specs.git`
Downloading dependencies
Installing FirebaseCore (6.0.8)
Installing FirebaseCoreDispatch (6.0.8)
Installing FirebaseMLCommon (0.16.0)
Installing FirebaseMLVision (0.16.0)
Installing FirebaseMLVisionAutoML (0.16.0)
Installing GoogleMobileVision (1.3.0)
Installing GoogleMobileVision (1.6.0)
Installing GoogleTFLiteForMac (2.2.0)
Installing Protobuf (3.7.0)
Installing TensorFlowLite (0.6.0)
Installing TensorflowLite (1.13.1)
Generating Pods project
Integrating client project

[!] Please close any current Xcode sessions and use 'MLVisionExample.xcworkspace' for this project from now on.
Pod installation complete! There are 3 dependencies from the Podfile and 12 total pods installed.

[!] FirebaseMLVisionAutoML has been deprecated in favor of MLKitImageLabelingAutoML

(base) RAGURS-M-CSKF:mlkit-automl ragurs$
```

The screenshot shows the Google Cloud Platform Vision interface. On the left, a sidebar lists steps 1 through 7 for training a model. Step 4, 'Train a model', is currently selected. The main area shows a 'Flowers' dataset with a 'TRAIN' tab selected. A modal window titled 'Models' is open, showing the progress of training a model named 'Flowers_mobile_model1'. The progress bar is at 0%. Below the progress bar is a 'CANCEL' button.

The screenshot shows the Google Cloud Platform Vision interface. The sidebar indicates step 4 is complete. The main area shows the 'TEST & USE' tab selected. A dropdown menu under 'Model' shows 'Flowers_mobile_model1'. Below the tabs, there are two informational messages: one about online prediction and another about the v1beta1 API endpoint. At the bottom, there's a section titled 'Use your model' with four options: TF Lite, TensorFlow.js, Core ML, and Container. Each option has a description and a corresponding icon.

The screenshot shows the Google Cloud Platform Vision interface. The left sidebar has 'Vision' selected. The main area shows a 'Flowers' dataset with 'LABEL STATS' and 'EXPORT DATA' tabs. The 'TEST & USE' tab is active. A model named 'Flowers_mobile_model' is selected. The right panel shows the 'Export TF Lite package' dialog with the following content:

Export TF Lite package

The Tensorflow Lite (.tflite) format allows you to run your model on mobile and embedded devices.

1. Export your model as a TF Lite package.

Destination folder on Cloud Storage [BROWSE](#)

EXPORT

2. After your model finishes exporting, you can copy your package to your computer using this command:
S gsutil cp -r gs://target ./download_dir

3. Follow the quickstart to learn how to implement your model on your device.
[Android quickstart](#) [iOS quickstart](#)

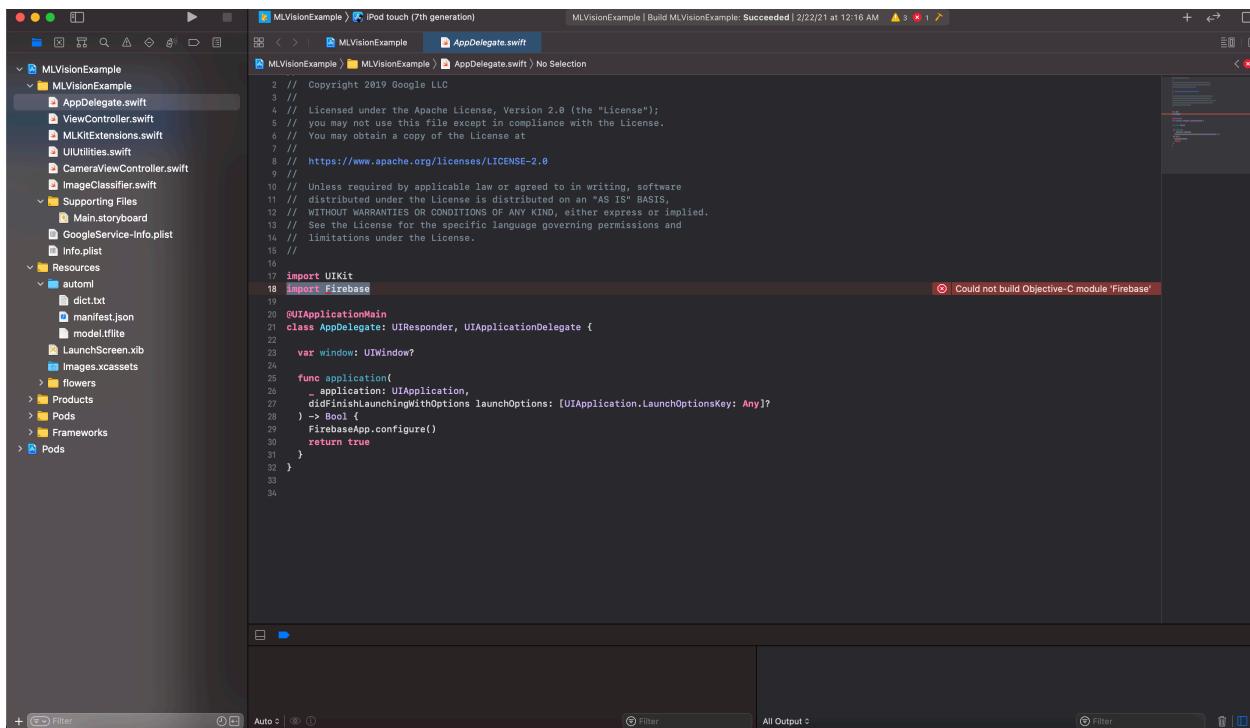
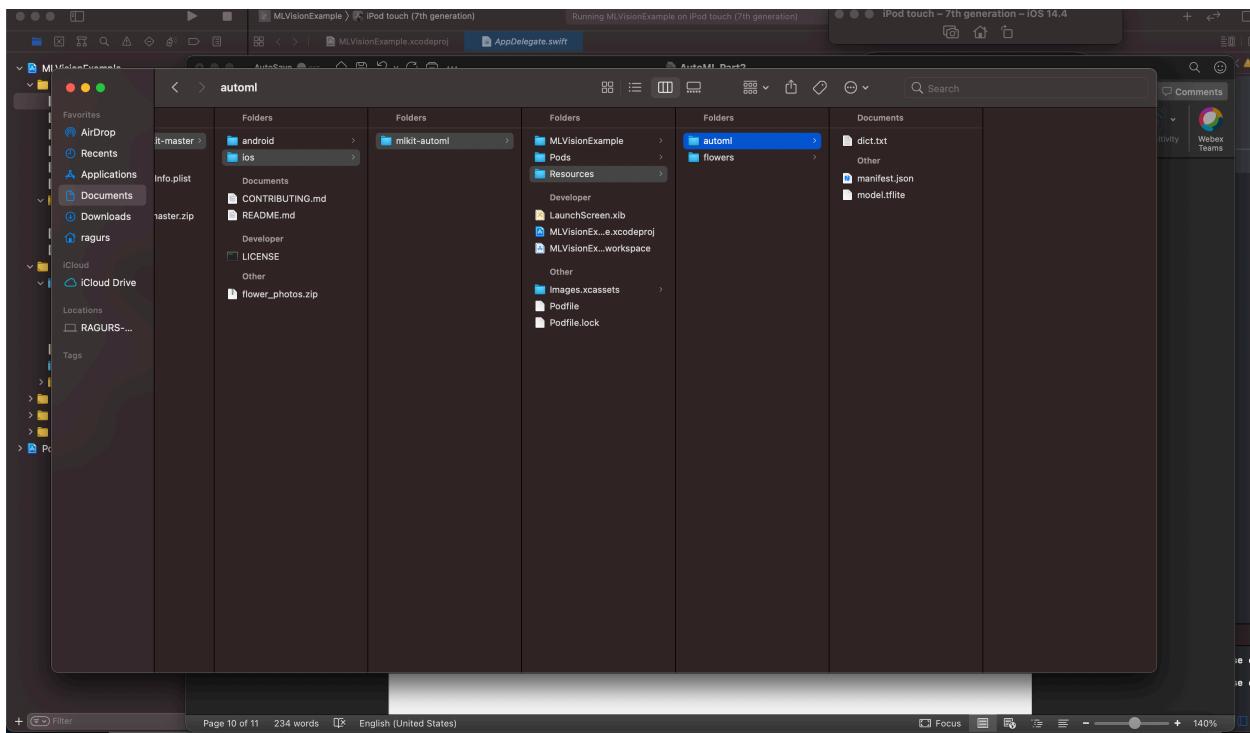
The screenshot shows the Google Cloud Platform Vision interface. The left sidebar has 'Vision' selected. The main area shows a 'Flowers' dataset with 'LABEL STATS' and 'EXPORT DATA' tabs. The 'TEST & USE' tab is active. A model named 'Flowers_mobile_model' is selected. The right panel shows the 'Select folder' dialog with the following content:

Select folder

Buckets

- cmpe258di-vcm
- flowersmodel
- model-export
- icon

SELECT **CANCEL**



There is only one way to solve this issue.

1. Quit Xcode.
2. Delete project's temp files located at `~/Library/Developer/Xcode/DerivedData`
3. Delete `ProjectName.xcworkspace`

4. Delete Podfile.lock file and Pods folder
5. Run pod install.
6. Open the newly created ProjectName.xcworkspace file and build.

The screenshot shows a forum post on developer.apple.com. The title is "Could not build Objective-C module 'Firebase'". The post was asked 1 year ago by Faycel_TUN_2020. The response provides a step-by-step guide to resolve the issue:

There is only one way to solve this issue.

1. Quit Xcode.
2. Delete project's temp files located at `~/Library/Developer/Xcode/DerivedData`.
3. Delete ProjectName.xcworkspace
4. Delete Podfile.lock file and Pods folder
5. Run pod install.
6. Open the newly created ProjectName.xcworkspace file and build.

A green checkmark icon is next to the sixth item. The terminal window shows the command-line steps taken to resolve the issue:

```
mlkit-automl -- bash - 94x29
Installing Firebase (6.34.0)
Installing FirebaseAnalytics (6.9.0)
Installing FirebaseAuth (6.9.2)
Installing FirebaseCore (6.18.4)
Installing FirebaseFirestore (5.1.0)
Installing FirebaseFirestoreMessaging (5.7.0)
Installing FirebaseInstallations (1.7.0)
Installing FirebaseInstanceID (4.8.0)
Installing FirebaseMLCommon (1.0.0)
Installing FirebaseMLKit (0.8.0)
Installing FirebaseMLVision (0.8.0)
Installing FirebaseMLVisionAutoML (6.16.0)
Installing FirebaseMessaging (4.7.1)
Installing GTMSessionFetcher (1.8.0)
Installing GoogleAPICloudMessaging (1.5.1)
Installing GoogleAppMeasurement (6.9.0)
Installing GoogleDataTransport (7.5.1)
Installing GoogleMobileAds (0.6.0)
Installing GoogleMobileAdsMediation (2.3.1)
Installing GoogleUtilities (6.7.2)
Installing PromisesObjC (1.2.12)
Installing Protobuf (3.19.0)
Installing SwiftProtobuf (1.13.1)
Installing nanopb (1.3996.0)
Generating Pods project
Integrating client project
pod install completed! There are 7 dependencies from the Podfile and 22 total pods installed.

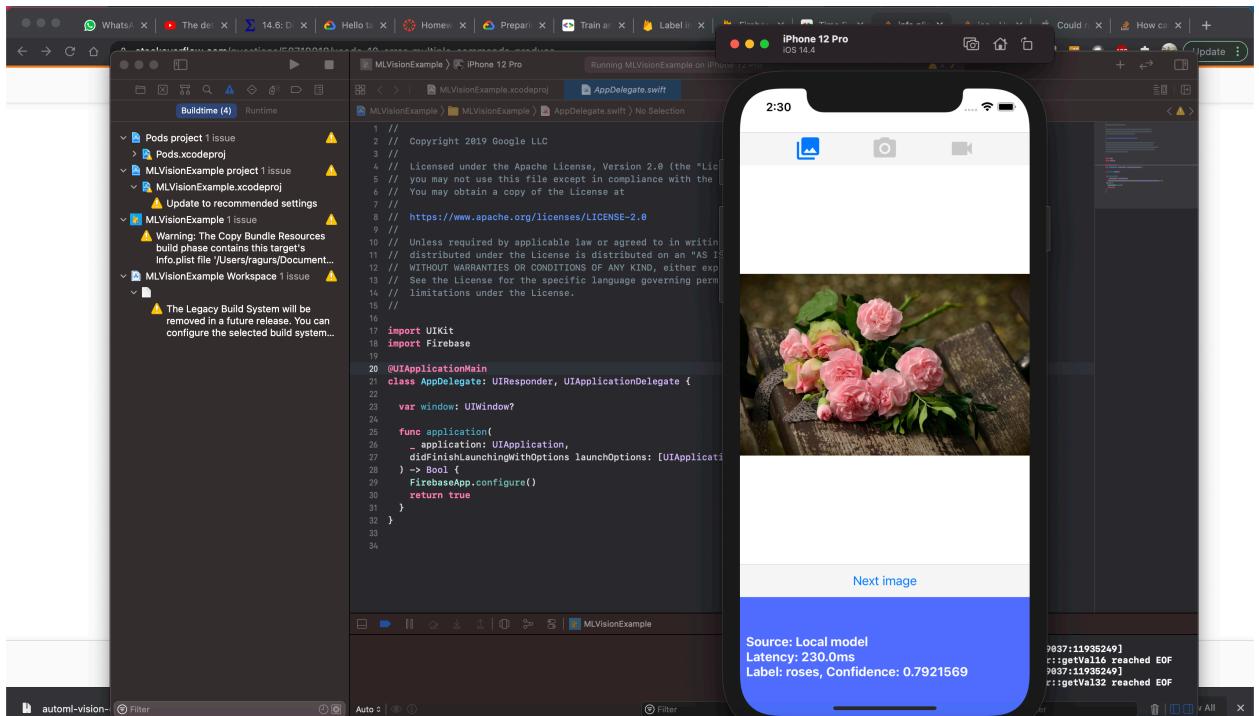
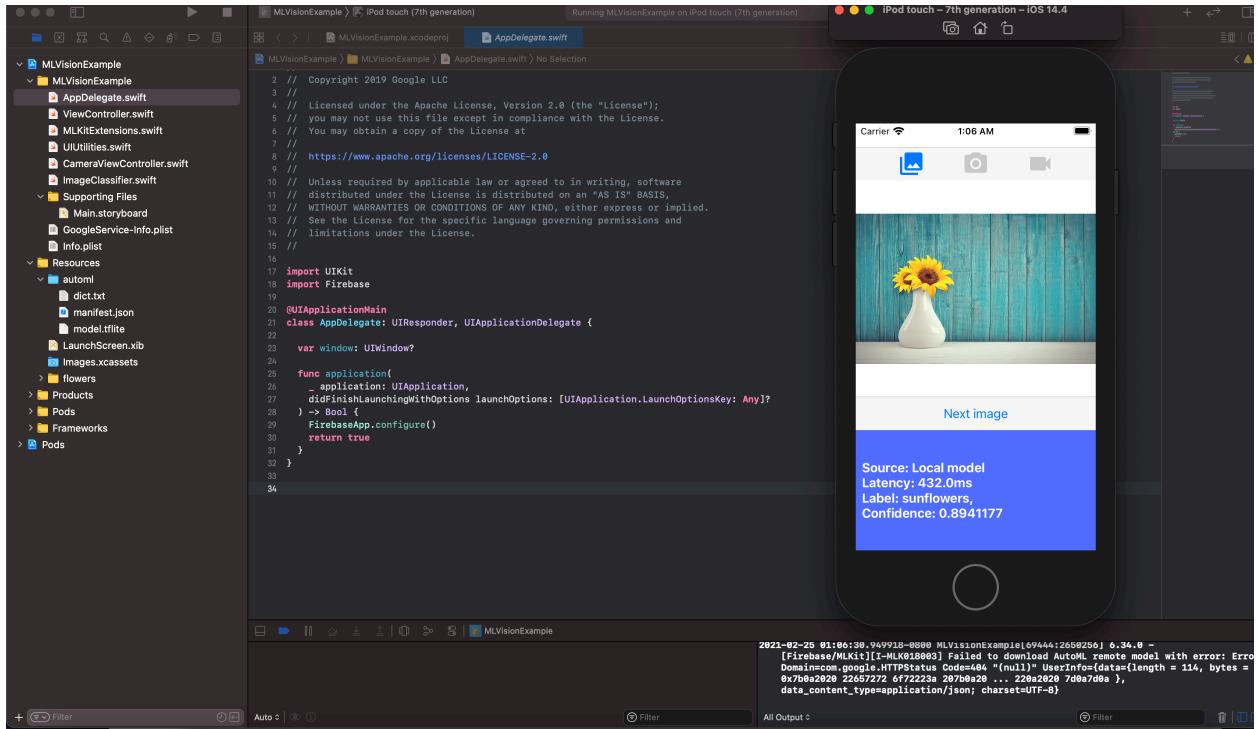
[!] FirebaseMLVisionAutoML has been deprecated in favor of MLKitImageLabelingAutoML
(base) RAGURS-M-CKF:mlkit-automl rags$
```

Posted 1 year ago by Faycel_TUN_2020

4 Replies

The screenshot shows the Xcode interface with the project "MLVisionExample" open. The left sidebar shows the project structure with files like AppDelegate.swift, ViewController.swift, MLKitExtensions.swift, UIUtilities.swift, CameraViewController.swift, ImageClassifier.swift, Supporting Files, Main.storyboard, GoogleService-Info.plist, and Info.plist. The right side shows the code editor with the AppDelegate.swift file open. The code includes the Apache License header and the implementation of the UIApplicationDelegate protocol:

```
2 // Copyright 2019 Google LLC
3 //
4 // Licensed under the Apache License, Version 2.0 (the "License");
5 // you may not use this file except in compliance with the License.
6 // You may obtain a copy of the License at
7 //
8 // https://www.apache.org/licenses/LICENSE-2.0
9 //
10 // Unless required by applicable law or agreed to in writing, software
11 // distributed under the License is distributed on an "AS IS" BASIS,
12 // WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.
13 // See the License for the specific language governing permissions and
14 // limitations under the License.
15 //
16
17 import UIKit
18 import Firebase
19
20 @UIApplicationMain
21 class AppDelegate: UIResponder, UIApplicationDelegate {
22
23     var window: UIWindow?
24
25     func application(_ application: UIApplication,
26                      didFinishLaunchingWithOptions launchOptions: [UIApplication.LaunchOptionsKey: Any]?) -
27         > Bool {
28         FirebaseApp.configure()
29         return true
30     }
31
32 }
33
34 |
```



Train and deploy on-device image classification model with AutoML Vision in ML Kit

7. Congratulations!

You have gone through an end-to-end journey of training an image classification model with your own training data using AutoML, and then use the model in a mobile app using ML Kit.

Please see our [documentation](#) to learn how to integrate AutoML Vision Edge in ML Kit to your own app.

You also can try our ML Kit sample apps to see other features of Firebase ML Kit.

Android samples

- [Visions](#)
- [Smart Reply](#)
- [Language Identification](#)

iOS samples

- [Visions](#)
- [Smart Reply](#)
- [Language Identification](#)

You earned the **First Codelab Completed badge!**



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Share [Twitter](#) [Facebook](#) [LinkedIn](#) Create profile Dismiss

Report a mistake

MLVisionExample > [iPod touch (7th generation)] Finished running MLVisionExample on iPod touch (7th generation)

console.cloud.google.com/vision/datasets/ICN7986861810013700096/images?authuser=1&project=cmpe258dl

AutoML Part1

Google Cloud Platform CMPE258DL Search products and resources

Vision Flowers LABEL STATS EXPORT DATA

Dashboard IMPORT IMAGES TRAIN EVALUATE TEST & USE Single-Label Classification

Datasets All images 1,000 Filter images Select all

Labeled 1,000

Unlabeled 0

Filter labels +

Label	Count	Image
daisy	200	
dandelion	200	
roses	200	
sunflowers	200	
tulips	200	

ADD NEW LABEL

Label	Image
sunflowers(1)	
dandelion(1)	
tulips(1)	
tulips(1)	
daisy(1)	
daisy(1)	

