

# Step-by-Step: Gunshot Detection with Create ML

## Step 1: Organize Your Audio Dataset

Create a folder structure like this:

```
GunshotSounds/  
├─ gunshot/  
│   ├── gun1.wav  
│   ├── gun2.wav  
│   └── ...  
├─ ambient/  
│   ├── crowd.wav  
│   ├── car_horn.wav  
│   └── ...  
└─
```

- **gunshot/** = audio files with gunshots
- **ambient/** = anything else: cars, speech, dogs, thunder, wind, etc.
- All files should be **.wav** or **.m4a** format, max 30 seconds each

1a) Directories where we got the audio files from:

- Gunshot Only: <https://www.kaggle.com/datasets/huseyngorbani1/gunshot-audio-dataset>
- Gunshot & Ambient Noise:  
<https://www.kaggle.com/datasets/chrisfilo/urbansound8k/data?select=fold3>
  - Note: files from this dataset are named in the following format:  
[fsID]-[classID]-[occurrenceID]-[sliceID].wav
    - Gunshots have classID = "6"

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## Step 2: Open Create ML App

1. Open **Xcode**, go to **Xcode > Open Developer Tool > Create ML**
  - a. Click "File" > "New" or use Cmd + N
  - b. Now you'll see a template chooser window

2. Choose **"Sound Classifier"**
  3. Drag in your **GunshotSounds** folder
  4. Click **Train**
    - a. You will see the training progress and results
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### Step 3: Export the Core ML Model

- Once training finishes, click **Get** (has a download icon)
- Save the file as **GunshotClassifier.mlmodel**
- Drag this file into the directory of your XCode project where the rest of the code is
  - Xcode will automatically compile it into .mlmodelc once you drag it in
- Note: Each time you retrain, it will generate GunshotClassiferv2, v3, etc. You must save and drag the new .mlmodel file in the directory of your XCode project **and rename it to** GunshotClassifier.mlmodel (without the version) and overwrite the previous version so that the code can properly reference it
  - All previous versions will still be stored in CreateML in case you want to go back