

Mahidol University
Wisdom of the Land



Super AI Engineer Development Program (West)

1
9 July 2024

Human Activity Recognition Mini Hackathon (Online)



Kaggle Case Study

kaggle Case Study

Human Activity Recognition (HAR)

The first HAR qualifier (online) is required in order to enter the second HAR competition (onsite).



<https://www.kaggle.com/t/f4d8eaee62c0400292f7b2e560b0bfa0>

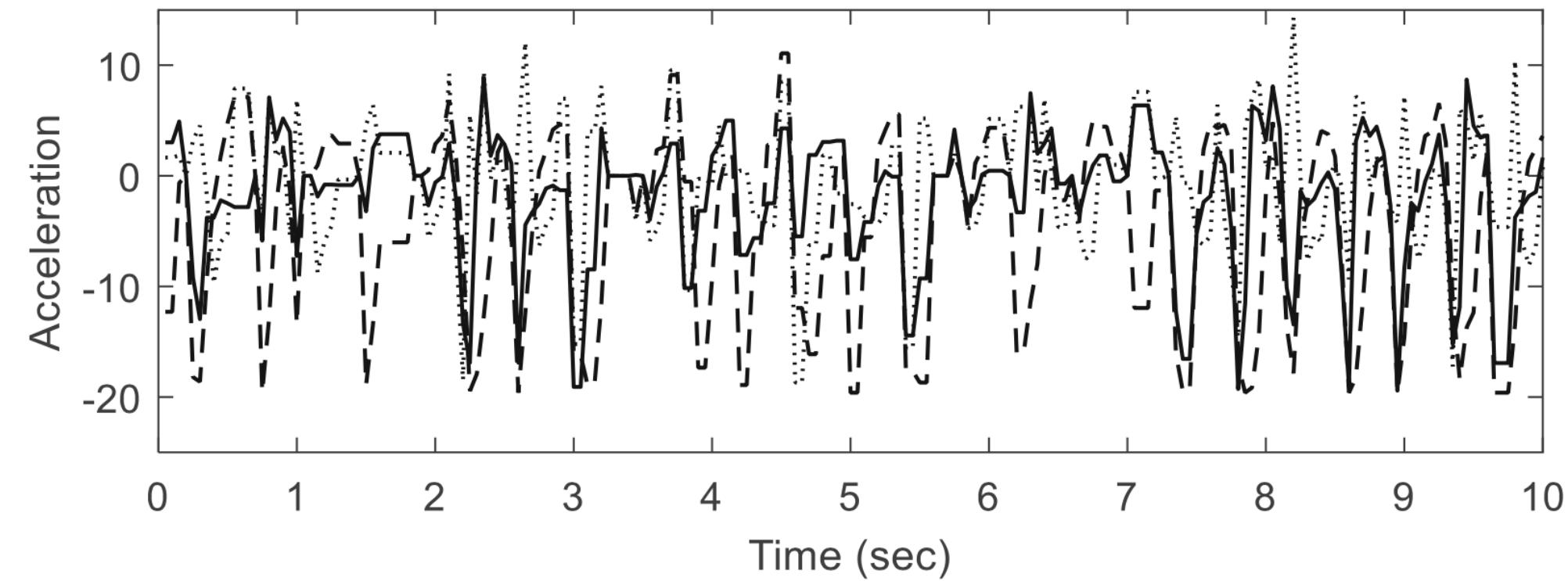
HAR Dataset



The primary objective of this mini hackathon competition is to practice a robust and accurate HAR model that can classify various types of activity.

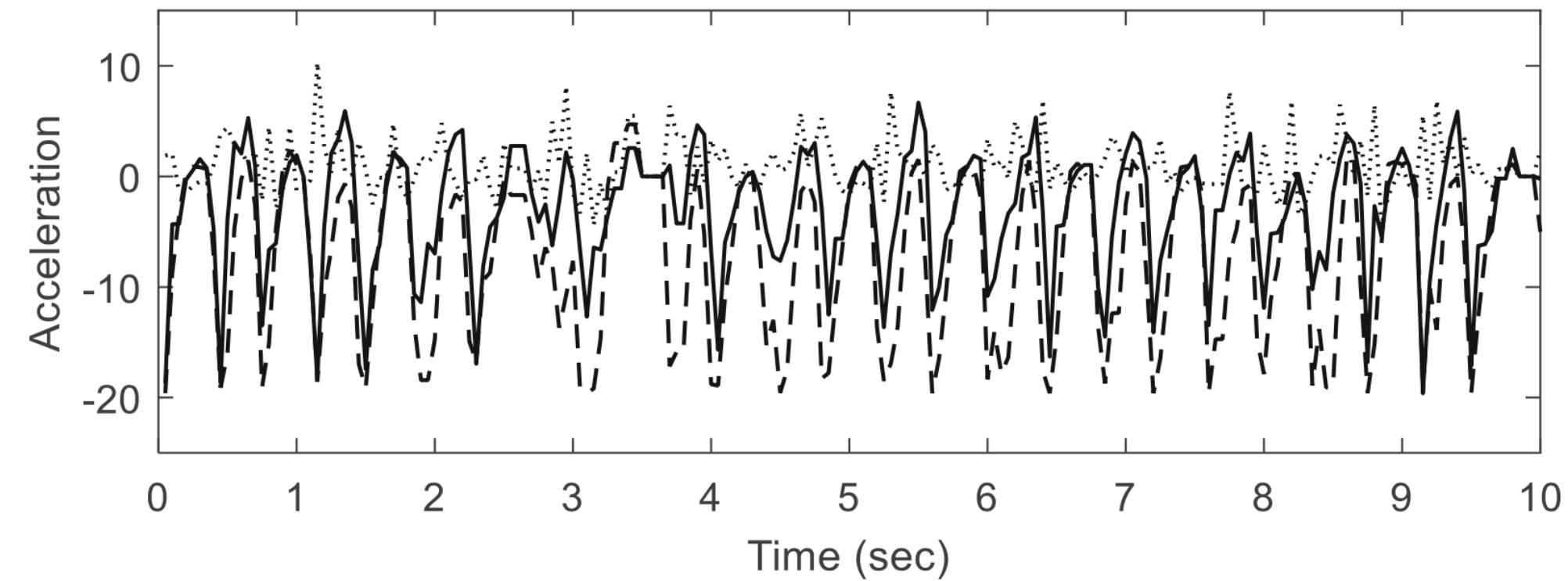
This dataset collected accelerometer data every 50 ms, yielding samples per second. On mobile phones, they labeled the activity using the application's simple graphical user interface.

HAR Dataset



Jogging

- - - X-Axis
- Y-Axis
- Z-Axis

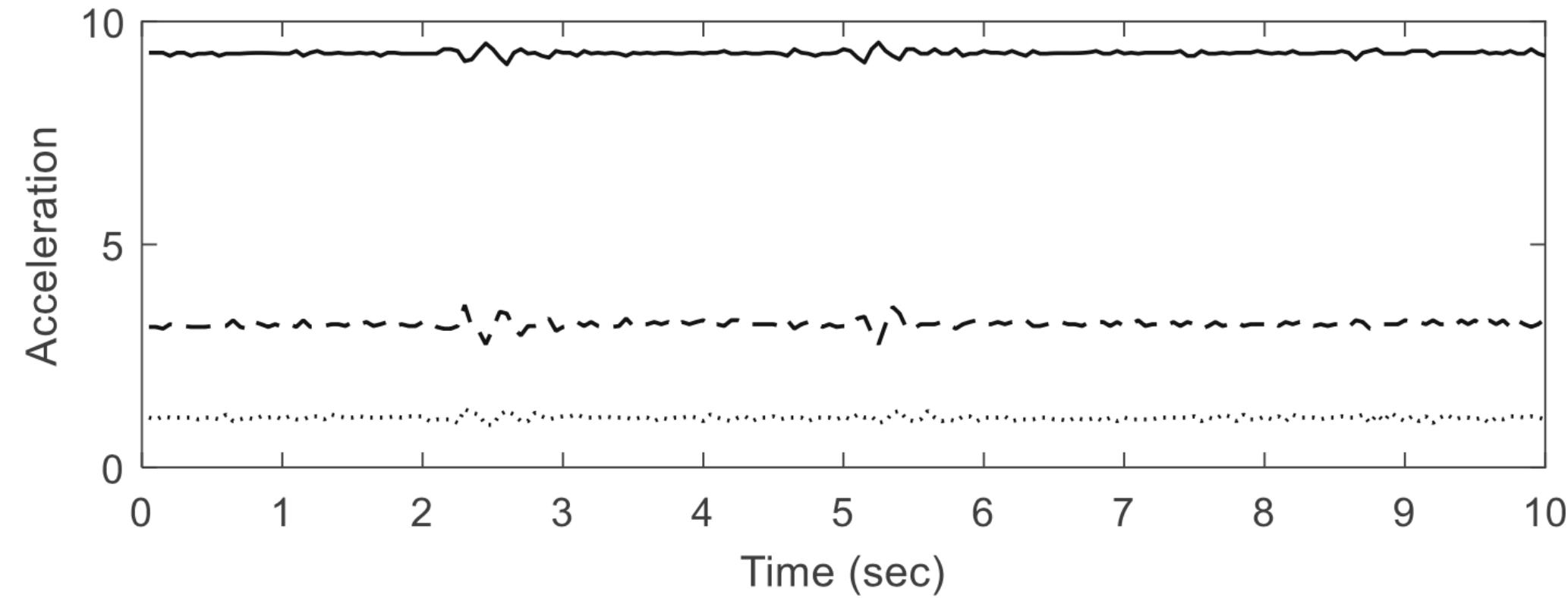


Upstairs

- - - X-Axis
- Y-Axis
- Z-Axis

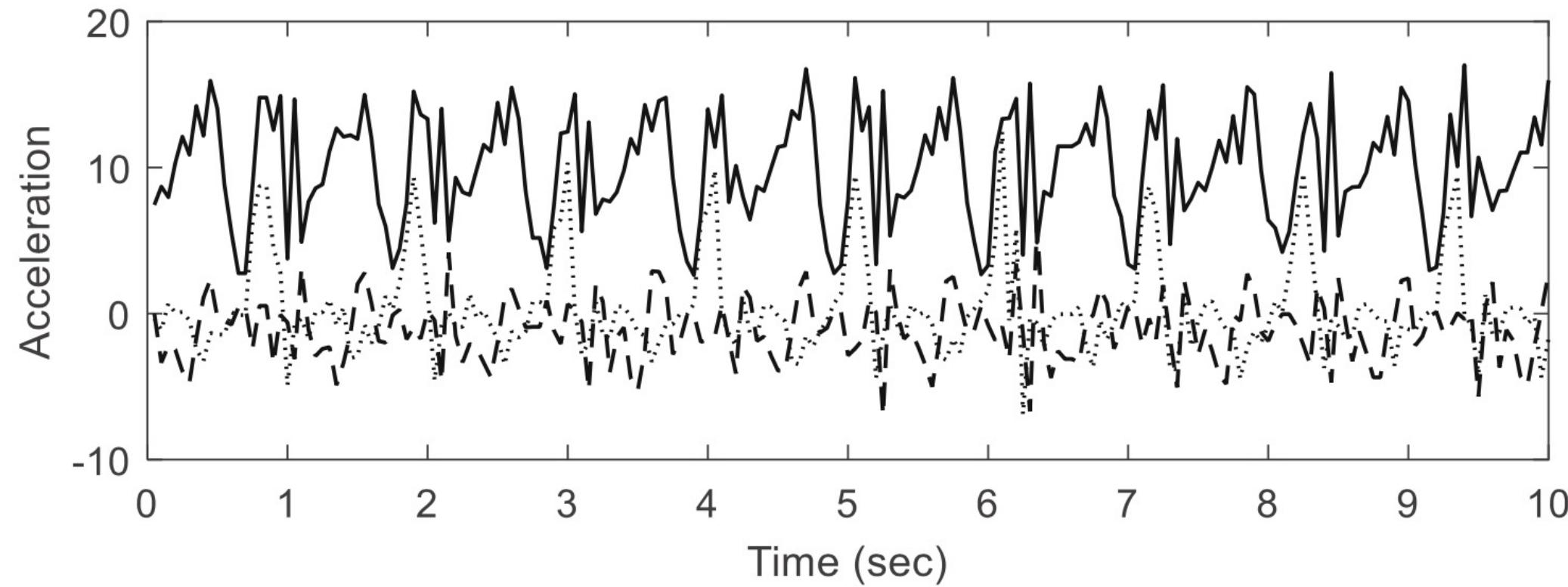


HAR Dataset



Sitting

- - - X-Axis
- Y-Axis
- Z-Axis

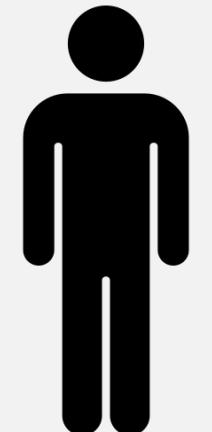
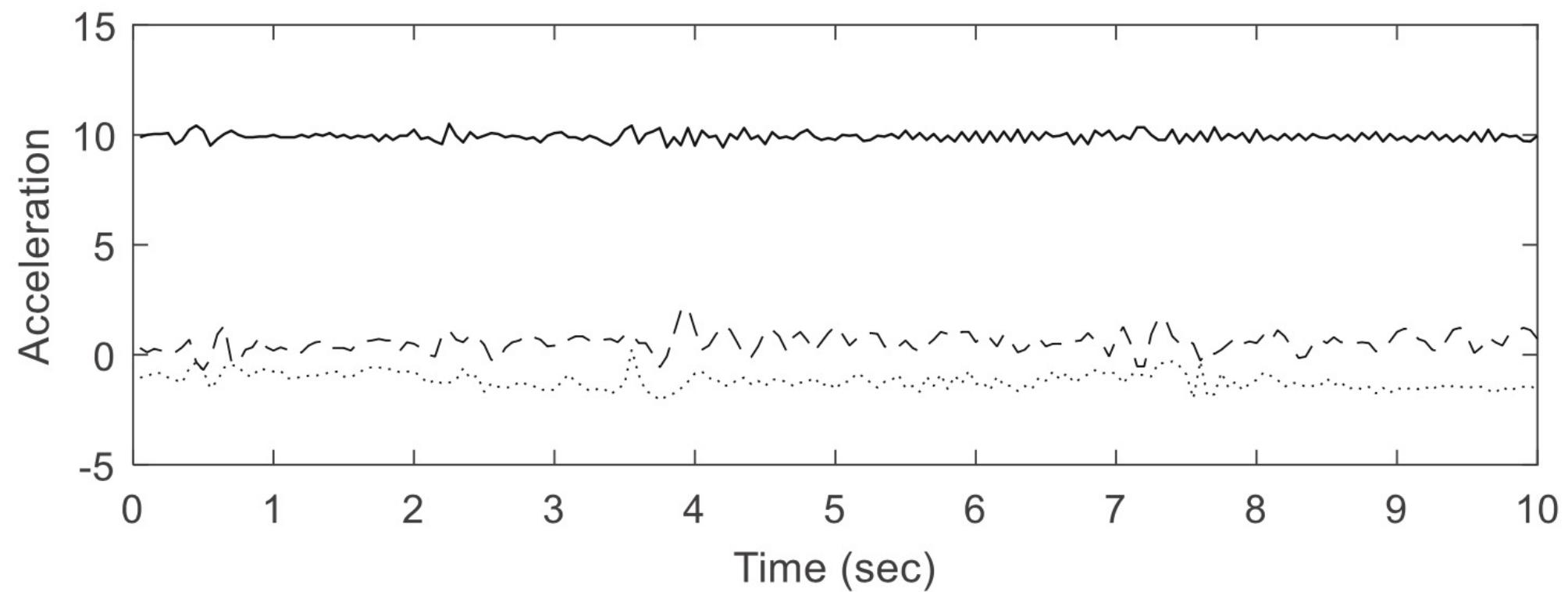
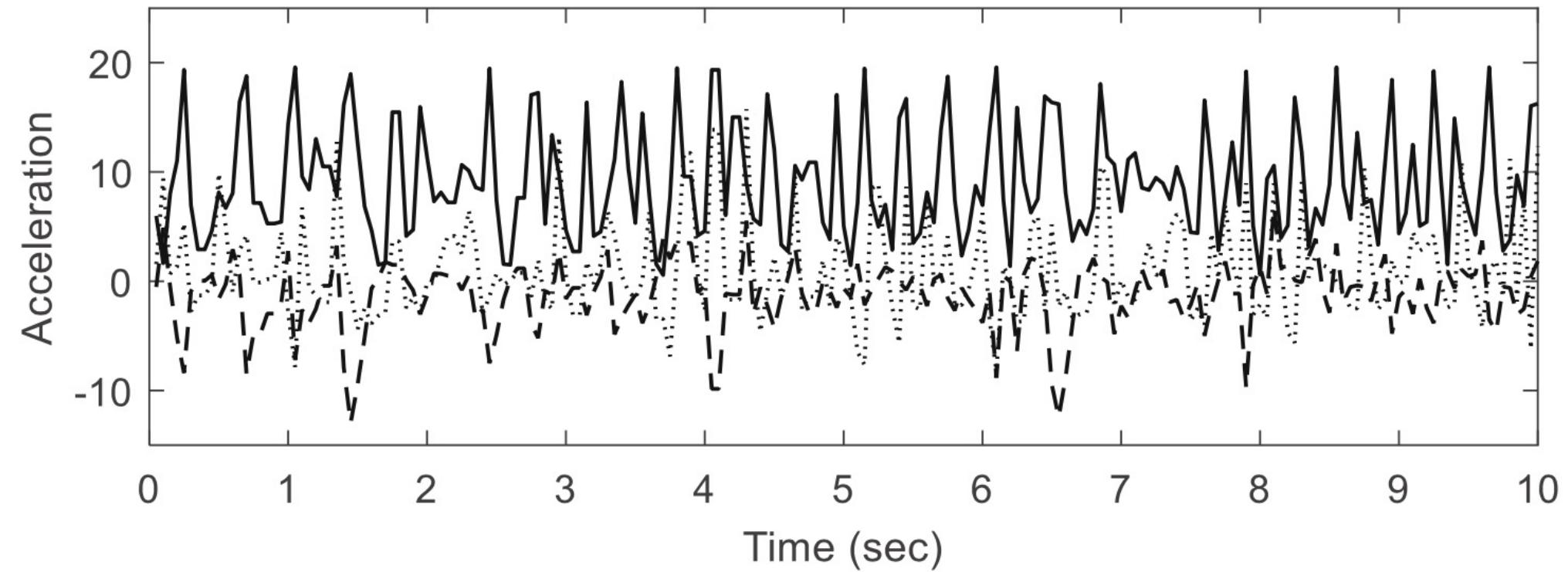


Walking

- - - X-Axis
- Y-Axis
- Z-Axis



HAR Dataset



Health Check

Human Activity Recognition (HAR)

Settings Overview Data Code Models Discussion Leaderboard Rules Team

🔒 Dataset Description

 Edit

Raw Time Series Data

- Number of attributes: 3
- Missing attribute values: None

Class Distribution

- Walking: 30 examples
- Jogging: 26 examples
- Upstairs: 26 examples
- Downstairs: 26 examples
- Sitting: 17 examples
- Standing: 18 examples

Data Explorer

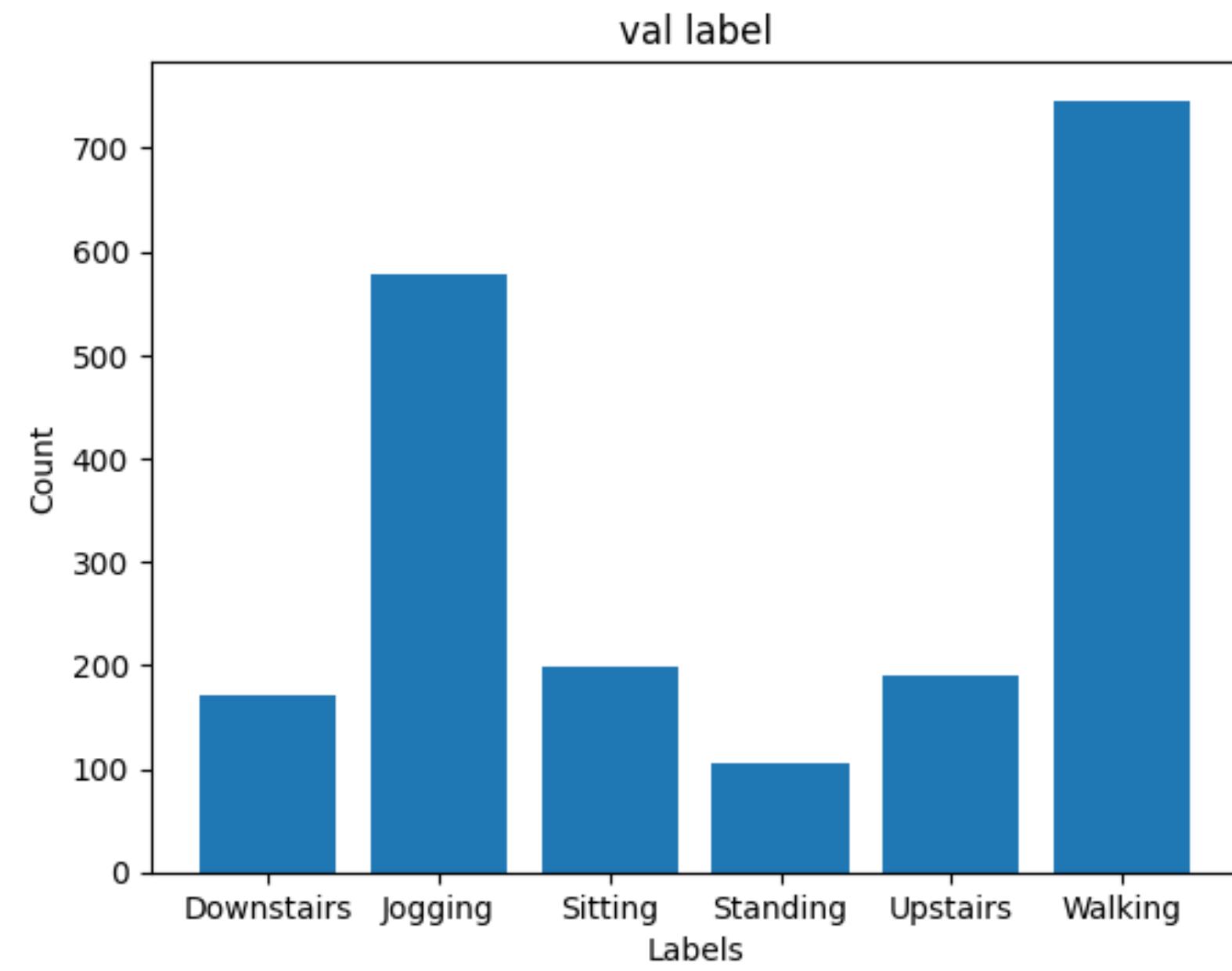
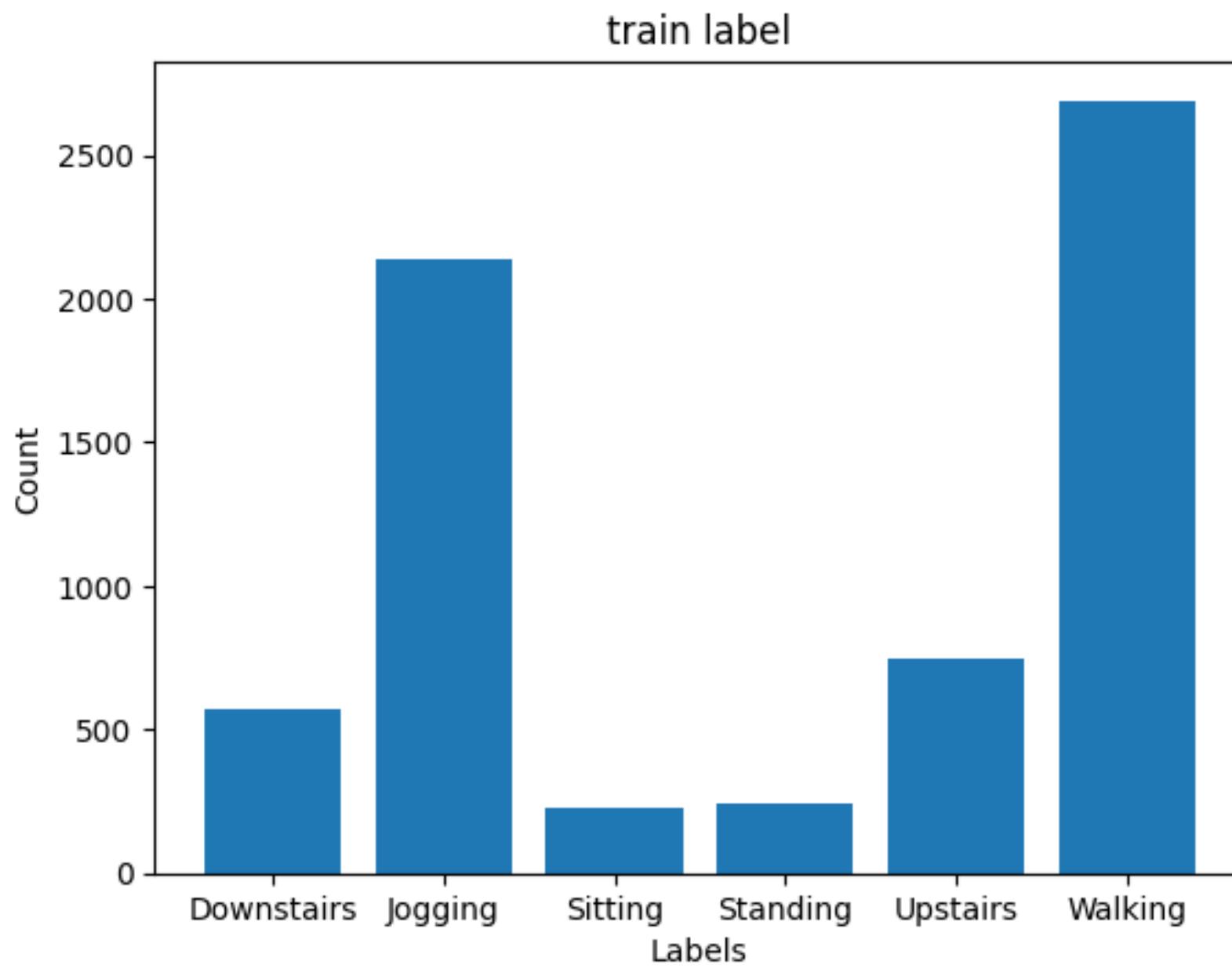
20.28 MB

-  HAR
 -  test
 -  train
 -  HAR_CNN_Lecture.ipynb
 -  HAR_Pre_Train_Lecture.ipynb
 -  sample_submission.csv

Summary

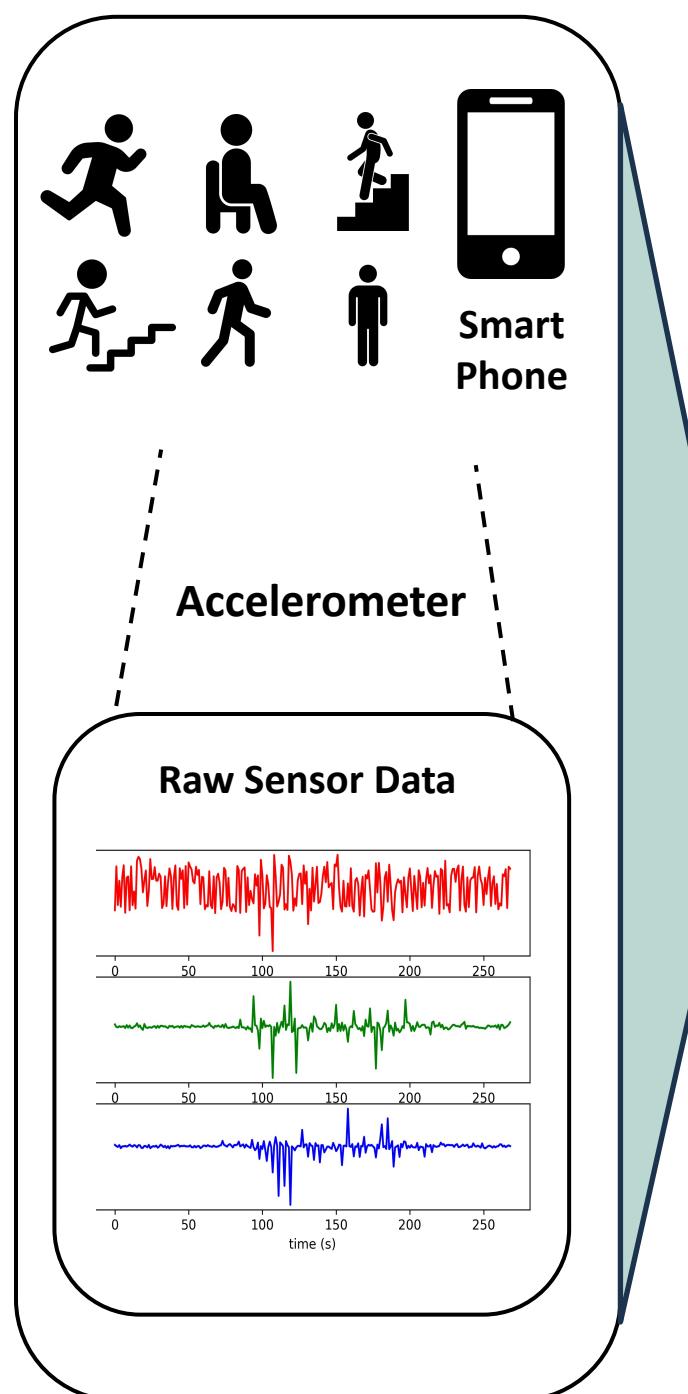
-  839 files
-  2510 columns

Health Check

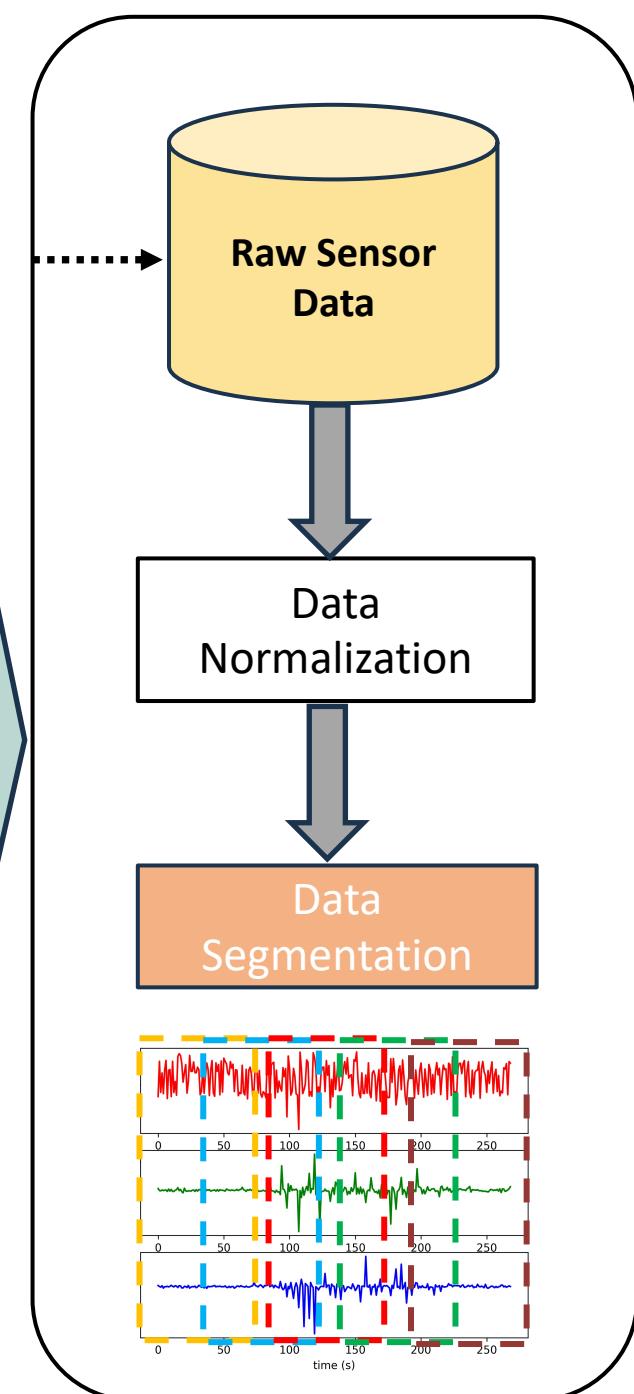


Practice Pipeline

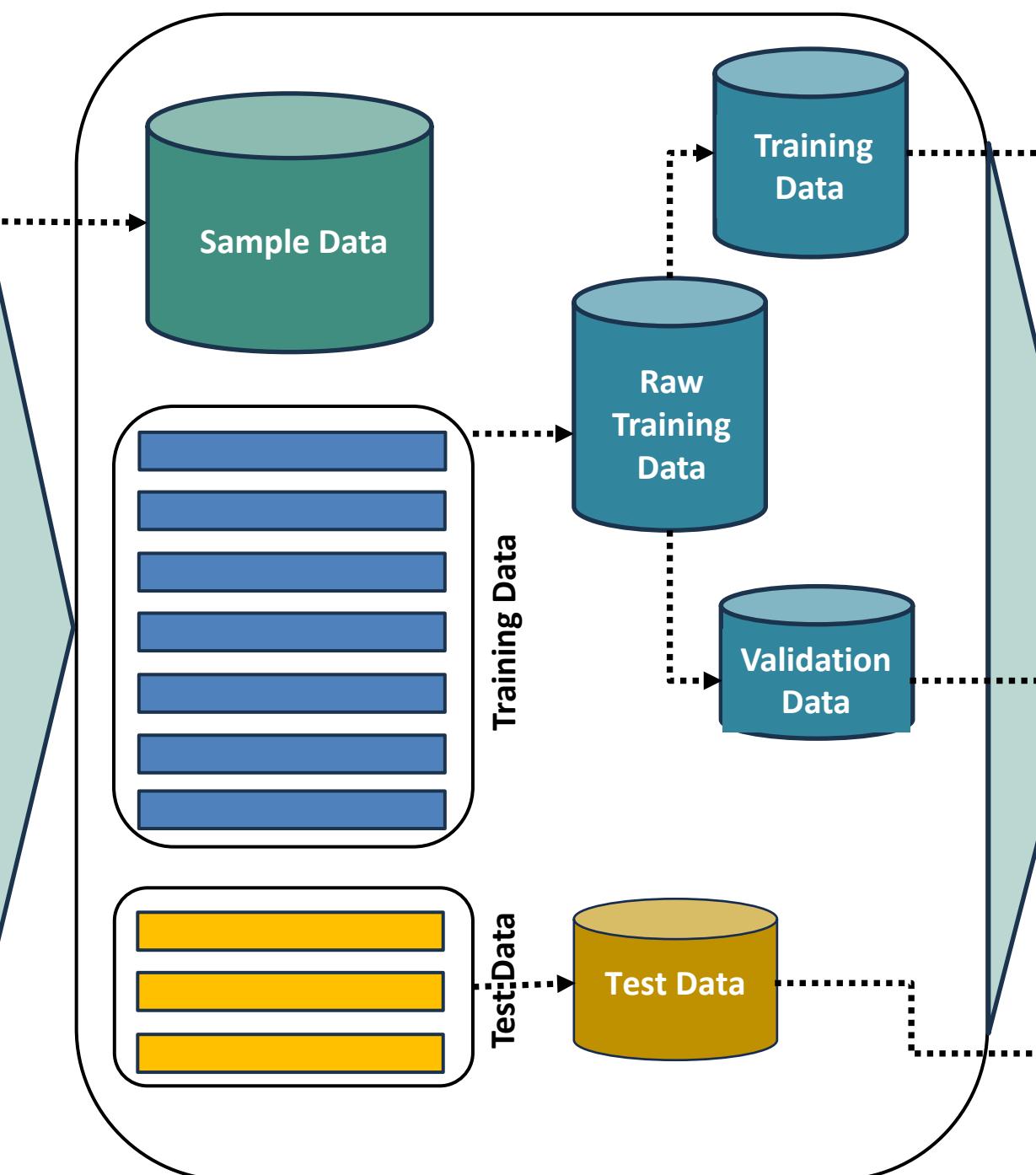
Data Acquisition



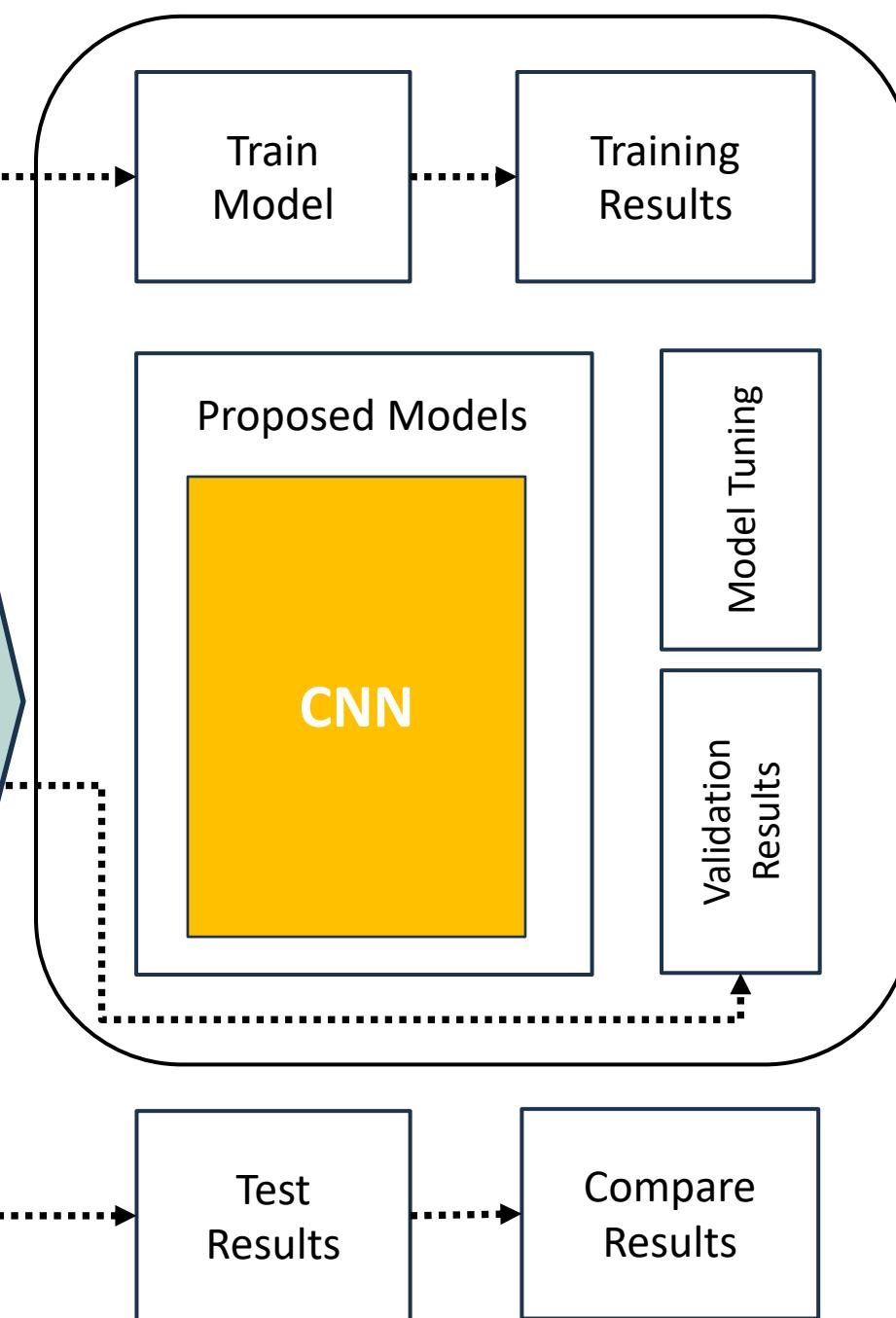
Data Pre-processing



Data Generation



Training Models and Classification



Rule

1. Starts from **Tuesday 9 July 2567 at 19:00, until Tuesday 9 July 2567 at 22:00.**
2. The HAR qualifier (online) is **required to enter the HAR competition (onsite).**
3. **No private sharing outside teams; No API calls from third-parties; No Private Dataset**
4. The competition is in a team format, where participants can name their teams. Everyone must join the competition before forming teams. Each team consists **1-3 members**, and team names are set after forming the team.
5. Submissions can be made up to **4 times.**
 - 50% of the Test data will be evaluated on the Public Leaderboard for model development purposes.
 - The remaining 50% of the Test data will be evaluated on the Private Leaderboard (using the best results from up to 2 submissions on the Public Leaderboard, or manually selecting before the competition ends) to determine the final rankings.
6. For submissions, participants must provide complete frame-level predictions for all images in the Test data, as shown in “sample_submission.csv” file. Otherwise, scores will not be calculated.
7. The winning team will be selected to proceed to **the HAR competition (onsite).**
8. Decisions made by the committee are final.

Ranking Score

- 1. Evaluate Submissions:** All submissions are evaluated using the **accuracy score metric**.
- 2. Compare Scores:** **Scores** are compared to determine the rankings.
- 3. Sort by Timestamp:** The submissions are sorted by their timestamps, If two or more participants have identical scores, the next step is to compare the submission times and the **earlier submissions are ranked higher**.

Evaluation Matrices

- ในการวัดผลจะใช้ metric : Accuracy Score

$$\text{Accuracy} = \frac{(TP + TN)}{(TP + FP + TN + FN)}$$

ค่า Accuracy Score สูง จะได้คะแนนสูง

Baseline Score

This leaderboard is calculated with approximately 50% of the test data. The final results will be based on the other 50%, so the final standings may be different.

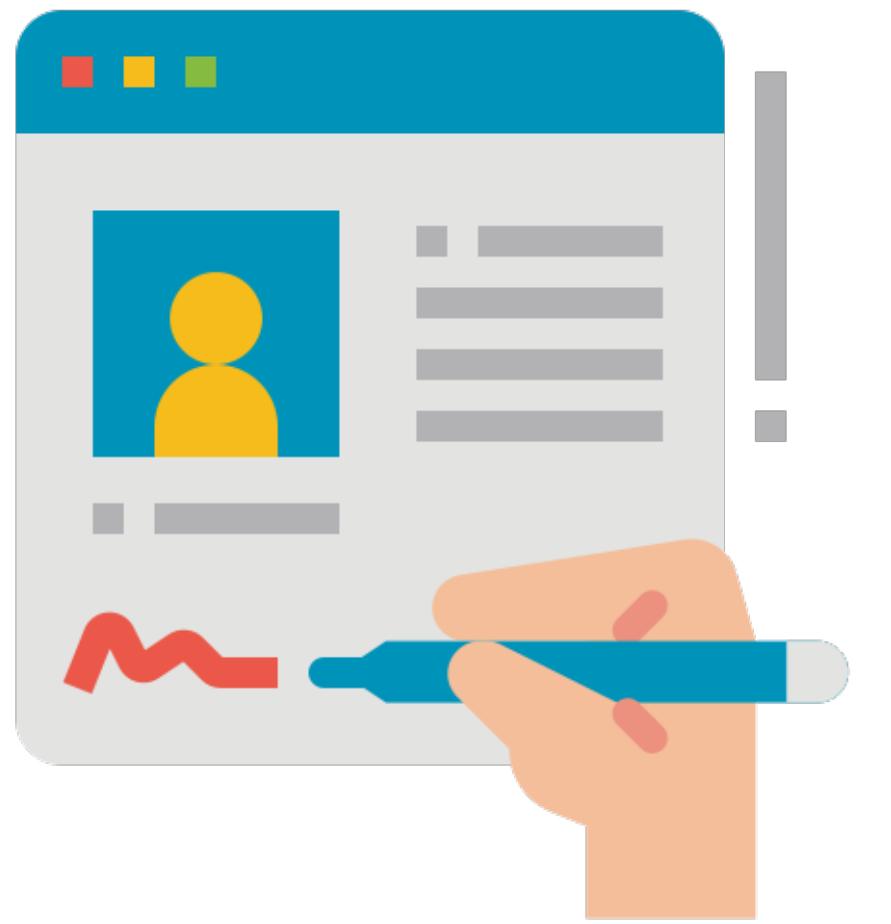
#	Team	Members	Score	Entries	Last	Join
1	submission_cnn.csv	• Score คำนวณจาก Accuracy	0.81791			

Score \geq
baseline



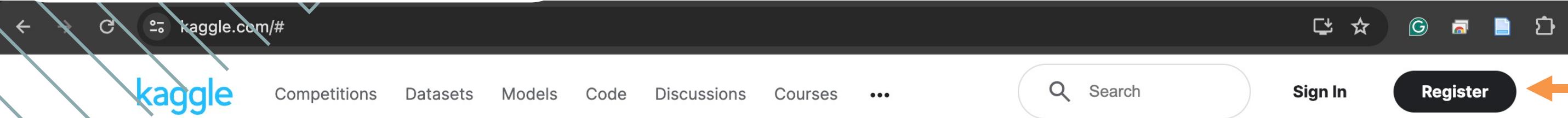


Q&A



Kaggle Register

kaggle How to



kaggle.com/#

Competitions Datasets Models Code Discussions Courses ...

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<https://www.kaggle.com/#>

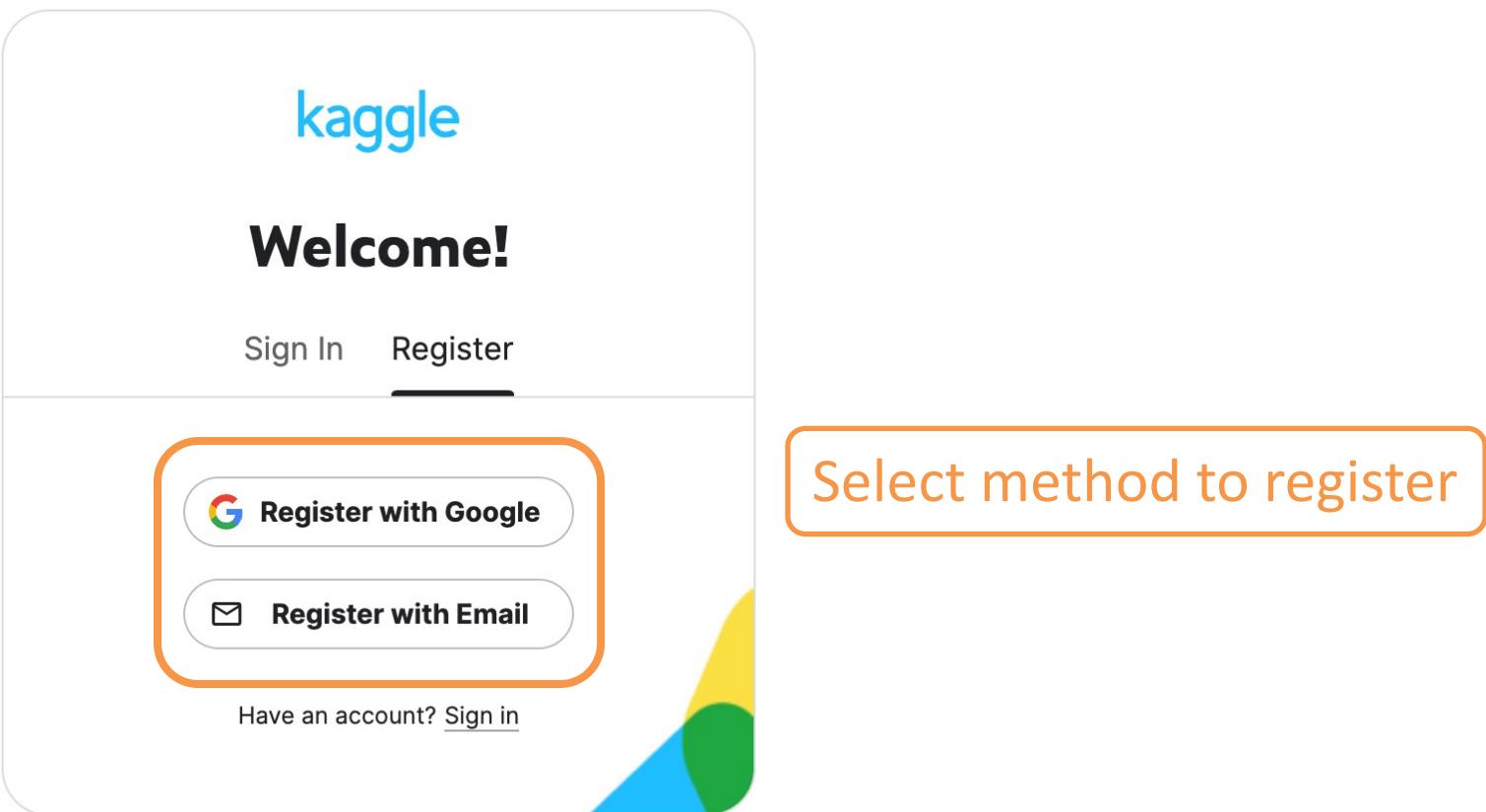
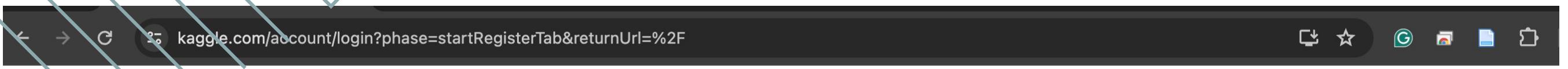


Register an account



<https://www.kaggle.com/#>

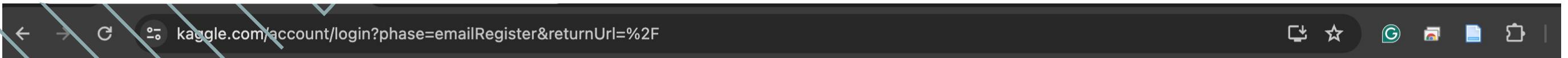
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When you link your Facebook, Google, or Yahoo account, Kaggle collects certain information stored in that account that you have configured to make available. By linking your accounts, you authorize Kaggle to access and use your account on the third party service in connection with your use of kaggle.com.

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Register with email

EMAIL

Enter your email address

PASSWORD

Enter password

Minimum of 7 characters

FULL NAME

Enter your full name

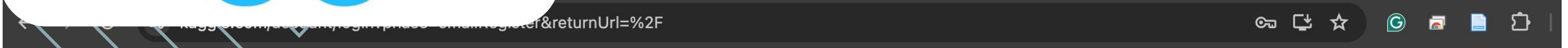
Will be displayed on your profile

I'm not a robot
reCAPTCHA
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Email me Kaggle news and tips
You can opt out at any time

[← Back](#) [Next](#)

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kaggle

Privacy and Terms

Kaggle is the world's largest data science and machine learning community. We provide powerful tools and resources like customizable Jupyter notebooks, public datasets and machine learning competitions to help you achieve your data science goals.

To create a Kaggle account, you'll need to agree to the [Terms of Use](#).

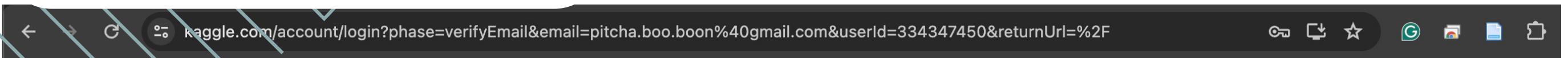
In addition, when you create an account, we process your information as described by our [Privacy Policy](#), including the key points below.

Data we process when you use Kaggle:

- When you set up a Kaggle account, we store information you give us like

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Verify your email

We've sent you an email with a six-character code. Please enter it here.

SIX-CHARACTER CODE

Enter six-character code

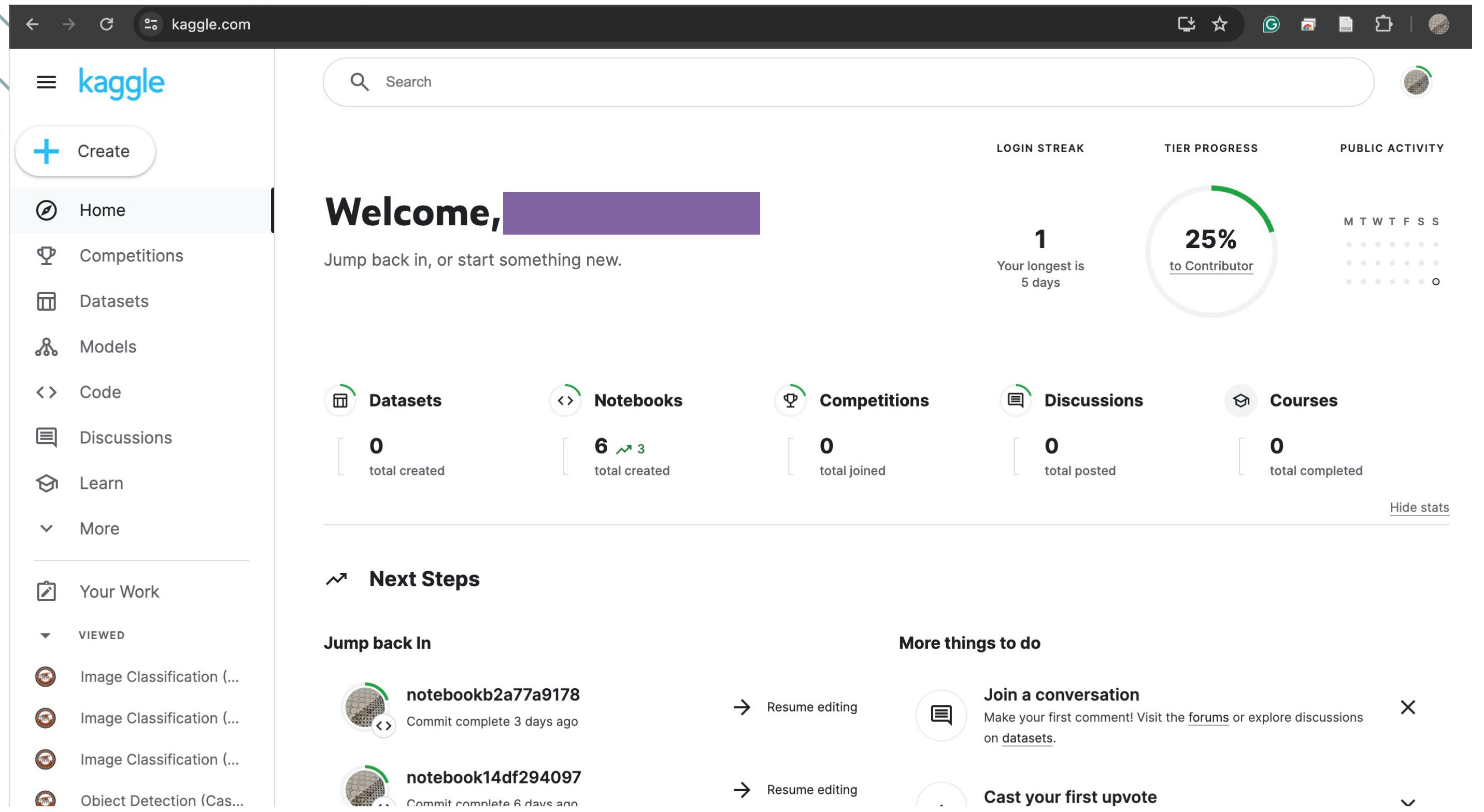
Resend email

Next

Contact Us / Support

Go to your mailbox and enter six digit code

kaggle How to



The image shows the homepage of kaggle.com. The left sidebar contains navigation links: Create, Home, Competitions, Datasets, Models, Code, Discussions, Learn, More, Your Work, and VIEWED. Under VIEWED, there are entries for Image Classification tasks and an Object Detection task. The main content area features a "Welcome" message and a search bar. It displays activity statistics: 1 login streak (5 days), 25% tier progress (Contributor), and counts for Datasets (0 total created), Notebooks (6 total created, 3 new), Competitions (0 total joined), Discussions (0 total posted), and Courses (0 total completed). A "Hide stats" link is located below the stats section. Below this, the "Next Steps" section includes "Jump back in" with two notebook entries (notebookb2a77a9178 and notebook14df294097) and "More things to do" sections for joining conversations and casting upvotes.

kaggle.com

Search

Welcome, [REDACTED]

Jump back in, or start something new.

LOGIN STREAK

TIER PROGRESS

PUBLIC ACTIVITY

25%
to Contributor

1
Your longest is
5 days

Datasets: 0 total created

Notebooks: 6 total created, 3 new

Competitions: 0 total joined

Discussions: 0 total posted

Courses: 0 total completed

Hide stats

Next Steps

Jump back in

notebookb2a77a9178
Commit complete 3 days ago

notebook14df294097
Commit complete 6 days ago

More things to do

Join a conversation
Make your first comment! Visit the [forums](#) or explore discussions on [datasets](#).

Cast your first upvote

kaggle How to



Your Work

Your Profile

Settings

Sign Out

Your accelerator quota

GPU 29h 56m available of 30h

Your notifications

No notifications to display

X

Search

Your Work Your profile

Settings

Control over your Kaggle account and all communications

Account Notifications

Your email address

Change email

Please verify phone number to use GPU

Phone verification

Verified

Identity verification

You have not verified your identity using Persona, a trusted 3rd-party service. Verifying your identity allows you to join competitions that require identity verification. [Learn More](#)

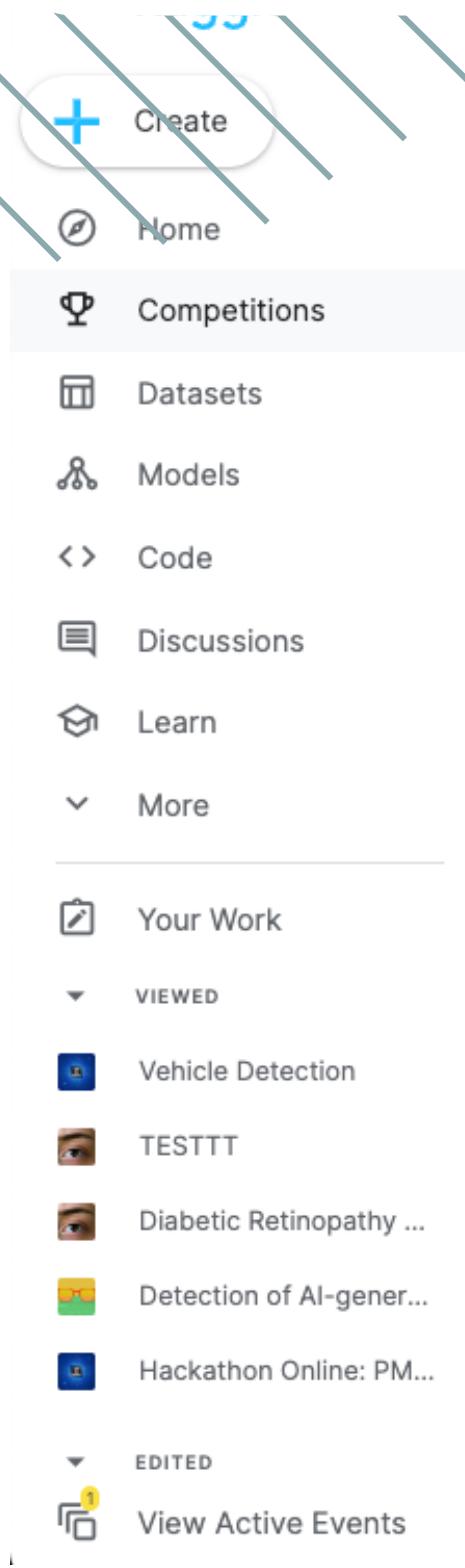
Verify my account

Theme BETA



Kaggle Submission

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Vehicle Detection

Settings Overview Data Code Models Discussion Leaderboard Rules Team

- [TrafficPublic/train/class.txt](#) - a dictionary of class names
- [sample_submission.csv](#) - a sample submission file in the correct format
- [pretrain-30-percent-finetune.ipynb](#) - python notebook and it contains the notebook code for custom training model
- [zero-shot.ipynb](#) - python notebook and it contains the notebook code for predict using a pre-train model

Launch Checklist ...

jpg,txt,ipynb + other

License

Unset

TrafficPublic (2 directories)

[] >

About this directory

This file does not have a description yet.



Download Data

Data Explorer

545.81 MB

▼ [TrafficPublic](#)
 ▶ [test](#)
 ▶ [train](#)
 ▶ [pretrain-30-percent-finetune.ipynb](#)
 ▶ [sample_submission.csv](#)
 ▶ [zero-shot.ipynb](#)

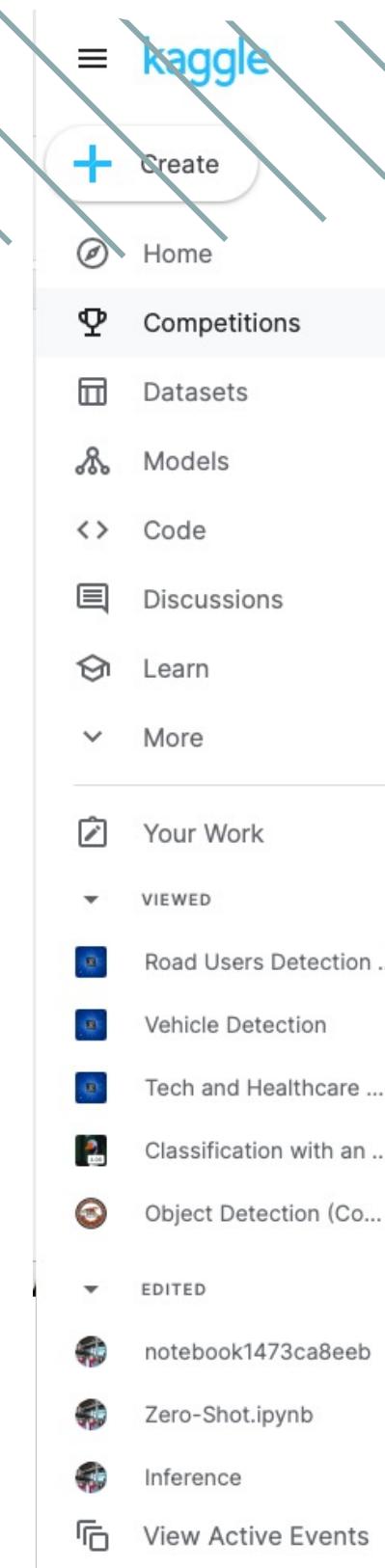
Summary

▶ [10.4k files](#)
▶ [4 columns](#)

↓ [Download All](#)

+ [New Version](#)

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Search

COMMUNITY PREDICTION COMPETITION · PRIVATE · UNLAUNCHED

SuperAI 4 Hackathon Online Practice

Launch Checklist ...

Code

Your competition is ready to launch! You've completed 10 of 10 tasks to launch your competition.

View Launch Checklist

+ New Notebook

No notebooks found

No notebooks to show.

Settings Overview Data Code Models Discussion Leaderboard Rules Team

Notebooks

Search notebooks

All Your Work Shared With You Bookmarks

Hotness ▾

A screenshot of a Kaggle competition page. The 'Code' tab is selected and highlighted with a red box. A callout bubble labeled 'Create new notebook' points to the '+ New Notebook' button, which is also highlighted with a red box. The page displays a message about the competition being ready to launch and shows a section for notebooks with no results found.

Create new notebook

kaggle How to

The screenshot shows the Kaggle Notebook interface. A red box highlights the 'Import Notebook' option in the top-left menu bar. An orange callout box labeled 'Import .ipynb notebook' points to this menu item. The main workspace displays a sample Jupyter notebook code snippet.

notebook16daca7ee0 Draft saved

File Edit View Run Add-ons Help

+ New Notebook
Import Notebook
Download Notebook
Open in Colab
Link to GitHub
Set as Utility Script

Add input
Upload input

Language
Editor Type

Share
Save Version
Version history
Delete Notebook

Draft Session off (run a cell to start) ⚡

Share Save Version

Notebook

Input

+ Add Input Upload

COMPETITIONS

Vehicle Detection

Output

/kaggle/working

Submit to competition

Session options

ACCELERATOR None

LANGUAGE Python

PERSISTENCE No persistence

ENVIRONMENT Pin to original environment

You won't get new packages, but your code is less likely to break. What is a notebook environment?

INTERNET Internet on

TAGS

Import .ipynb notebook

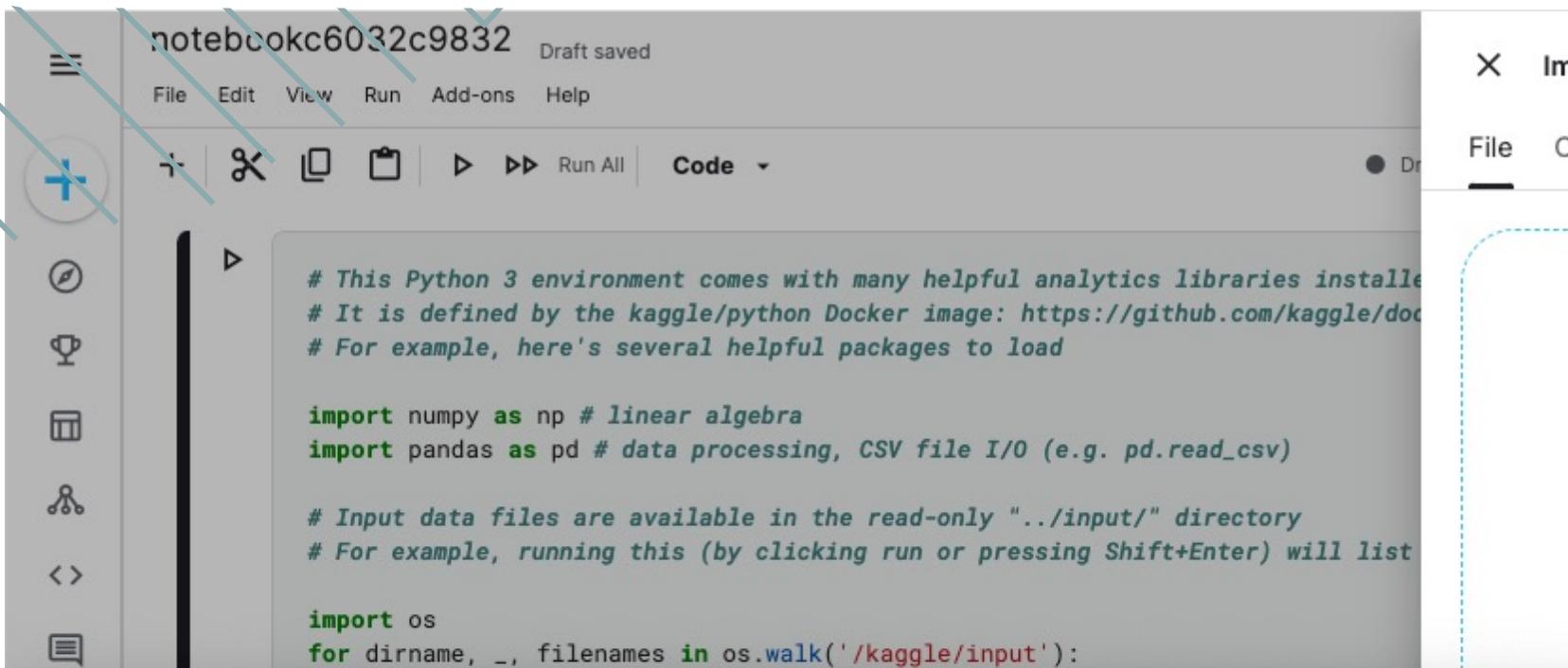
```
# linear algebra
# data processing, CSV file I/O (e.g. pd.read_csv)

are available in the read-only "../input/" directory
running this (by clicking run or pressing Shift+Enter) will list all files under the input directory

filenames in os.walk('/kaggle/input'):
    filenames:
        path.join(dirname, filename)

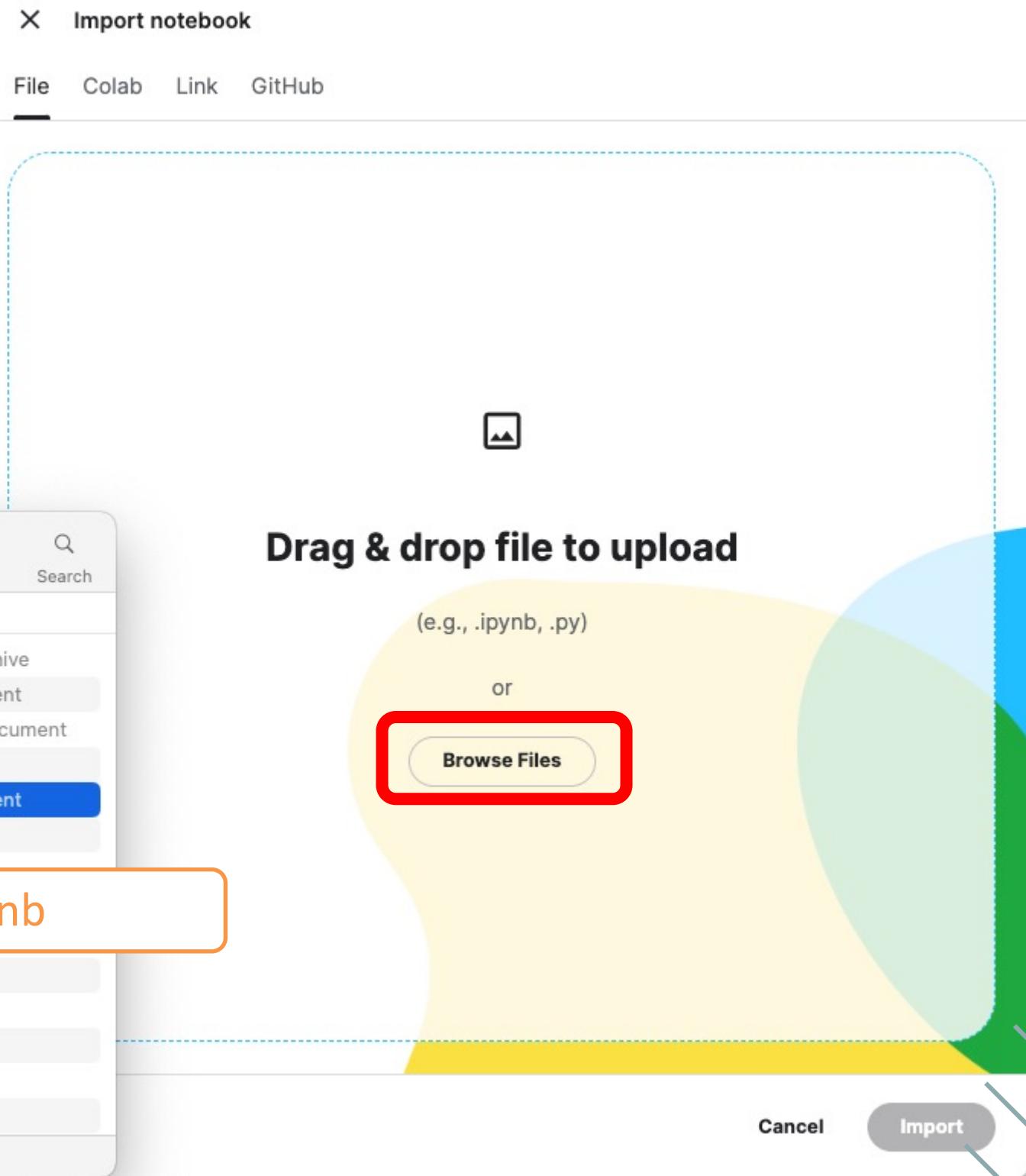
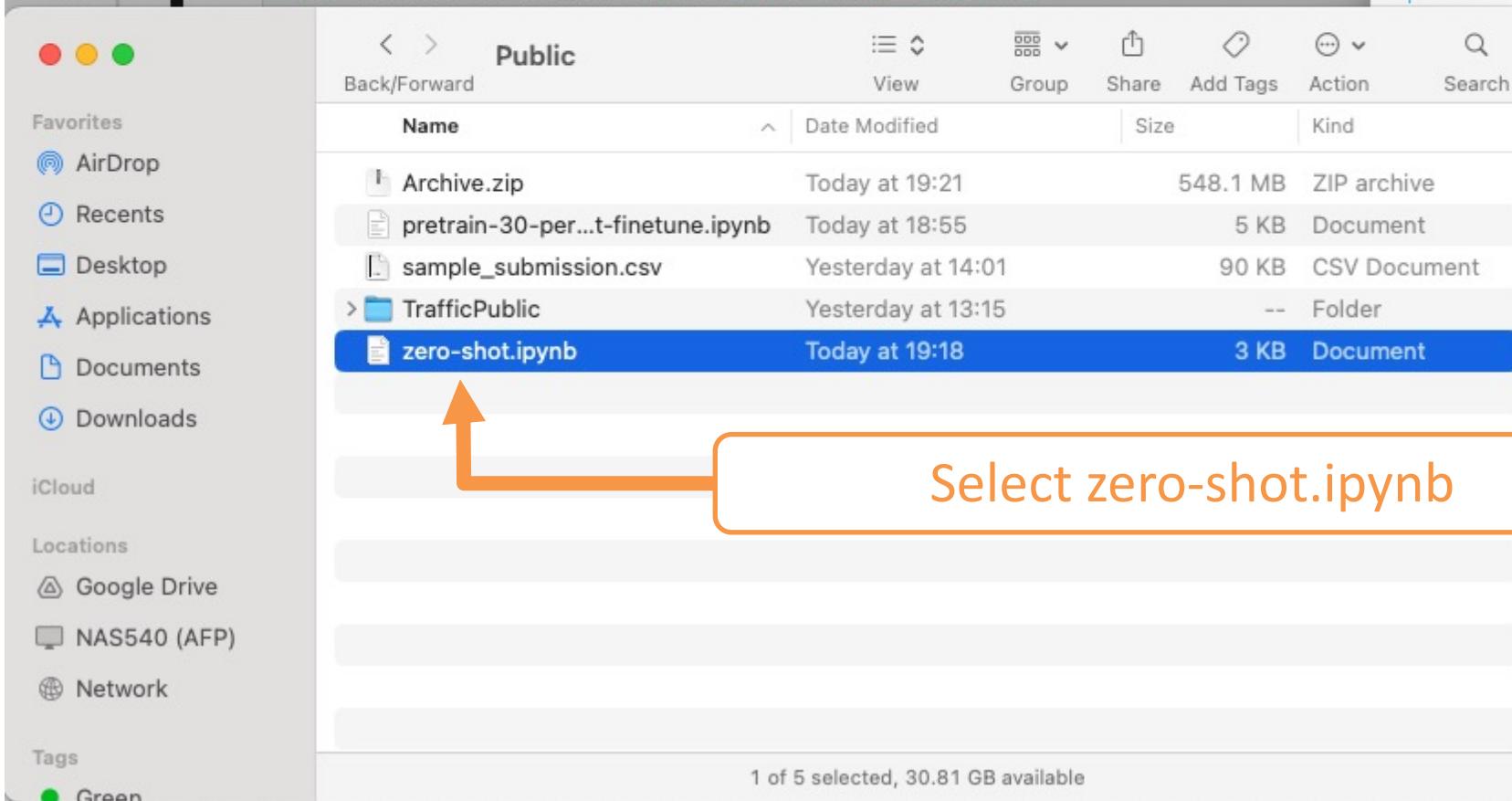
to 20GB to the current directory (/kaggle/working/) that gets preserved as output when you create a version using "Save & Run All"
use temporary files to /kaggle/temp/, but they won't be saved outside of the current session
```

kaggle How to

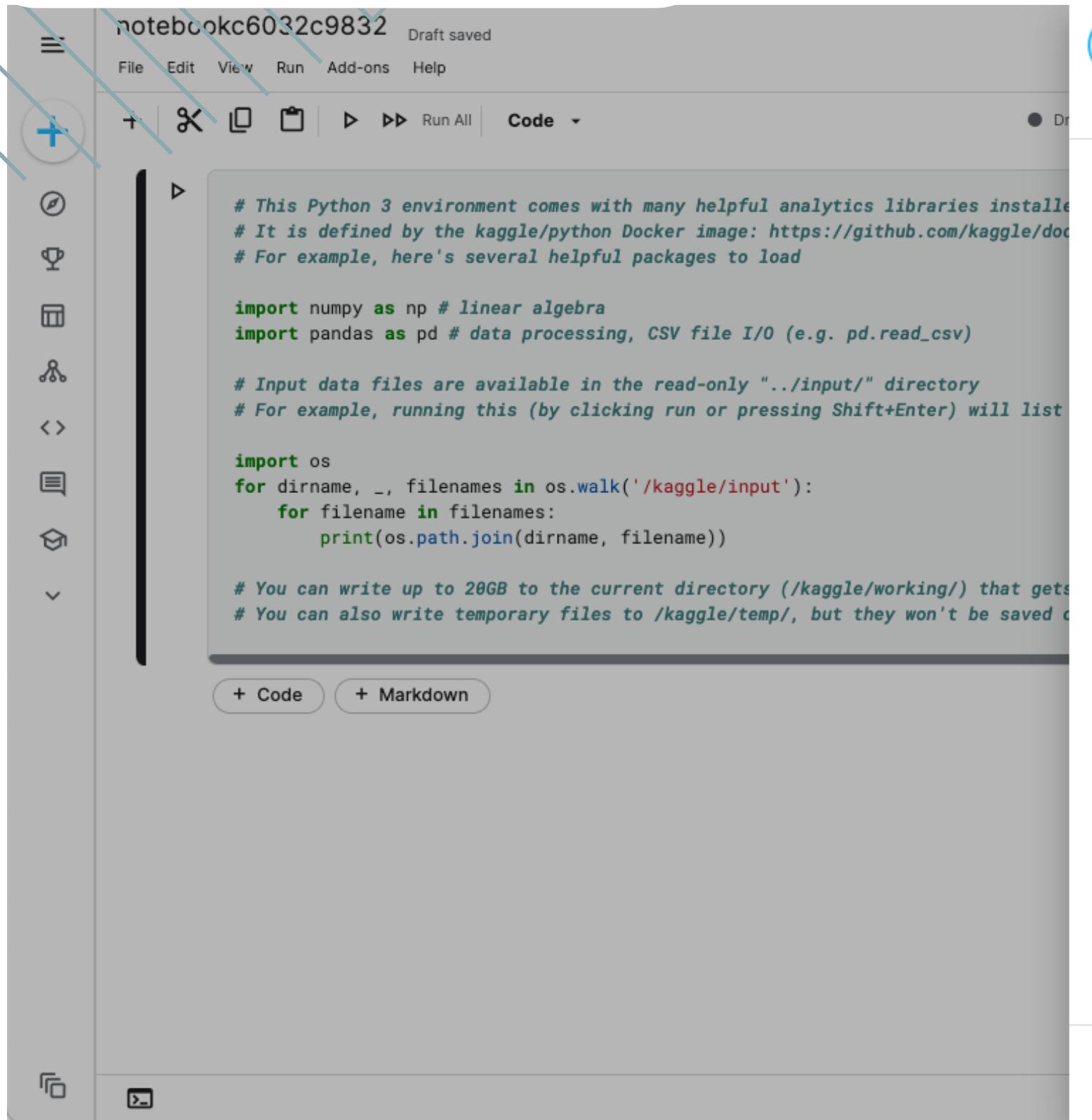


A screenshot of a Jupyter Notebook interface. The top bar shows "notebookc6032c9832" and "Draft saved". The toolbar includes File, Edit, View, Run, Add-ons, Help, and a "Code" dropdown. The main area contains Python code:

```
# This Python 3 environment comes with many helpful analytics libraries installed  
# It is defined by the kaggle/python Docker image: https://github.com/kaggle/docker-python  
# For example, here's several helpful packages to load  
  
import numpy as np # linear algebra  
import pandas as pd # data processing, CSV file I/O (e.g. pd.read_csv)  
  
# Input data files are available in the read-only "../input/" directory  
# For example, running this (by clicking run or pressing Shift+Enter) will list the files in this directory  
  
import os  
for dirname, _, filenames in os.walk('/kaggle/input'):
```



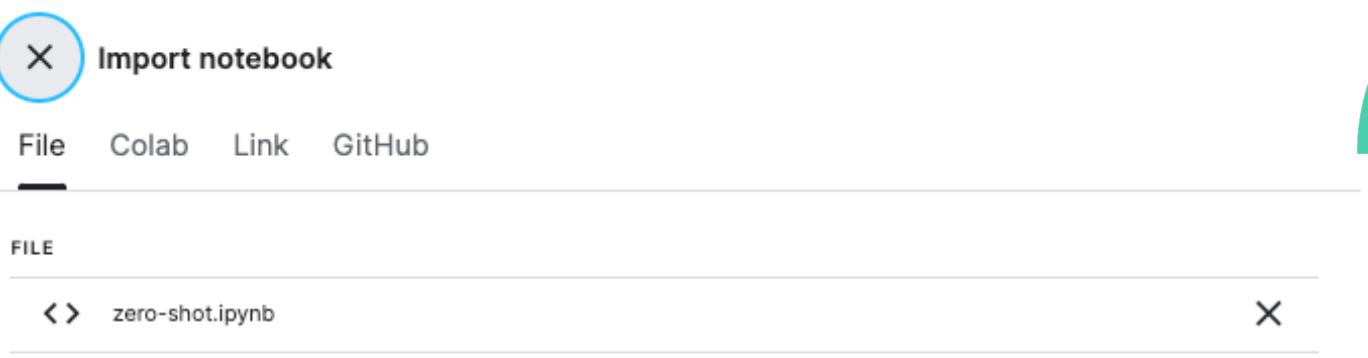
kaggle How to



A screenshot of a Jupyter Notebook interface. The title bar says "notebookc6032c9832 Draft saved". The toolbar includes File, Edit, View, Run, Add-ons, Help, a plus sign for new cells, a delete icon, a copy icon, a run icon, and "Run All". A "Code" dropdown is open. The main area contains Python code:

```
# This Python 3 environment comes with many helpful analytics libraries installed  
# It is defined by the kaggle/python Docker image: https://github.com/kaggle/docker-python  
# For example, here's several helpful packages to load  
  
import numpy as np # linear algebra  
import pandas as pd # data processing, CSV file I/O (e.g. pd.read_csv)  
  
# Input data files are available in the read-only "../input/" directory  
# For example, running this (by clicking run or pressing Shift+Enter) will list the files in this directory  
  
import os  
for dirname, _, filenames in os.walk('/kaggle/input'):  
    for filename in filenames:  
        print(os.path.join(dirname, filename))  
  
# You can write up to 20GB to the current directory (/kaggle/working/) that gets uploaded to output when you click "Submit"  
# You can also write temporary files to /kaggle/temp/, but they won't be saved outside of this notebook
```

At the bottom are "+ Code" and "+ Markdown" buttons.



Cancel

Import

Click to import

kaggle How to

The screenshot shows a Kaggle Notebook interface with the following sections:

- Install Library:** A code cell [1] contains the command `!pip install ultralytics -q`. Another code cell [2] contains Python imports for os, glob, tqdm, cv2, numpy, and YOLO from ultralytics.
- Data preprocessing:** A code cell [3] sets dataset and test directory paths: `dataset_dir = '/kaggle/input/vehicle-detection/TrafficPublic'` and `test_dir = dataset_dir + '/test'`.
- Session options:** The "ACCELERATOR" dropdown menu is highlighted with a red box and an orange arrow pointing to the "GPU T4 x2" option, which is also highlighted with a gray background.

On the right side of the notebook, there is a sidebar with the following sections:

- Output (22.7MB / 19.5GB):** Shows a folder path: /kaggle/working.
- Submit to competition:** A section for the "Vehicle Detection" competition, showing latest and best scores, and daily submissions count.
- Session options:** A dropdown menu for selecting the accelerator type, with "GPU T4 x2" selected.

Select GPU T4 X 2

kaggle How to

The screenshot shows a Kaggle Notebook interface with the following components:

- Top Bar:** File, Edit, View, Run, Add-ons, Help.
- Toolbar:** +, X, Run, Run All, Markdown dropdown.
- Notebook Area:**
 - Cell 1:** Title "Install Library".
 - + Code, + Markdown buttons.
 - Code cell: `!pip install ultralytics -q`
 - Cell 2:** Title "Data preprocessing".
 - Code cell:

```
dataset_dir = '/kaggle/input/vehicle-detection/TrafficPublic'
test_dir = dataset_dir + '/test'
```
 - Code cell:

```
# get class from text file (txt)
```
- Right Sidebar:**
 - Draft Session off (run a cell to start) button (highlighted with a red box).
 - Notebook:** Input (+ Add Input, Upload), Competitions (Vehicle Detection), Output (working folder), Submit to competition (Vehicle Detection), Latest Score, Best Score, Daily Submissions (0 / 8 used), Submit button.
 - Session options:**
 - Schedule a notebook to run:** Schedule this notebook to run and save a new version on a future date. View all your scheduled notebooks.

An orange arrow points from the "Start Session" button in the sidebar to the Draft Session off button in the top right.

kaggle How to

notebookc6032c9832 Draft saved

File Edit View Run Add-ons Help

+ X Run All Markdown

Draft Session off (run a cell to start)

Data preprocessing

```
[ ]: dataset_dir = '/kaggle/input/vehicle-detection/TrafficPublic'  
      test_dir = dataset_dir + '/test'  
  
[ ]: # get class from text file (.txt)  
      with open(dataset_dir + '/train/classes.txt') as file:  
          class_names = [line.rstrip() for line in file]  
      class_names
```

Inference

```
[ ]: answer_list = []  
      # Use the model  
      model = YOLO('yolov8s.pt')  
      names = model.names  
  
      for file in tqdm(glob(test_dir + '/*')):
```

Share Save Version 0

Notebook

Input + Add Input Upload

COMPETITIONS Vehicle Detection

- TrafficPublic
- pretrain-30-percent-finetune
- sample_submission.csv

Copy directory path

Output /kaggle/working

Submit to competition Vehicle Detection

LATEST SCORE - BEST SCORE - DAILY SUBMISSIONS 0 / 8 used

Session options

Schedule a notebook to run

Copy dataset path



kaggle How to

The screenshot shows a Jupyter Notebook interface with the following code:

```
coor_box = box.xyxy.cpu().numpy().tolist() # Boxes object for bounding box outputs
class_box = box.cls.cpu().numpy().tolist()
class_scores = box.conf.cpu().numpy().tolist()

label = names[int(class_box[0])]

if label in class_names:
    bbox_list.append(coor_box[0])
    # Re-index to target class
    cls_list.append(class_names.index(label))
    scores_list.append(class_scores[0])

value = (file.split('/')[-1], bbox_list, cls_list, scores_list)

answer_list.append(value)

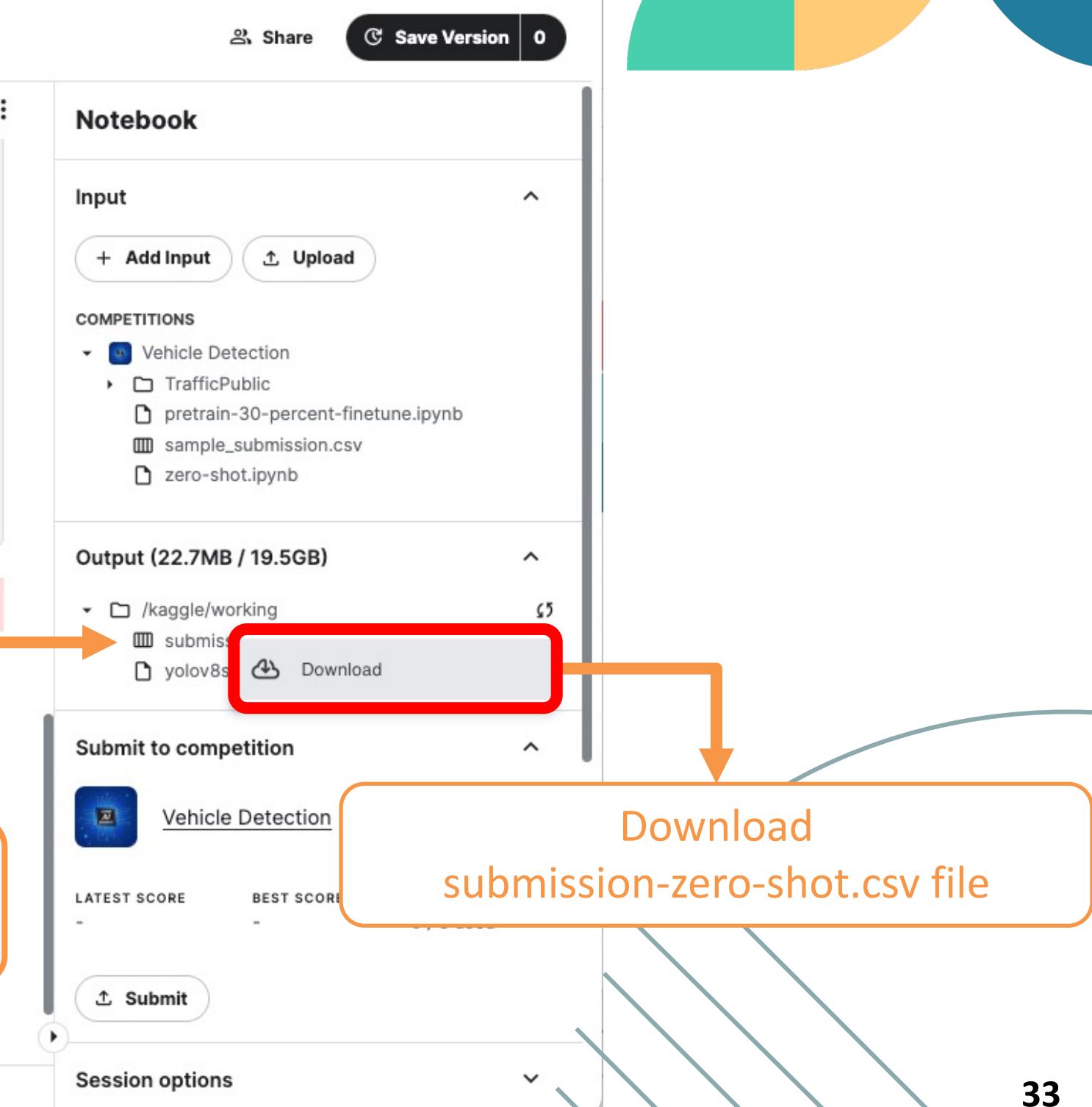
Downloading https://github.com/ultralytics/assets/releases/download/v8.2.0/yolov8s.pt to 'yolov8s.pt'...
100%|██████████| 21.5M/21.5M [00:00<00:00, 150MB/s]
100%|██████████| 1552/1552 [00:40<00:00, 38.04it/s]
```

Submission

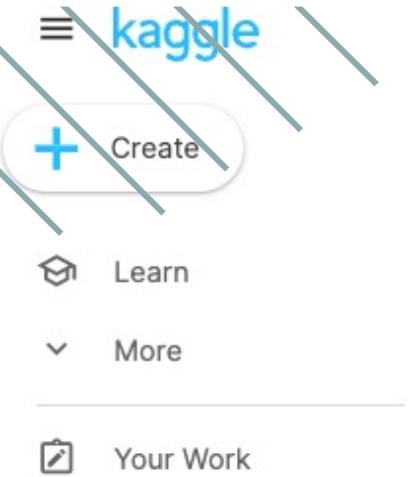
create submission.csv file

```
import pandas as pd
column_name = ['id', 'boxes', 'labels', 'scores']
xml_df = pd.DataFrame(answer_list, columns=column_name)
xml_df.to_csv('/kaggle/working/submission-zero-shot.csv', index=None)
```

+ Code + Markdown



kaggle How to



Search Community Prediction Competition - PRIVATE - 10 hours to go

Submit Score

Vehicle Detection (Demo)
SuperAI 4 Hackathon Online Practice

Overview Data Code Models Discussion Leaderboard Rules Team Submissions Settings

Overview

Competition Objective
The primary objective of this competition is to practice a robust and accurate detection model that can identify and classify various types of road users in diverse traffic scenarios.

Road User Categories
Participants are required to detect and classify the following types of vehicles:

- 0 : **Motorcycle**, Two-wheeled motorized vehicles.
- 1 : **Car**, Standard passenger vehicles with four wheels.
- 2 : **Truck**, Heavy-duty vehicles designed for transporting goods.
- 3 : **Pickup-van**, Larger vehicles used for transporting goods or groups of people.
- 4 : **Bus**, Large vehicles designed to carry many passengers.

Competition Host

Prizes & Awards
Kudos
Does not award Points or Medals

Participation
0 Entrants
0 Participants
0 Teams
0 Submissions

Tags
Custom Metric

Table of Contents
Overview
Description

Start just now **Close** 10 hours to go

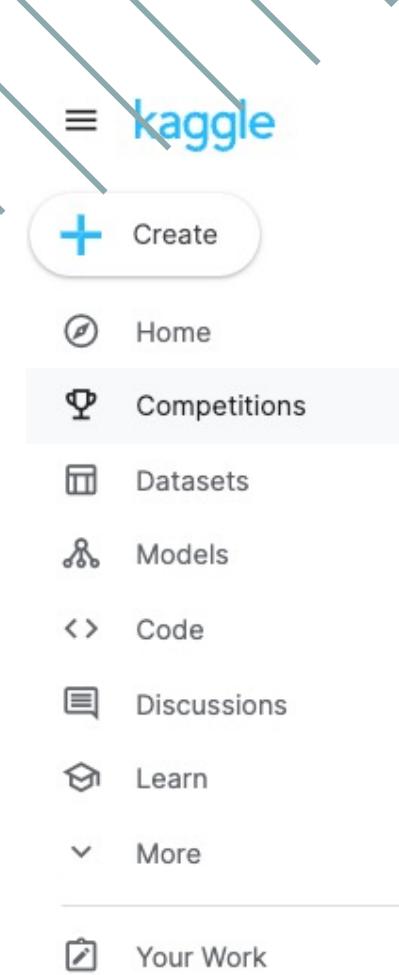
View Active Events <https://www.kaggle.com>

kaggle How to

The screenshot shows the Kaggle interface for the "Vehicle Detection (Demo)" competition. On the left, there's a sidebar with options like "Learn", "More", "Your Work", and "Viewed". The main area displays the competition details, including the title "Vehicle Detection (Demo)", the subtitle "SuperAI 4 Hackathon Online Practice", and tabs for "Overview", "Data", "Code", "Models", "Discussion", and "Leaderboard". A modal window titled "Submit to Competition" is open, showing a "File Upload" tab selected. It contains a section for "Vehicle Detection (Demo)" with a note about remaining submissions. Below this is a "Drag and drop file to upload" field with a placeholder "(e.g., .csv, .parquet, .zip, .gz, .7z, .tar)". An orange arrow points from a file named "submission-zero-shot.csv" in a Finder window on the left to this upload field. The Finder window also shows the file's details: Name: submission-zero-shot.csv, Date Modified: Today at 20:27, Size: 1.2 MB, Kind: CSV Document.

Drag and Drop
Files into Box

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Search

COMMUNITY PREDICTION COMPETITION · PRIVATE · 10 HOURS TO GO

Submit Prediction ...

Vehicle Detection (Demo)

SuperAI 4 Hackathon Online Practice

Overview Data Code Models Discussion Leaderboard Rules Team Submissions Settings

Submissions

Select up to 6 submissions that will count towards your final leaderboard score. If less than 6 are selected, Kaggle will automatically select from your best scoring submissions. [Learn More](#)

Auto-selection candidates [?](#)

All Successful Selected Errors

Recent ▾

Submission and Description	Public Score ?	Select
submission-zero-shot.csv Complete · 3m ago	0.29052	<input checked="" type="checkbox"/>

EDITED

View Active Events

<https://www.kaggle.com/competitions/vehicle-detection-demo/submissions#>

Select Submission to Leaderboard

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The screenshot shows the Kaggle interface for the "Vehicle Detection (Demo)" competition. The left sidebar includes links for Home, Competitions, Datasets, Models, Code, Discussions, Learn, More, and Your Work. A red arrow points from the "kaggle" logo at the top left to the "Create" button. The main content area displays the competition title "Vehicle Detection (Demo)" and subtitle "SuperAI 4 Hackathon Online Practice". Below this are tabs for Overview, Data, Code, Models, Discussion, Leaderboard (which is selected), Rules, Team, Submissions, and Settings. A search bar is at the top right. The Leaderboard section shows a recent submission:

YOUR RECENT SUBMISSION

submission-zero-shot.csv
Submitted by Nagorn · Submitted 5 minutes ago

Score: 0.26650
Public score: 0.29052

[↓ Jump to your leaderboard position](#)

A red box highlights the "Jump to your leaderboard position" link. An orange arrow points from the "Leaderboard" tab in the navigation bar down to this link. A callout bubble on the right side of the screen contains the text "Select Submission to Leaderboard".