

NSF HDR ML Challenge Codabench Tutorial



PHY-2117997

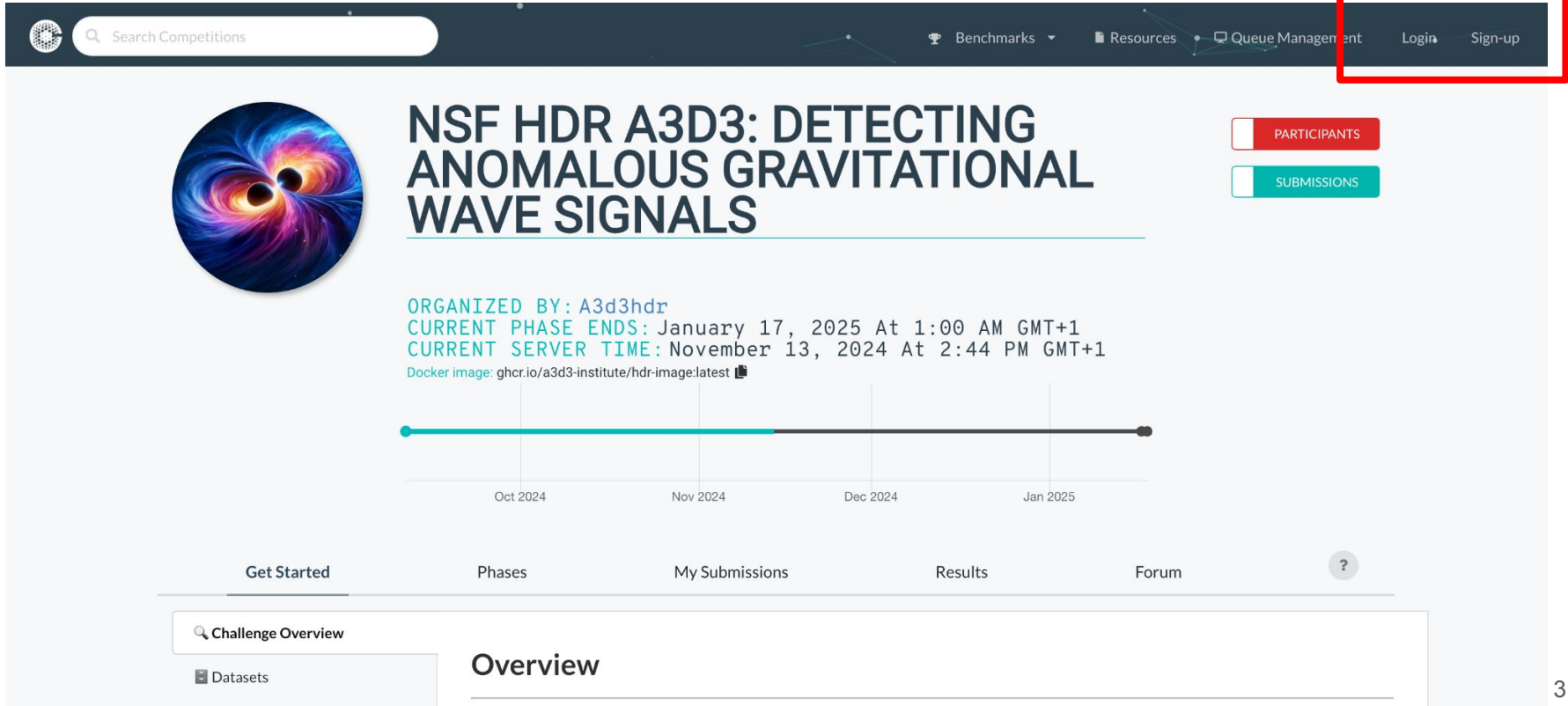
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A3D3 Institute
for HDR ML Challenge team



<https://a3d3.ai/>

Hand-on session

1. Login or Create Account on Codabench

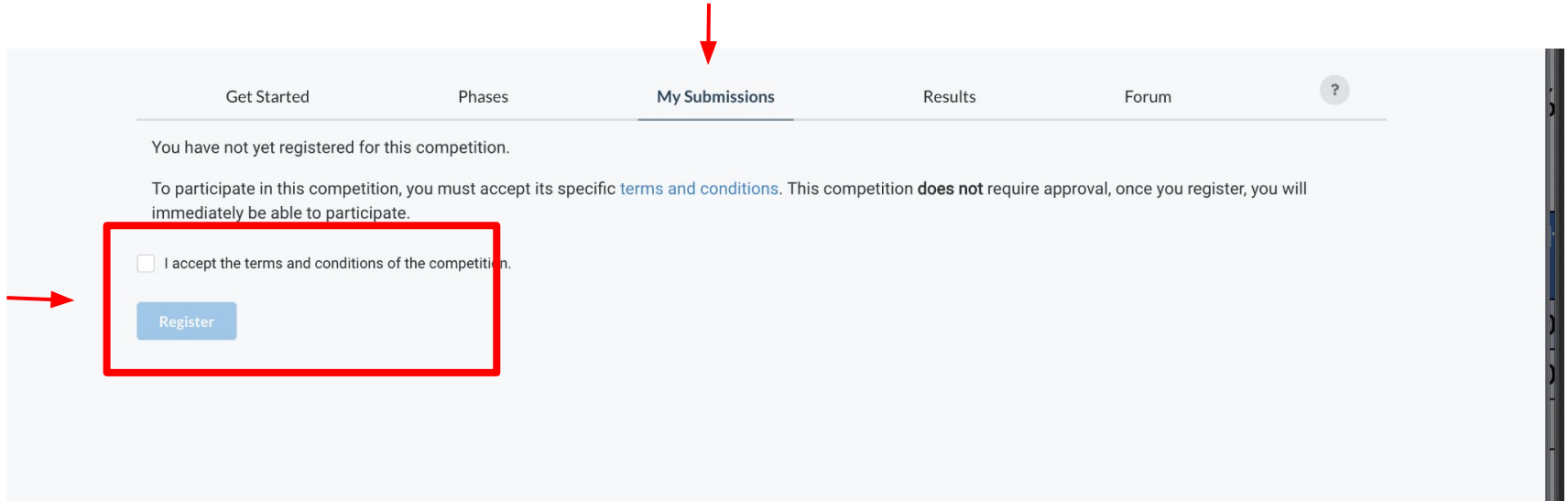


The screenshot displays the Codabench website interface for a specific challenge. At the top, a dark navigation bar contains a search bar on the left and several menu items on the right: 'Benchmarks', 'Resources', 'Queue Management', 'Login', and 'Sign-up'. A red rectangular box highlights the 'Login' and 'Sign-up' buttons, with a red arrow pointing downwards towards it from the top right of the slide.

The main content area features a large circular image of a gravitational well on the left. To its right, the challenge title 'NSF HDR A3D3: DETECTING ANOMALOUS GRAVITATIONAL WAVE SIGNALS' is prominently displayed. Below the title, there are two buttons: a red 'PARTICIPANTS' button and a teal 'SUBMISSIONS' button. Further down, the text indicates the challenge is 'ORGANIZED BY: A3d3hdr' and provides phase end dates: 'CURRENT PHASE ENDS: January 17, 2025 At 1:00 AM GMT+1' and 'CURRENT SERVER TIME: November 13, 2024 At 2:44 PM GMT+1'. A 'Docker image' link is also present. A horizontal timeline at the bottom shows the progression from October 2024 to January 2025.

At the bottom of the page, there is a navigation menu with tabs for 'Get Started', 'Phases', 'My Submissions', 'Results', and 'Forum'. A search bar is also visible, containing the text 'Challenge Overview' and 'Datasets'.

2. Register in the Competition



The screenshot shows a navigation bar with the following items: "Get Started", "Phases", "My Submissions" (highlighted with a red arrow), "Results", "Forum", and a help icon (a question mark in a circle). Below the navigation bar, the text reads: "You have not yet registered for this competition." followed by "To participate in this competition, you must accept its specific [terms and conditions](#). This competition **does not** require approval, once you register, you will immediately be able to participate." A red box highlights the registration form, which contains an unchecked checkbox with the text "I accept the terms and conditions of the competition." and a blue "Register" button. A red arrow points to the checkbox.

Get Started Phases **My Submissions** Results Forum ?

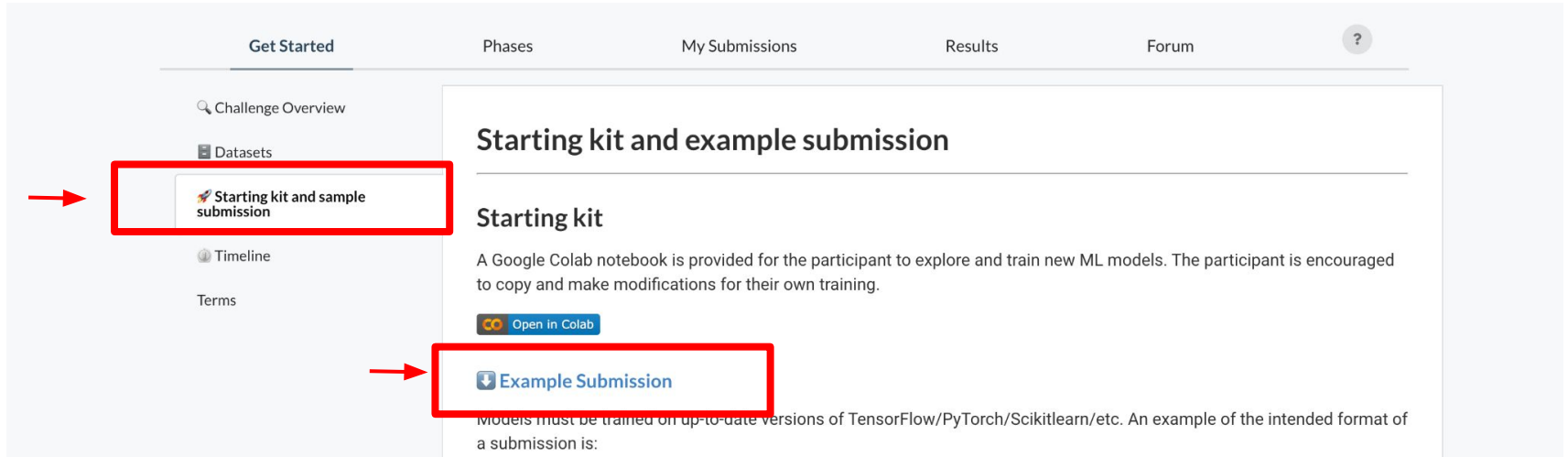
You have not yet registered for this competition.

To participate in this competition, you must accept its specific [terms and conditions](#). This competition **does not** require approval, once you register, you will immediately be able to participate.

I accept the terms and conditions of the competition.

Register

3. Download Dummy Submission



The screenshot shows a web interface with a top navigation bar containing 'Get Started', 'Phases', 'My Submissions', 'Results', and 'Forum'. A left sidebar contains 'Challenge Overview', 'Datasets', 'Starting kit and sample submission', 'Timeline', and 'Terms'. The main content area is titled 'Starting kit and example submission' and includes a sub-section 'Starting kit' with a paragraph of text and an 'Open in Colab' button. Below this is an 'Example Submission' button. Two red boxes highlight the 'Starting kit and sample submission' menu item and the 'Example Submission' button, with red arrows pointing to them.

Get Started Phases My Submissions Results Forum ?

Challenge Overview

Datasets

Starting kit and sample submission

Timeline

Terms

Starting kit and example submission

Starting kit

A Google Colab notebook is provided for the participant to explore and train new ML models. The participant is encouraged to copy and make modifications for their own training.

[Open in Colab](#)

[Example Submission](#)

Models must be trained on up-to-date versions of TensorFlow/PyTorch/Scikitlearn/etc. An example of the intended format of a submission is:

4. Submit Dummy Submission

The screenshot shows a web interface for managing submissions. At the top, there are navigation tabs: "Get Started", "Phases", "My Submissions" (highlighted with a red arrow), "Results", and "Forum". Below the tabs are two buttons: "Development Phase" and "Final Phase".

Two summary cards are displayed:

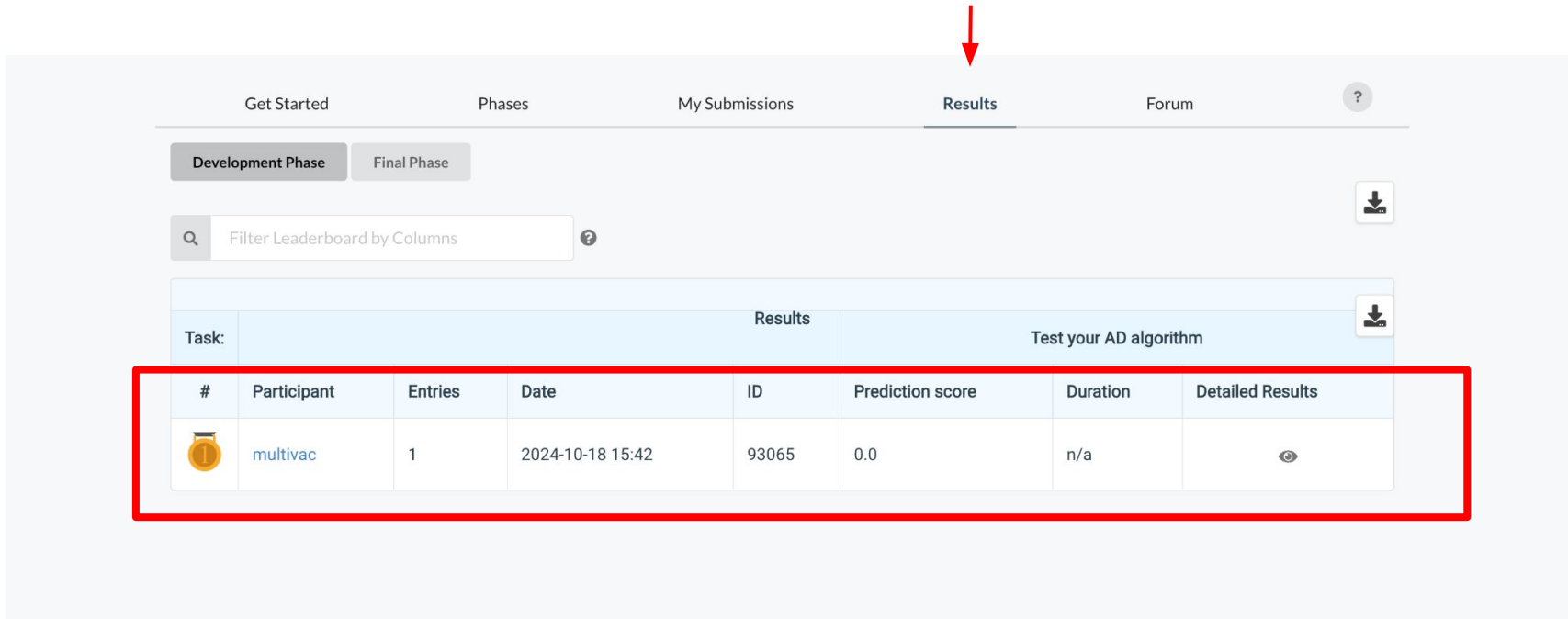
- "Number of submissions used for the day" with a value of "0 out of 500".
- "Number of total submissions used" with a value of "0 out of 1000".

The main section is titled "Submission upload". It includes a "Submit as:" dropdown menu currently set to "Yourself" (indicated by a red arrow). Below this is a large file upload area, which is highlighted with a red rectangular border. This area contains a paperclip icon and a text input field.



At the bottom, there is a search bar with the text "Search..." and a magnifying glass icon, and a "Status" dropdown menu. Below these is a table with the following columns: "ID #", "File name", "Date", "Status", "Score", "Detailed Results", and "Actions".

At the very bottom of the page, a message reads: "No submissions found! Please make a submission".

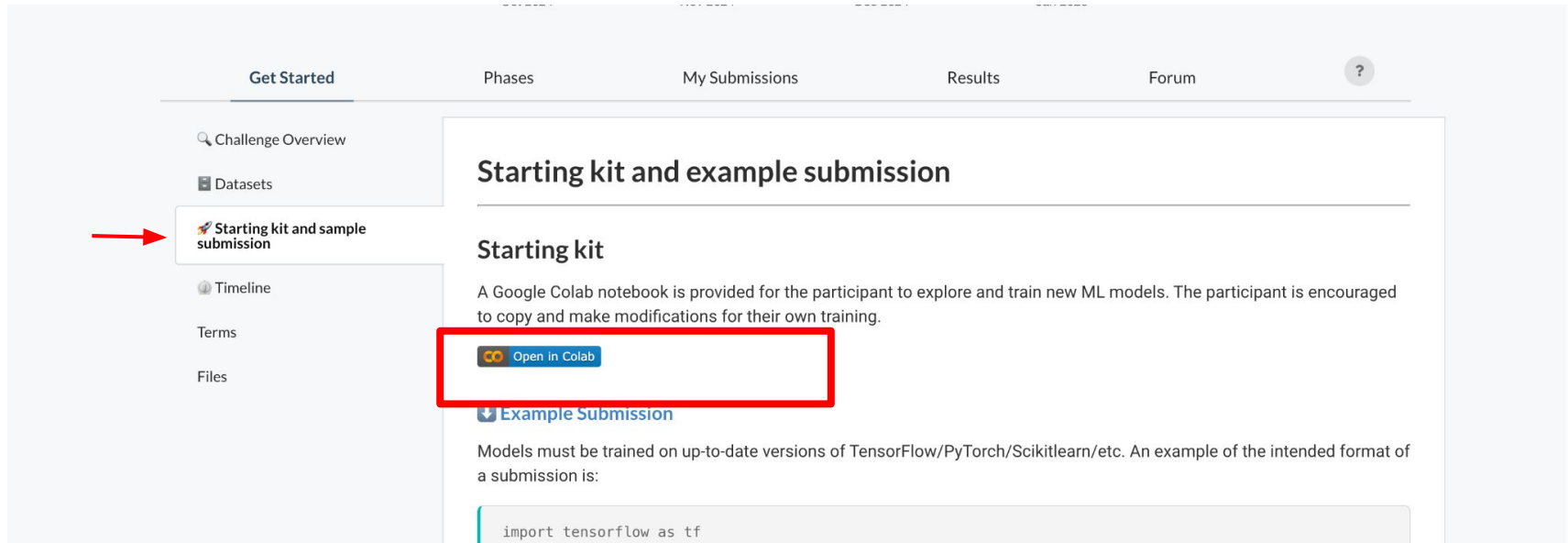
5. Check results in the leaderboard



The screenshot shows a web interface with a navigation bar containing 'Get Started', 'Phases', 'My Submissions', 'Results', and 'Forum'. A red arrow points to the 'Results' tab. Below the navigation bar, there are two tabs: 'Development Phase' and 'Final Phase'. A search bar labeled 'Filter Leaderboard by Columns' is present. The main content area displays a table for the task 'Test your AD algorithm'. The table has columns for '#', 'Participant', 'Entries', 'Date', 'ID', 'Prediction score', 'Duration', and 'Detailed Results'. The first row is highlighted with a red border and contains the following data:

#	Participant	Entries	Date	ID	Prediction score	Duration	Detailed Results
	multivac	1	2024-10-18 15:42	93065	0.0	n/a	

6. Check out the starting kit



The screenshot displays a web interface for a challenge. The top navigation bar includes 'Get Started', 'Phases', 'My Submissions', 'Results', and 'Forum'. A sidebar on the left contains a search bar and several menu items: 'Challenge Overview', 'Datasets', 'Starting kit and sample submission' (highlighted with a red arrow), 'Timeline', 'Terms', and 'Files'. The main content area is titled 'Starting kit and example submission' and contains the following text:

Starting kit

A Google Colab notebook is provided for the participant to explore and train new ML models. The participant is encouraged to copy and make modifications for their own training.

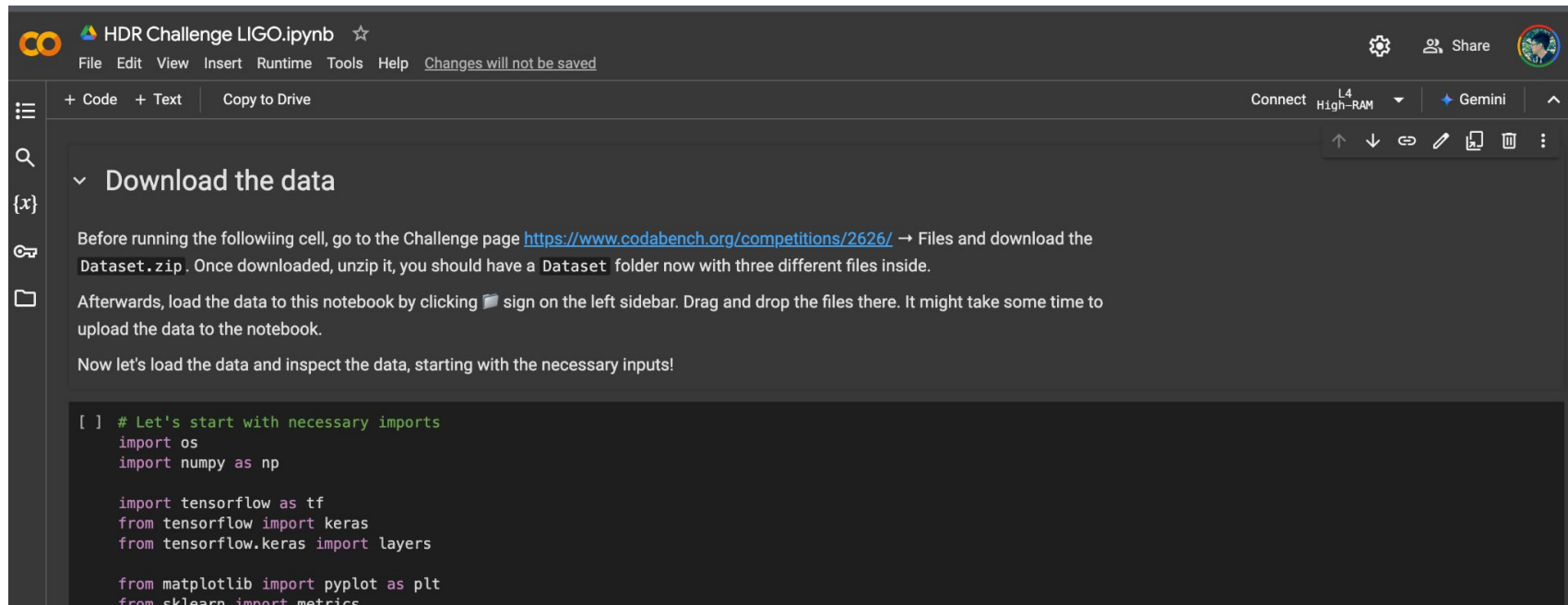
[Open in Colab](#)

Example Submission

Models must be trained on up-to-date versions of TensorFlow/PyTorch/Scikitlearn/etc. An example of the intended format of a submission is:

```
import tensorflow as tf
```



7. Starting kit as a Google Colab Notebook



The screenshot shows a Google Colab notebook interface. At the top, the title is "HDR Challenge LIGO.ipynb" with a star icon. Below the title is a menu bar with "File", "Edit", "View", "Insert", "Runtime", "Tools", and "Help". A status bar indicates "Changes will not be saved". On the right side, there are icons for settings, share, and a globe. Below the menu bar, there are tabs for "+ Code", "+ Text", and "Copy to Drive". On the far right, there are options for "Connect" (with "L4 High-RAM" selected), "Gemini", and an upward arrow. The main content area has a search icon, a close icon "{x}", a key icon, and a folder icon. The notebook content is as follows:

Download the data

Before running the following cell, go to the Challenge page <https://www.codabench.org/competitions/2626/> → Files and download the Dataset.zip. Once downloaded, unzip it, you should have a Dataset folder now with three different files inside.

Afterwards, load the data to this notebook by clicking  sign on the left sidebar. Drag and drop the files there. It might take some time to upload the data to the notebook.

Now let's load the data and inspect the data, starting with the necessary inputs!

```
[ ] # Let's start with necessary imports
import os
import numpy as np

import tensorflow as tf
from tensorflow import keras
from tensorflow.keras import layers

from matplotlib import pyplot as plt
from sklearn import metrics
```

8. Get Public Data

The screenshot shows a challenge interface with a timeline at the top and a navigation menu on the left. The timeline spans from October 2024 to January 2025. The navigation menu includes 'Challenge Overview', 'Datasets', 'Starting kit and sample submission', 'Timeline', 'Terms', and 'Files'. A red arrow points to the 'Files' menu item. The main content area displays a table with the following data:

Download	Phase	Task	Type	Size
solution @ 04-09-2024 19:28	Development Phase	Test your AD algorithm	Solution	522 B
Dataset	Development Phase	-	Public Data	473.26 MB

9. Checkout example submissions

HDRchallenge / scripts / example_submissions /

Advaith Anand and Advaith Anand optional requirements testing a8aa274 · 6 months ago History

This branch is [30 commits ahead of](#) [katyagovorkova/HDRchallenge:main](#) . **Contribute** **Sync fork**

Name	Last commit message	Last commit date
..		
full_pretrained_example	restructured repo moved example submissions	6 months ago
pretrained_direct	restructured repo moved example submissions	6 months ago
pretrained_new	dynamic requirements	6 months ago
tf_reqs	optional requirements testing	6 months ago
transformer_new_tf	dynamic requirements	6 months ago
trivial_submission	restructured repo moved example submissions	6 months ago

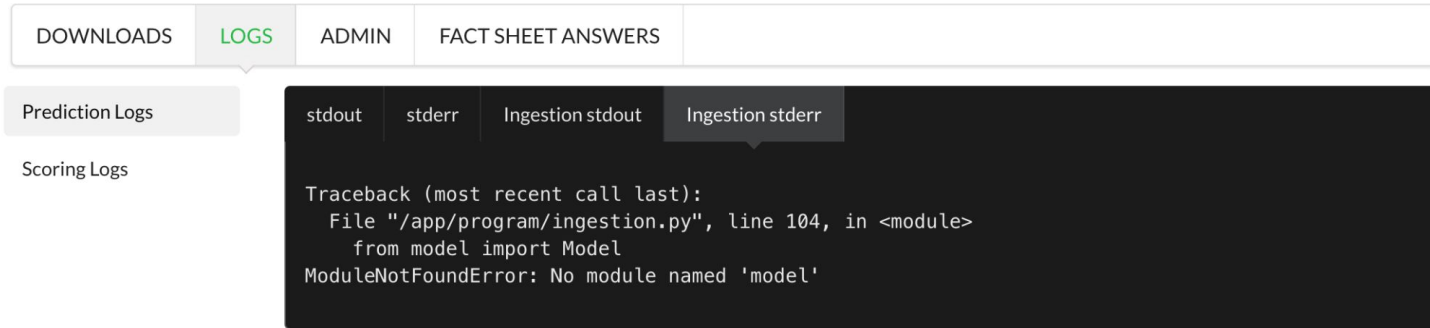
11. Code submission structure [\[Example\]](#)

```
1 import tensorflow as tf
2 import json
3 import os
4
5 class Model:
6     def __init__(self):
7         # You could include a constructor to initialize your model here, but all calls will be made to the load meth
8         self.clf = None
9
10    def predict(self, X):
11        # This method should accept an input of any size (of the given input format) and return predictions appropri
12        preds = self.clf.predict(X)
13        print(preds)
14        return preds
15
16    def load(self):
17        # This method should load your pretrained model from wherever you have it saved
18
19        with open(os.path.join(os.path.dirname(__file__), 'config.json'), 'r') as file:
20            for line in file:
21                self.clf = tf.keras.models.model_from_json(line)
22        self.clf.load_weights(os.path.join(os.path.dirname(__file__), 'model.weights.h5'))
```

[*] Follow the example to load your model. Avoid hard-coded path to model weight

Common issue

[!!] Do not zip the whole folder. ONLY select the model.py and relevant weight files to make the tarball



The screenshot shows a web application interface with a navigation bar containing 'DOWNLOADS', 'LOGS', 'ADMIN', and 'FACT SHEET ANSWERS'. Below the navigation bar, there are two tabs: 'Prediction Logs' and 'Scoring Logs'. The 'Prediction Logs' tab is active, and the 'Ingestion stderr' sub-tab is selected. The main content area displays a Python traceback error:

```
Traceback (most recent call last):
  File "/app/program/ingestion.py", line 104, in <module>
    from model import Model
ModuleNotFoundError: No module named 'model'
```

If you see the above error, mostly likely you zip the whole folder when making the tarball



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