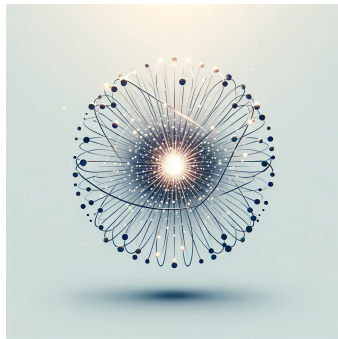




FAIR Universe



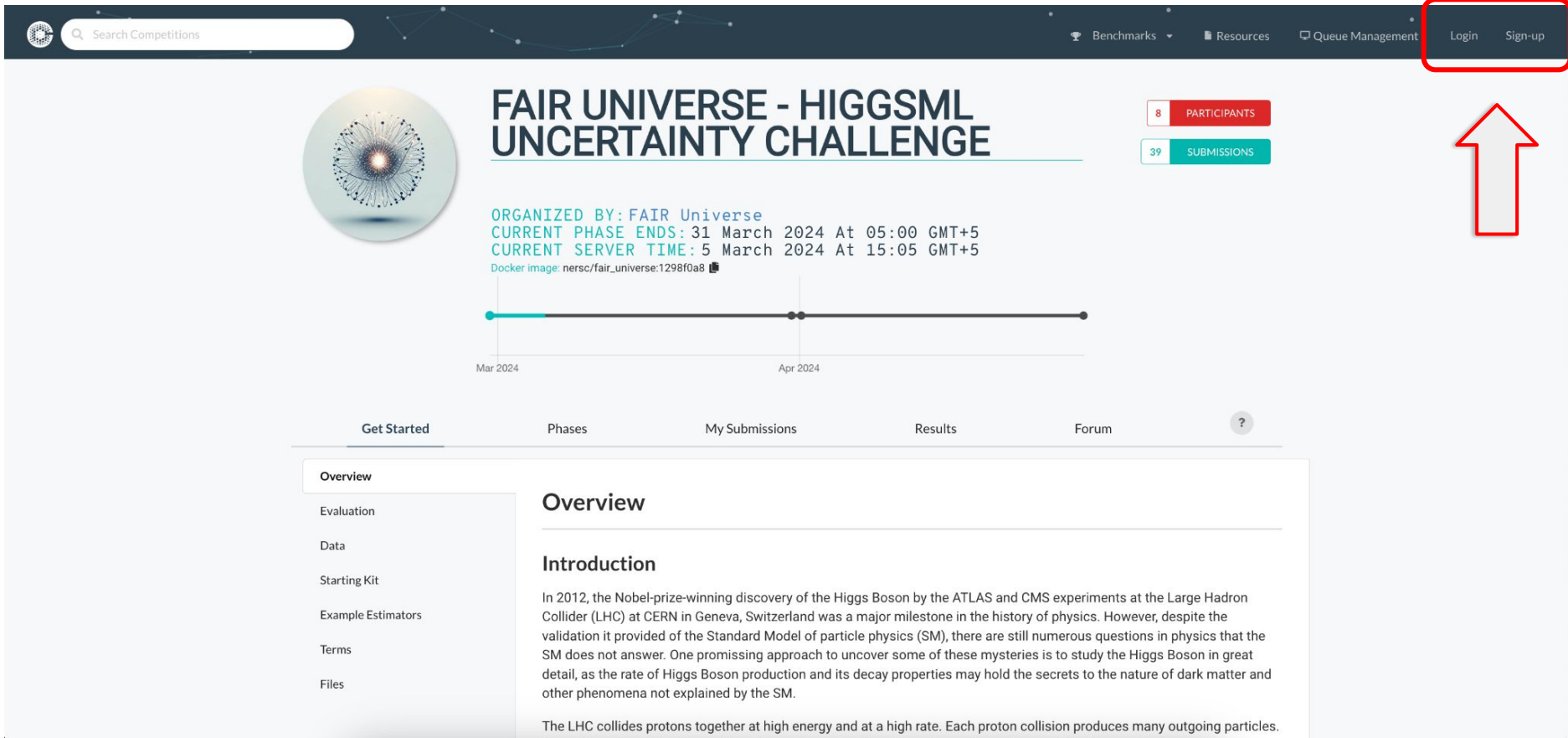
Fair Universe

HiggsML Uncertainty Challenge

Codabench Tutorial



1. Login or Create Account on Codabench <https://www.codabench.org/>



The screenshot shows the Codabench website interface for the "FAIR UNIVERSE - HIGGSML UNCERTAINTY CHALLENGE". The top navigation bar includes a search bar, links for Benchmarks, Resources, Queue Management, Login, and Sign-up. The main header features a circular logo of a particle detector, the challenge title, and statistics: 8 PARTICIPANTS and 39 SUBMISSIONS. Below this, the organizer is listed as FAIR Universe, and the current phase ends on 31 March 2024 at 05:00 GMT+5. A timeline shows the challenge duration from March to April 2024. The left sidebar contains a menu with Overview, Evaluation, Data, Starting Kit, Example Estimators, Terms, and Files. The main content area displays the Overview section, which includes an Introduction paragraph about the Higgs Boson discovery and the challenge's purpose.

FAIR UNIVERSE - HIGGSML UNCERTAINTY CHALLENGE

ORGANIZED BY: FAIR Universe
CURRENT PHASE ENDS: 31 March 2024 At 05:00 GMT+5
CURRENT SERVER TIME: 5 March 2024 At 15:05 GMT+5
Docker image: nersc/fair_universe:1298f0a8

8 PARTICIPANTS
39 SUBMISSIONS

Mar 2024 Apr 2024

Get Started Phases My Submissions Results Forum ?

Overview

Introduction

In 2012, the Nobel-prize-winning discovery of the Higgs Boson by the ATLAS and CMS experiments at the Large Hadron Collider (LHC) at CERN in Geneva, Switzerland was a major milestone in the history of physics. However, despite the validation it provided of the Standard Model of particle physics (SM), there are still numerous questions in physics that the SM does not answer. One promising approach to uncover some of these mysteries is to study the Higgs Boson in great detail, as the rate of Higgs Boson production and its decay properties may hold the secrets to the nature of dark matter and other phenomena not explained by the SM.

The LHC collides protons together at high energy and at a high rate. Each proton collision produces many outgoing particles.

2. Competition Flow

Phase 1

Phase 2



Get Public Data



Train model



Prepare zip with model.py
and pre-trained model



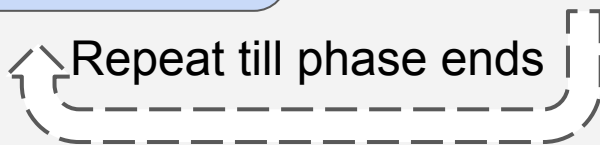
Make sure to not
re-train in *fit* function



Submit your model to the
competition website



Leaderboard is updated
once a day



Compete with other
best submissions
and win the
competition




Best submission is
taken to *Phase 2*

3. Register in the Competition

Search Competitions

BenchmarksResourcesQueue Managementihsan




FAIR UNIVERSE - HIGGSML UNCERTAINTY CHALLENGE

8 PARTICIPANTS

39 SUBMISSIONS

ORGANIZED BY: FAIR Universe
CURRENT PHASE ENDS: 31 March 2024 At 05:00 GMT+5
CURRENT SERVER TIME: 5 March 2024 At 15:07 GMT+5
Docker image: nersc/fair_universe:1298f0a8



Get Started

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Forum

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You have not yet registered for this competition.

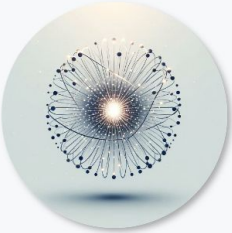
To participate in this competition, you must accept its specific [terms and conditions](#).

This competition **requires approval** from the competition organizers. After submitting your registration request, an email will be sent to the competition organizers notifying them of your request. Your application will remain pending until they approve or deny it.

☐ I accept the terms and conditions of the competition.

Register

4. Get Public Data



FAIR UNIVERSE - HIGGSML UNCERTAINTY CHALLENGE


1

PARTICIPANTS

40

SUBMISSIONS

ORGANIZED BY: FAIR Universe
CURRENT PHASE ENDS: 31 March 2024 At 05:00 GMT+5
CURRENT SERVER TIME: 5 March 2024 At 16:11 GMT+5
Docker image: [nersc/fair_universe:1298f0a8](#)



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Data

Starting Kit


Example Estimators

Terms

Files


| Download | Phase | Task | Type | Size |
|-------------------------------------|-------|------|-------------|---------|
| <div>ACAT Public Data Parquet</div> | 1 | - | Public Data | 1.32 GB |

5. Check out the starting kit



FAIR UNIVERSE - HIGGSML UNCERTAINTY CHALLENGE

ORGANIZED BY: FAIR Universe
CURRENT PHASE ENDS: 31 March 2024 At 05:00 GMT+5
CURRENT SERVER TIME: 5 March 2024 At 15:05 GMT+5
Docker image: nersc/fair_universe:1298f0a8



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Starting Kit and Sample Submission

Starting Kit

We are providing a starting kit as a Google Colab notebook to demonstrate the problem and a solution for it which can be submitted as a submission the competition. You can copy the Colab notebook and make changes as you want.

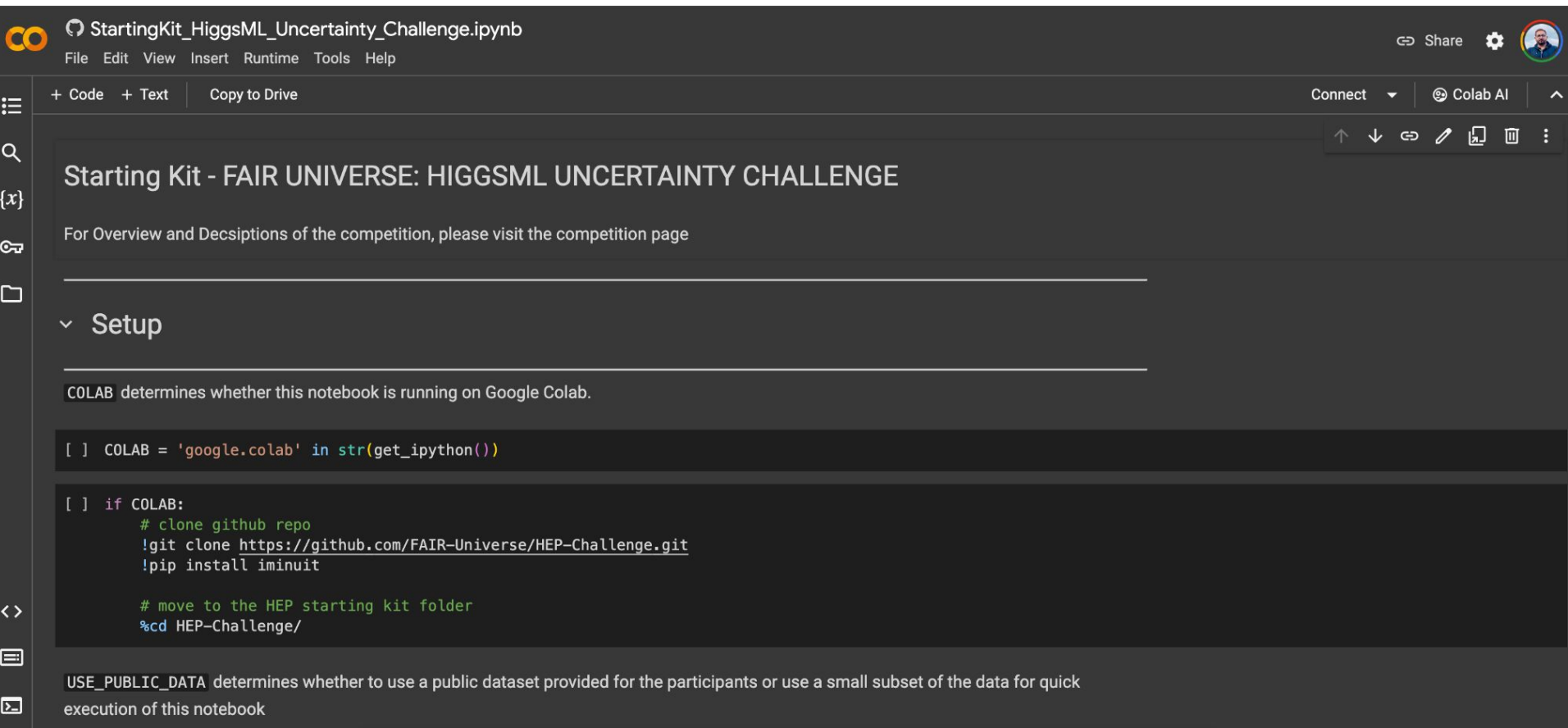
Open In Colab

Dummy Sample Submission

Dummy sample submission is provided to make you understand what is expected as a submission. You can modify the sample submission the way you want but make sure the format is the same as instructed in the sample submission

[Dummy Sample Submission](#)

6. Starting kit as a Google Colab Notebook



The screenshot shows a Google Colab notebook interface. At the top, the title bar reads 'StartingKit_HiggsML_Uncertainty_Challenge.ipynb'. Below it is a menu bar with 'File', 'Edit', 'View', 'Insert', 'Runtime', 'Tools', and 'Help'. On the right side of the title bar are 'Share', a settings gear icon, and a user profile picture. Below the menu bar is a toolbar with '+ Code', '+ Text', and 'Copy to Drive'. On the far right of the toolbar are 'Connect', 'Colab AI', and an upward arrow icon. The main content area has a dark background. It starts with a large heading 'Starting Kit - FAIR UNIVERSE: HIGGSML UNCERTAINTY CHALLENGE'. Below this heading is a paragraph: 'For Overview and Descriptions of the competition, please visit the competition page'. This is followed by a section header 'Setup' with a dropdown arrow. Below 'Setup' is a paragraph: 'COLAB determines whether this notebook is running on Google Colab.' Then there are two code blocks. The first code block contains:

```
[ ] COLAB = 'google.colab' in str(get_ipython())
```

 The second code block contains:

```
[ ] if COLAB:
    # clone github repo
    !git clone https://github.com/FAIR-Universe/HEP-Challenge.git
    !pip install iminuit

    # move to the HEP starting kit folder
    %cd HEP-Challenge/
```

 At the bottom of the notebook is a final paragraph: 'USE_PUBLIC_DATA determines whether to use a public dataset provided for the participants or use a small subset of the data for quick execution of this notebook'.

StartingKit_HiggsML_Uncertainty_Challenge.ipynb

File Edit View Insert Runtime Tools Help

+ Code + Text Copy to Drive

Connect Colab AI

Starting Kit - FAIR UNIVERSE: HIGGSML UNCERTAINTY CHALLENGE

For Overview and Descriptions of the competition, please visit the competition page

Setup

COLAB determines whether this notebook is running on Google Colab.


```
[ ] COLAB = 'google.colab' in str(get_ipython())
```

```
[ ] if COLAB:
    # clone github repo
    !git clone https://github.com/FAIR-Universe/HEP-Challenge.git
    !pip install iminuit

    # move to the HEP starting kit folder
    %cd HEP-Challenge/
```


USE_PUBLIC_DATA determines whether to use a public dataset provided for the participants or use a small subset of the data for quick execution of this notebook

7. Download Dummy Submission



FAIR UNIVERSE - HIGGSML UNCERTAINTY CHALLENGE

ORGANIZED BY: FAIR Universe
CURRENT PHASE ENDS: 31 March 2024 At 05:00 GMT+5
CURRENT SERVER TIME: 5 March 2024 At 15:05 GMT+5
Docker image: nersc/fair_universe:1298f0a8



8 PARTICIPANTS

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Starting Kit and Sample Submission


Starting Kit

We are providing a starting kit as a Google Colab notebook to demonstrate the problem and a solution for it which can be submitted as a submission the competition. You can copy the Colab notebook and make changes as you want.

 [Open In Colab](#)

Dummy Sample Submission

Dummy sample submission is provided to make you understand what is expected as a submission. You can modify the sample submission the way you want but make sure the format is the same as instructed in the sample submission

 [Dummy Sample Submission](#)

8. Submit Dummy Submission

[Get Started](#)[Phases](#)[My Submissions](#)[Results](#)[Forum](#)

?

Phase 1

Phase 2

Number of submissions used for the day

0 out of 5

Number of total submissions used

28 out of 100

Submission upload

Metadata or Fact Sheet

Method Name: *

Dummy Submission

Submit as: ?

Yourself

HiggsML_Dummy_Submission.zip

9. Check results in the leaderboard

Updated approx once per day for full competition

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

Phase 1 Phase 2

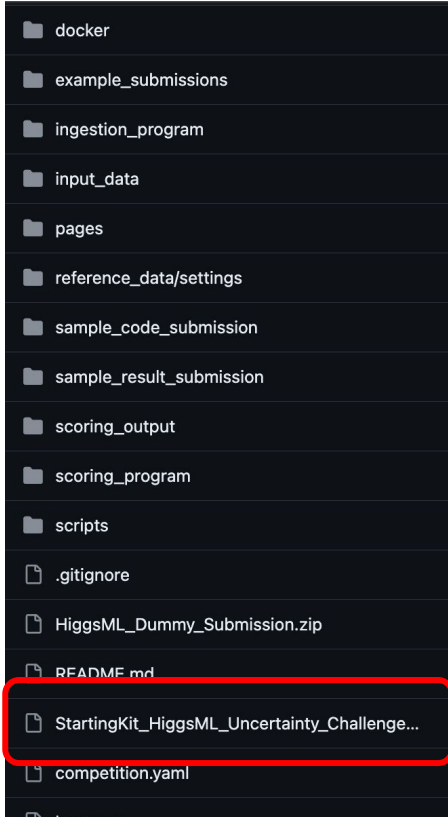
Filter Leaderboard by Columns ?

Results

| Task: | | | | Fact Sheet Answers | ACAT TASK 4X50 PHASE1 | | | | |
|-------|-------------------------------|---------|------------------|--------------------|-----------------------|----------|----------|-----------------|------------------|
| # | Participant | Entries | Date | Method Name | Quantile Score | Interval | Coverage | Run Time (mins) | Detailed Results |
| 1 | cjh1 | 3 | 2024-03-06 19:47 | test | 2.755 | 0.063 | 0.625 | 1.0 | |
| 2 | ragansu | 1 | 2024-03-06 10:36 | saved NN | 2.631 | 0.066 | 0.6 | 9.0 | |
| 3 | FAIR Universe | 2 | 2024-03-06 10:36 | test xgb_saved | 2.363 | 0.064 | 0.59 | 1.0 | |
| 4 | FAIR Universe | 2 | 2024-03-06 10:25 | test xgb_saved | 0.704 | 0.068 | 0.565 | 1.0 | |
| 5 | cjh1 | 3 | 2024-03-06 20:40 | test | -3.0 | 0.057 | 0.475 | 1.0 | |
| 6 | saschadief | 2 | 2024-03-06 16:29 | test | -4.816 | 0.0 | 0.0 | 0.0 | |
| 7 | cjh1 | 3 | 2024-03-06 20:24 | test | -4.989 | 0.059 | 0.385 | 1.0 | |

10. Access Starting Kit Notebook on Github

<https://github.com/FAIR-Universe/HEP-Challenge>



11. Checkout example submissions


https://github.com/FAIR-Universe/HEP-Challenge/tree/master/example_submissions


 Pytorch_model.zip

 README.md

 Tensorflow_model.zip

 Tensorflow_saved.zip

 xgb_model.zip

 xgb_saved.zip

12. Submit Pre-Trained Models

- Use the code structure from Dummy Sample Submission
- Use Public data to train your models
- Submit your submissions with pre-trained model file included in the zip

13. Get in touch

Join **#higgsml-uncertainty-challenge-spring-24** channel in the FAIR Universe slack workspace

https://join.slack.com/t/fairuniverse/shared_invite/zt-2dt9ovrp1-jvi0DnCK9jzL3VGrdwYNMA



<https://fair-universe.lbl.gov/>

Competition Flow

Phase 1

Phase 2



Get Public Data



Train model



Prepare zip with model.py
and pre-trained model



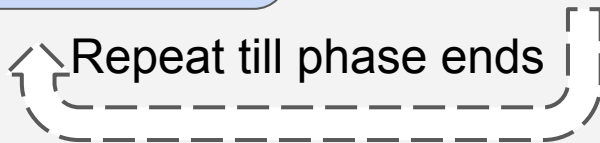
Make sure to not
re-train in *fit* function



Submit your model to the
competition website



Leaderboard is updated
once a day



Compete with other
best submissions
and win the
competition



Best submission is
taken to *Phase 2*