



brainhack

INTO THE MULTIVERSE





Qualifiers Info Pack

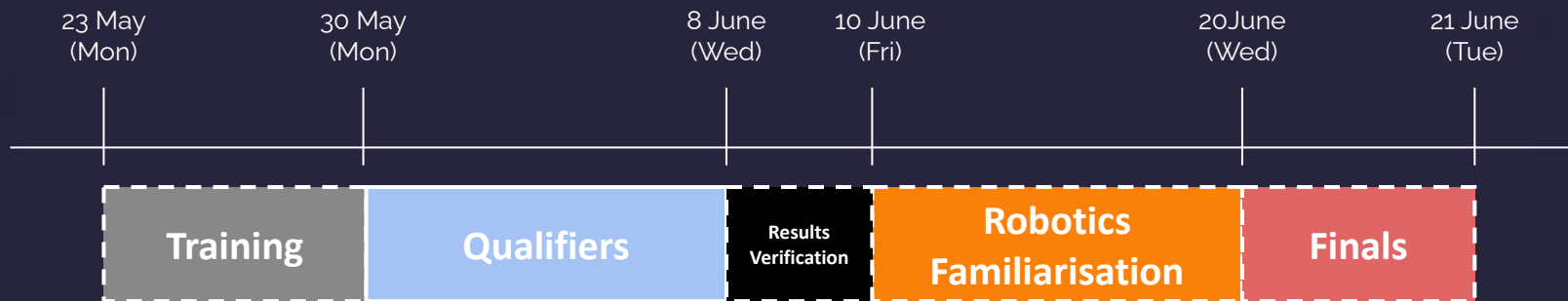
Today I Learned (TIL) 2022

Content:

1. TIL 2022 Event Timeline
2. Prelude
3. CV Challenge
4. NLP Challenge
5. Easter Eggs
6. Leaderboard
7. Final Evaluation
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Timeline TIL 2022



Qualifying Period: 30 May 2022, 1200h - 8 June 2022, 1600H

Testing Dataset Release: 8 June 2022, 1500H

Submission Deadline: 8 June 2022, 1600H

Announcement of Finalists: 10 June 2022, 1800H



Prelude

TIL 2022

Greetings, potential rescuers! As part of our efforts to help uplift ancient civilisations, we will need to harness the power of advanced A.I. and robotics to mount autonomous rescue operations to save citizens from disaster prone areas. Only the best teams will be allowed to enter the rescue sites and utilise our rescue robots. Do you have what it takes?

Begin your journey by first entering our training space, where you will be trained for the challenges ahead. Once training is completed, enter yourself into the qualifiers where your team will compete against others to prove yourselves as worthy rescuers.

The best teams will then be allowed access to the finalist space where you will familiarise yourselves with our rescue robots and integrate your A.I. models. Finally, you and your teammates will be sent out to perform an actual rescue operation in the finals for the chance to be named the champion team of 2022!

Overview

CV Challenge

What is the CV Challenge about?

1. The training dataset provided will contain images of humans in various standing and fallen positions.
2. You are tasked to create and train an **Object Detection** model to:
 - a. Detect the bounding box coordinates of all humans in the images
 - b. Classify the positions of all humans in the images (standing or fallen)
3. You are allowed to use/include external datasets of your choice but you need to cite your sources and abide by any copyright rules stated by the data owners.
4. The evaluation data will consist of images of humans in various standing and fallen positions.

1. The CV task will be evaluated using **AP@[0.5:0.95]*** (rounded off to 4 decimal places) scores, the average AP for IoU from 0.5 to 0.95 with a step size of 0.05..
2. Your model's outputs must be stored in a **JSON file** in the COCO format for evaluation. Below is a sample of an expected JSON file:

```
[
  {
    "image_id": 999,
    "bbox": [
      109.0,
      159.5,
      20.0,
      67.0
    ],
    "category_id": 2,
    "score": 0.897798
  },
  {
    "image_id": 999,
    "bbox": [
      153.0,
      229.5,
      39.0,
      22.0
    ],
    "category_id": 1,
    "score": 0.938375
  },
  {
    "image_id": 484,
    "bbox": [
      155.0,
      208.5,
      18.0,
      21.0
    ],
    "category_id": 1,
    "score": 0.938375
  }
]
```

Image ID of image.

- Type: Integer

Category ID of object detected.

- 1 = Fallen | 2 = Standing.
- Type: Integer

Bounding Box Coordinates in COCO format

- x_min, y_min, width, height
- Type: Float

Confidence Score

- Type: Float

**Threshold values may be changed without prior notice to distinguish between competing results in the fairest manner possible at the sole discretion of the TIL committee*

Evaluation CV Challenge

How will the CV Challenge be evaluated?

Overview

NLP Challenge

What is the NLP Challenge about?

1. The dataset is a collection of audio clips with expressions of the following emotions: angry, fear, happy, neutral, sad.
2. Your task is to train a model to perform ***speech emotion recognition***.
3. You will be provided a training set for your use. You are allowed to include additional data to train your model.
4. The evaluation data will consist of audio clips spoken in multiple languages.
5. Majority of the evaluation data are in the intonation of Singapore English.

Evaluation

NLP Challenge

How will the NLP Challenge be evaluated?

1. The NLP challenge will be evaluated with **F1 score (rounded off to 4 decimal places)**, the harmonic mean of precision and recall:

$$F1 \text{ Score} = 2 * \frac{Precision * Recall}{Precision + Recall}$$

(Source: https://en.wikipedia.org/wiki/F1_score)

2. Ensure that the submissions are in .csv with format matching the provided sample (spreadsheet with no headers, sorted in ascending order by the first column with the correct number of entries). Below is a sample of an expected csv file:

Audio clip filename

- Include .wav extension
- Type: String

	A	B
1	test_0001.wav	angry
2	test_0002.wav	fear
3	test_0003.wav	happy
4	test_0004.wav	neutral
5	test_0005.wav	sad

Predicted emotion class.

- Type: String

**Threshold values may be changed without prior notice to distinguish between competing results in the fairest manner possible at the sole discretion of the TIL committee*

Extra Training Data Easter Eggs

What are Easter Eggs?



Psssstttt we have a secret to share!



With AI tasks, we strive to create models that can generalise well outside of the training dataset. However, it is also important that we train our models on data that is as close to our validation dataset as much as possible. As such, hidden across the event platform are 🥚 Easter Eggs 🥚 that contain extra data that you can unlock and gain access to which will help you in training your models.



Hunting for these Easter Eggs might just help you develop a better model!
Happy Hunting!

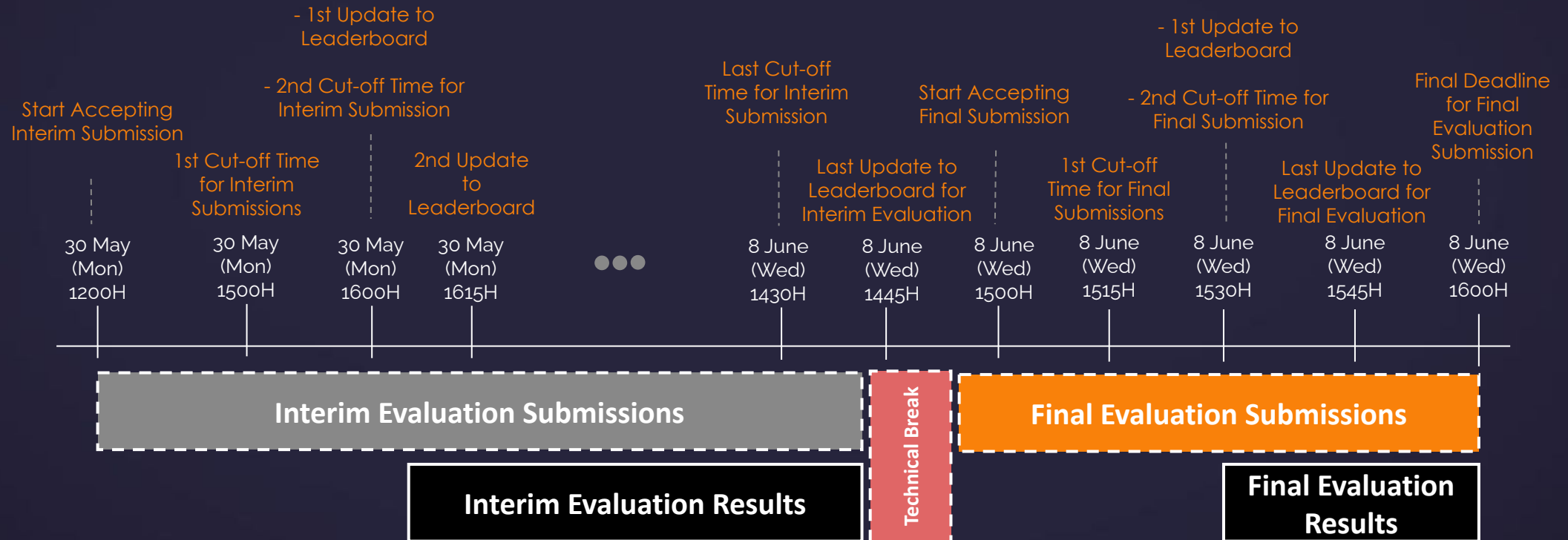
Knowing Where You Stand

Leaderboard

What is the Leaderboard?

1. You will be able to evaluate the interim performance of your models for both CV and NLP tasks in the qualifier using the interim datasets.
2. Upload your submissions through a unique Google Drive Link for your team. Submissions through other avenues will not be accepted.
3. The Leaderboard will start accepting submissions from **30 May 2022, 1200H** till **8 June 2022, 1545H**
 - The cut-off time for the 1st submission to the Leaderboard will be on: **30 May 2022, 1500H**
 - The 1st update to the Leaderboard will be on: **30 May 2022, 1600H**
 - Subsequent updates to the Leaderboard will be in **15 min block (i.e: 30 May 2022, 1615H)**
 - Results on the Leaderboard are reflective of your submissions **15 min ago**
 - A variance of approx. 5 mins to update the Leaderboard at each time block is expected.

Timeline Leaderboard



Knowing Where You Stand

Leaderboard

What should you do?

Perform the following tasks on the Interim Evaluation datasets:

A. Test your model's output

- Your model's output must be stored in a JSON file in the COCO format for the CV task and CSV format for the NLP task for evaluation
- You can submit multiple results but only the latest results in each 15 minute time block would be used for evaluation. Hence, we advise you to submit only a single result in each 15 minute time block to avoid confusion.
- **Successful Submission:**
 - ❖ Your score and rank would be on the Leaderboard **15 minutes later**
- **Unsuccessful Submission:**
 - ❖ Your score would not be reflected on the Leaderboard **15 minutes later**
 - ❖ An error.txt log file can be found in your team's Google Drive folder

B. Familiarise yourselves with the submission format and process

- The Final Evaluation submission format would be exactly the same as the Interim Evaluation

Knowing Where You Stand Leaderboard

How will your results be
evaluated?

We will be adopting an **equal scoring weightage** of 50% CV and 50% NLP for the consolidated rank (**based on rank position for both tasks**) on the leaderboard.

- **Scenario #1: Team ABC rank - CV: 5th, NLP: 6th.**
 - Team ABC's rank's computed by taking the average of its positions on both task (rounded down).
 - Overall rank would be 5th place overall.
- **Scenario #2: Team ABC rank - CV: 5th, NLP: 6th, Team XYZ rank - CV: 6th, NLP: 5th.**
 - The average of the aggregated raw scores (not rank position score) for both tasks per team would be used as tie-breaker.
 - The team with the higher average aggregated scores for both tasks would be placed higher on the Leaderboard.
 - The CV Task will use AP@[0.5:0.95]*. The NLP Task will use F1 score*.

*Threshold values may be changed without prior notice to distinguish between competing results in the fairest manner possible at the sole discretion of the TIL committee

Each team is required to submit the following:

1. **Submit through the unique Google Drive link provided for your team (same link as Interim Evaluation)**

Deadline: 8 June 2022, 1600H:

- A. JSON file for the CV Task
- B. CSV file for the NLP Task

2. **Submit through the unique Google Drive link provided for your team (different link as Interim Evaluation)**

Deadline: 8 June 2022, 2359H:

- A. Your final model's code that you used to run inference on
- B. A description on how to run your model
 - For participants that use Jupyter Notebook, you can include the description in markdown cells
 - For participants that use other IDEs, you can provide a word documentation instead

Submission Final Evaluation

What do you need to submit for the Final Evaluation?

1. We will be using a weighted scoring system: 50% CV and 50% NLP, similar to the Interim Evaluation.
2. The consolidated score will be updated on the Leaderboard, which will be available on Brainhack TIL 2022 official website by 8 June 2020 (Wed), 1700H.
3. Any appeals in scores, especially relating to Team Names, should be done via email at [**BH-TIL-AI@dsta.gov.sg**](mailto:BH-TIL-AI@dsta.gov.sg) by 10 June 2020 (Fri), 1759h.
4. TIL 2022 organising committee will make a professional judgment and the final verdict cannot be challenged.
5. Final results will be available on Brainhack TIL 2022 official website by 10 June 2020 (Fri), 1800H.

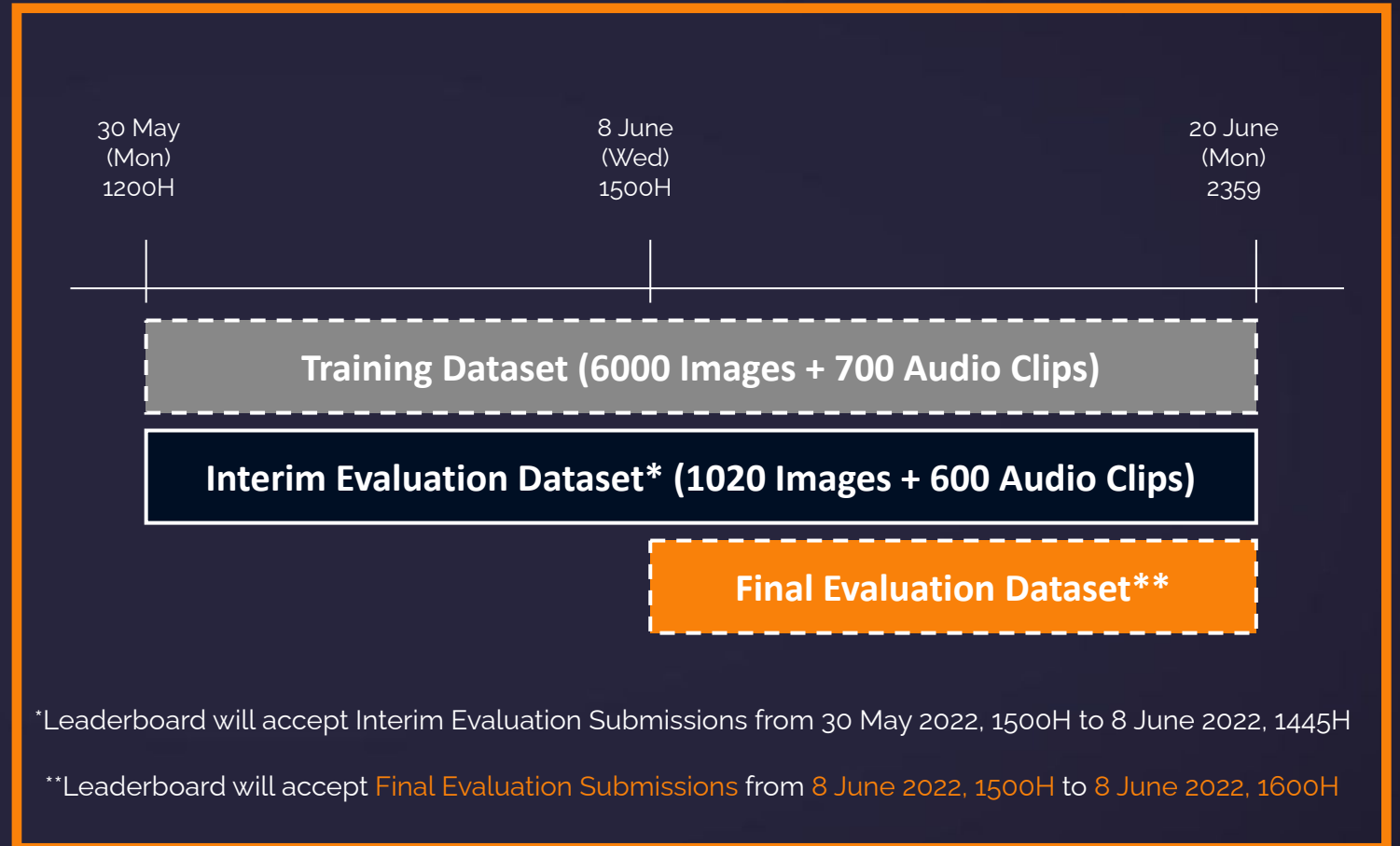
Scoring And Appeals

Final Evaluation

When will the final scores and appeal results be known?

Release Timings Datasets

When will the datasets be released?



Location Datasets

Where to download the dataset?

The Final Evaluation dataset will be made available on Google Drive.

1. Each team will receive a unique Google Drive link to access the dataset
2. The Final Evaluation dataset is the **same across all links**.
3. The rationale for providing multiple links is to ensure efficiency should your team prefers to download the data locally to run inference.
4. We do not encourage downloading the dataset because of its size although you are free to do so.
5. We encourage teams to add the folder to their Google Drives and run inference on it directly. This will be a much more efficient method that we recommend.

Each team will be provided the following GPU resource:

1. **2 Colab Pro** accounts
 - While you are free to prioritise the use of this resource, we advise that you use 1 account per task (CV & NLP) to maximise their compute power
 - Please refer to the documentation on how to access your Colab Pro accounts
 - The credentials of your Colab Pro account will be emailed to you between 23rd and 27th May

Other Free GPU Resources:

1. AWS Sagemaker Studio Lab
2. Kaggle
3. Colab (Free Tier)

The Extra Power You Need **GPU**

What GPU resources are
available for you?

1. You are **NOT** allowed to:
 - A. Purchase any additional products through the Colab Pro accounts
 - B. Change the default password assigned to the accounts
 - C. Hack/attempt to hack other teams' accounts
 - D. Share the account with others outside of your registered TIL 2022 team
2. The accounts are set up for your team specifically for TIL 2022 thus, the subscription will be terminated immediately w.e.f **22 June 2022**.
3. The organising committee can, at any point, terminate the accounts if non-compliant behaviour is detected without prior notice.
4. The organising committee reserves the right to terminate any accounts without prior notice.

The Rules

GPU

What are the rules on using Colab Pro?

A GPS Guide Navigation

What is the event platform?

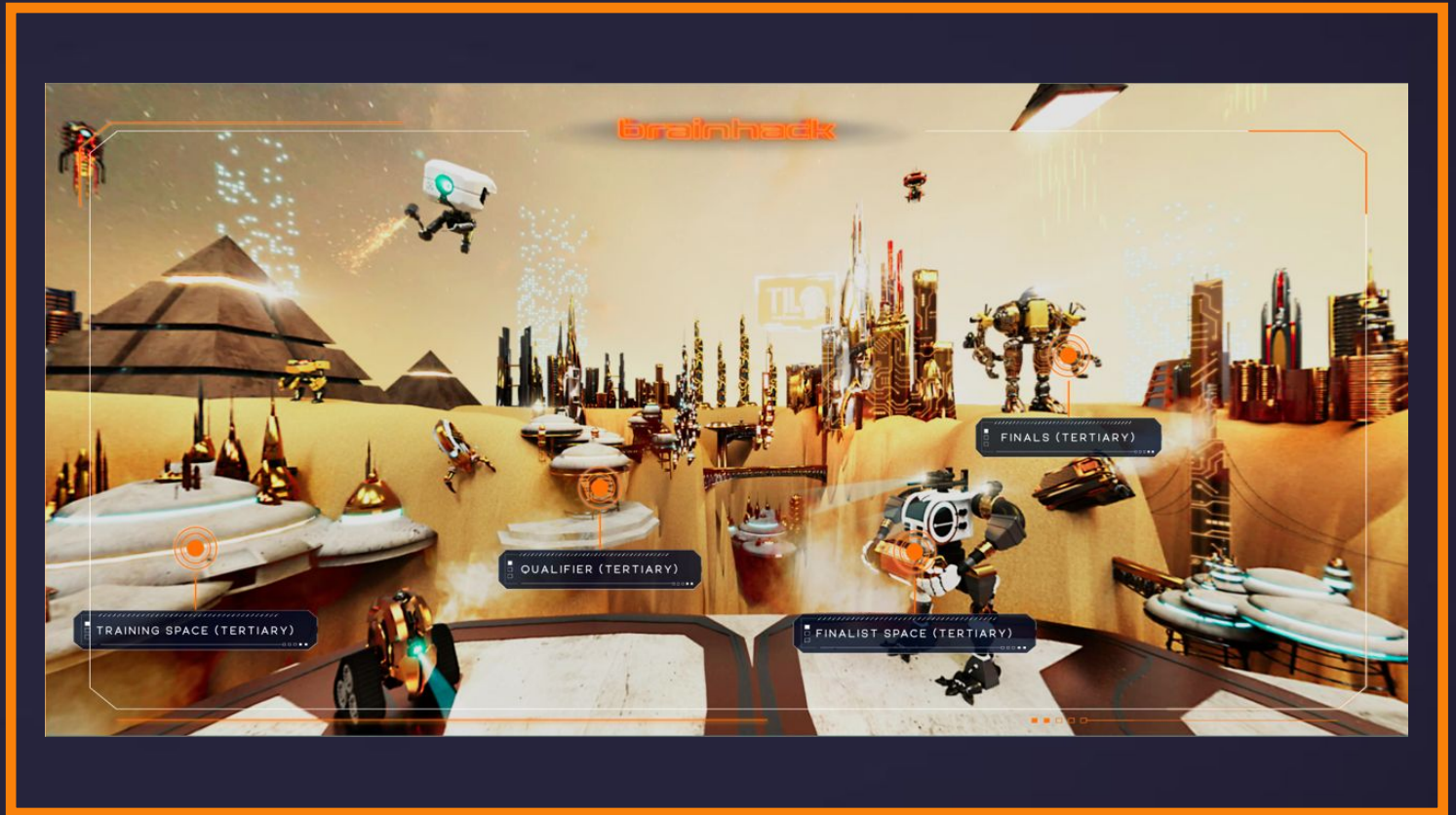
For this year's Brainhack TIL, we have specially prepared an event platform for you at www.brainhack2022.com. This is the official event site where you will find:

1. **Training Materials**
2. **Datasets** (Training, Interim & Final Evaluation)
3. **Leaderboard**
4. **Easter Eggs**
5. **Finals Live Streaming**

You may access the website from 23rd May onwards.

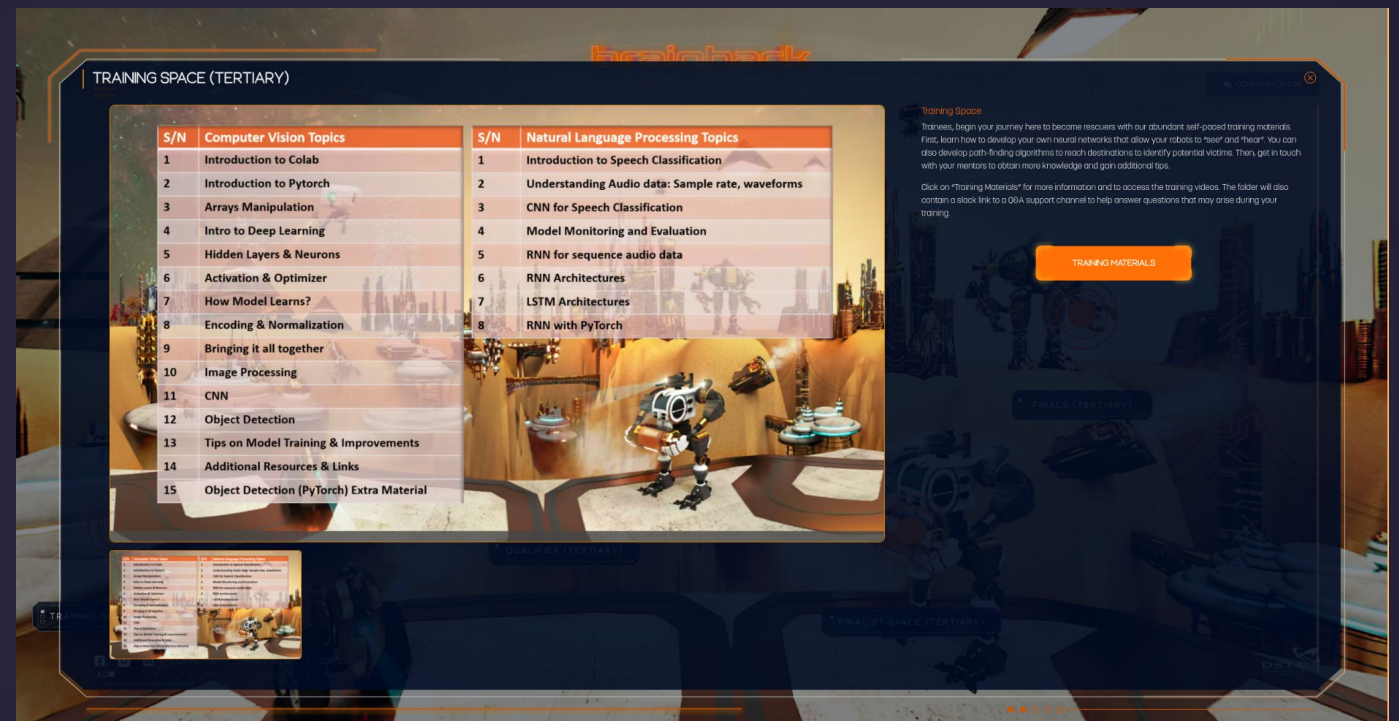
TIL Hotspots Navigation

What does the TIL landing page look like?



Training Space Navigation

Where to locate your training materials?



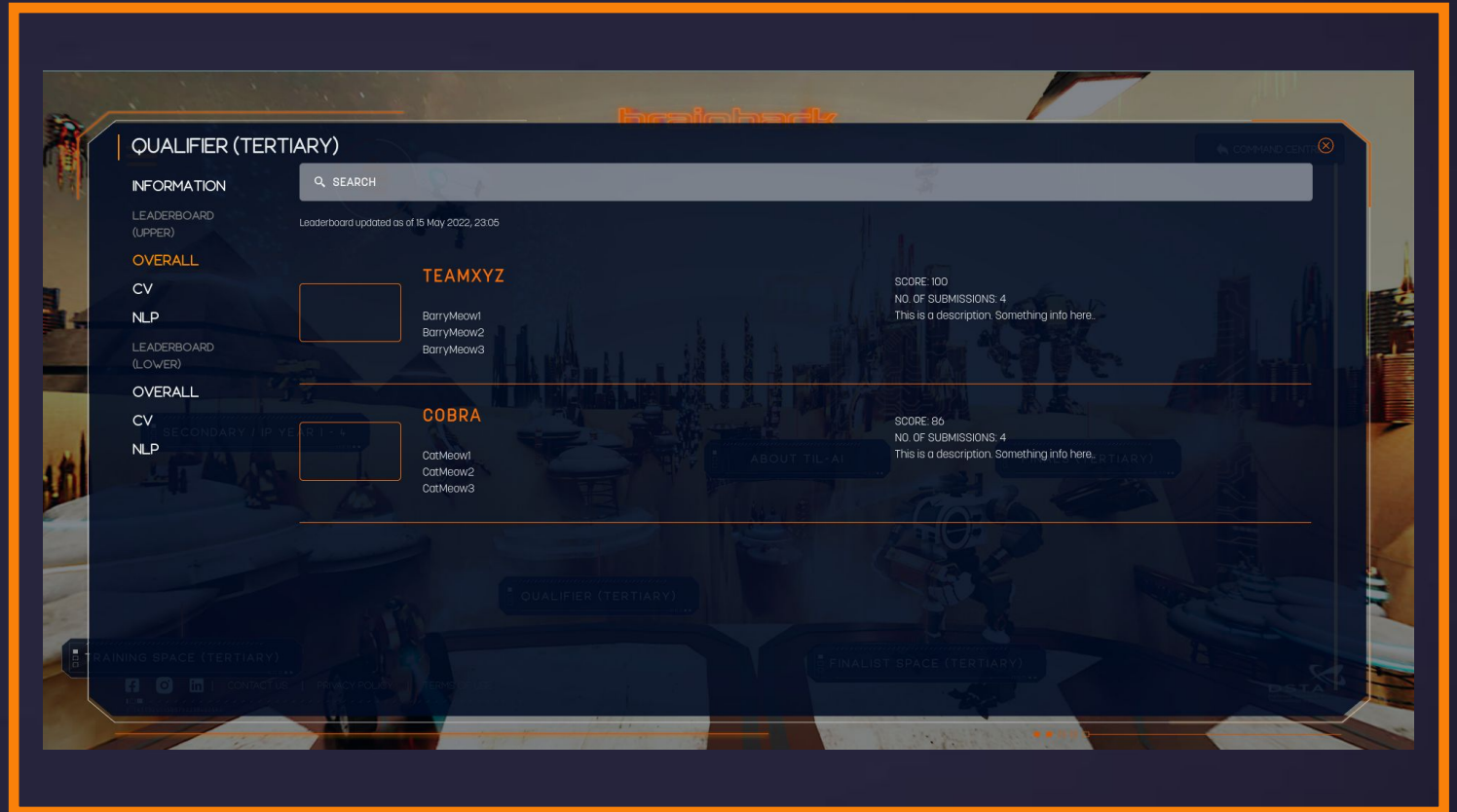
Qualifiers Navigation

Where to locate your
datasets?



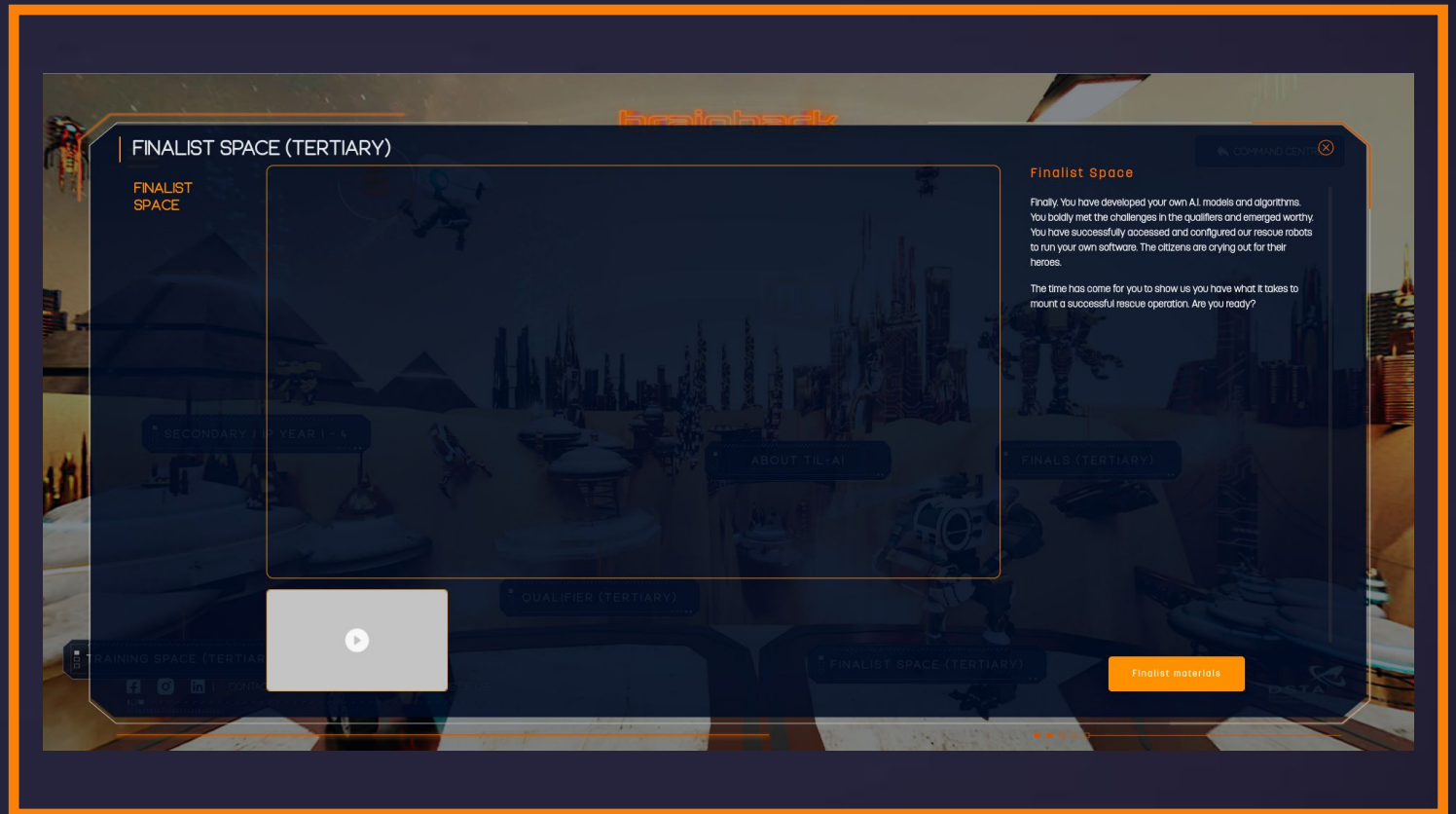
Leaderboard Navigation

Where to locate the
Leaderboard?



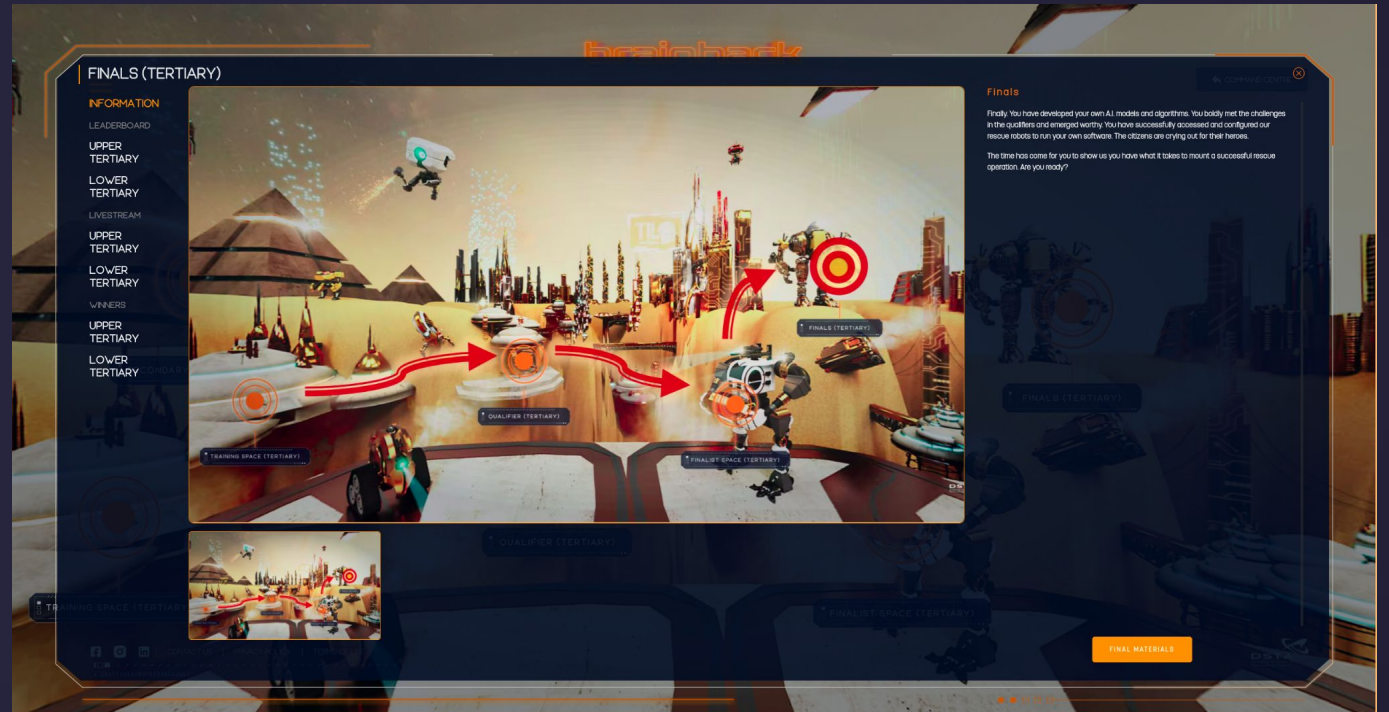
Finalist Space Navigation

Where to locate the training materials for the Finalists?



Finals Navigation

Where to locate the live stream of the Finals?



Extra Bites That You Might Need

FAQ

Colab Pro Accounts

Q: What if I am unable to access my Colab Pro account?

A: Please ask your team leader to send a message to the TIL 2022 organising committee over **Slack**.

Q: My team has forgotten the password for our Colab Pro accounts.

A: Please ask your team leader to send a message to the TIL 2022 organising committee over **Slack**.

Extra Bites That You Might Need

FAQ

Programming Languages & IDEs

Q: Can I use other languages other than Python?

A: Yes! You can use any programming languages of your choice.

Q: I do not like Jupyter Notebook/Colab, can I use other IDEs?

A: Yes! You can use any IDEs of your choice. However, you will still be subjected to the same rules of providing a documentation on how to run your code during the Final Evaluation Submission.

Extra Bites That You Might Need

FAQ

Use of open-source
codes/pre-trained weights
and external datasets

- Q:** Will there be a penalty to reference open-source codes/pre-trained weights?
- A:** No! We encourage teams to learn from and contribute back to the wider AI community. Similar to open datasets, please adhere to the respective citations/attributions required of open-source codes you may choose to use.
- Q:** Can I train my model on an external dataset instead of the one provided?
- A:** Yes! You are free to use any external datasets of your choice for training. However, cite your sources clearly when submitting your documentation in the Final Evaluation.

Extra Bites That You Might Need **FAQ**

Model

- Q:** Which will be of higher priority - model accuracy, model size or inference speed?
- A:** For qualifier, the evaluation is based on the individual metrics for each task; however model size/inference speed may be important during the Robotics Challenge.
- Q:** Will our qualifier models be used on the robot?
- A:** Yes, qualified teams will apply/adapt their models onto the robots, instead of re-working.
- Q:** Are the CV and NLP tasks independent of one another (i.e. can they be worked on concurrently)?
- A:** Yes, the tasks are independent of one another in this qualifier.

Extra Bites That You Might Need **FAQ**

Updates to the Leaderboard

- Q:** I submitted my results 15 minutes ago but I am not seeing my results on the Leaderboard.
- A:** Results are evaluated in 15 minutes block starting from 30 May 2022, 1600H. Our system will only evaluate your results in blocks of 15 minutes (i.e XX15H, XX30H, XX45H, XX00H). Results submitted between the blocks will only be reflected in the subsequent 15 minutes block.
- Q:** I have waited 30 minutes but I do not see my results reflected on the Leaderboard.
- A:** Please check the unique Google Drive folder that has been shared with your team for any error logs (labelled as error.txt). If you do not see any error logs, please ask your team leader send a message to the TIL 2022 organising committee over **Slack**.

Extra Bites That You Might Need **FAQ**

Updates to the Leaderboard

Q: The Leaderboard has not been updated for over 45 minutes.

A: We apologise for any inconvenience caused, but rest assured, please ask your team leader to send a message to the TIL 2022 organising committee over **Slack**.

Technical support for the Leaderboard will be available daily from 0830H to 1800H. We strive to provide rectification within 1 hour from Monday to Friday and within 3 hours on Saturday and Sunday but this cannot be guaranteed.

Q: I submitted my results at 1602H, well within the 15 minute time block between 1600H and 1615H, it is 1630H now and I am not seeing my results.

A: A variance of approximately 5 minutes to update the Leaderboard at each time block is expected.

Extra Bites That You Might Need **FAQ**

Scoring and Appeals

Q: What are the rules on making an appeal?

A: The grounds for grade appeal are as follows:

1. If the team finds demonstrable evidence that the score may have been influenced by discriminatory and prejudicial/unfair action by other teams.
2. The appeal is **NOT** an opportunity for teams to plead their case for better scores.
3. An obvious error in the evaluation process. Teams may be called upon to substantiate their claims.
4. The team must provide reason/justification clearly and concisely for their score appeal. Evidence provided must contain only factual information.

Extra Bites That You Might Need

FAQ

Scoring and Appeals

Q: How does my team submit an appeal?

A: Please ask your team leader to send an email containing the reason(s) for your team's appeal to **BH-TIL-AI@dsta.gov.sg** by 10 June 2022, 1759H. Any appeals submitted after that would be invalidated.

Q: When will my team know the final result of our appeal?

A: Appeal results will be made known via your team leader's email by 10 June 2022, 1759H. All appeal results are final and cannot be challenged.

Extra Bites That You Might Need **FAQ**

Qualifying Criteria

Q: How many teams are there in each category?

A: There are X JC/IP/ITE and X Uni/Poly teams this year. 6 teams from JC/IP/ITE and 6 teams from Uni/Poly will proceed the finals (Robotics Challenge) on 10 June 2022, 1800H.

Q: What if there is a tie between the teams?

A: The average of the aggregated raw scores (not rank position score) for both tasks per team would be used as tie-breaker.

The team with the higher average aggregated scores for both tasks would be placed higher on the Leaderboard.

The CV Task will use $AP@[0.5:0.95]^*$. The NLP Task will use F1 score*.

*Threshold values may be changed without prior notice to distinguish between competing results in the fairest manner possible at the sole discretion of the TIL committee