



Selected Topics in Visual Recognition using Deep Learning

Homework 1

TA: 楊証琨, Jimmy

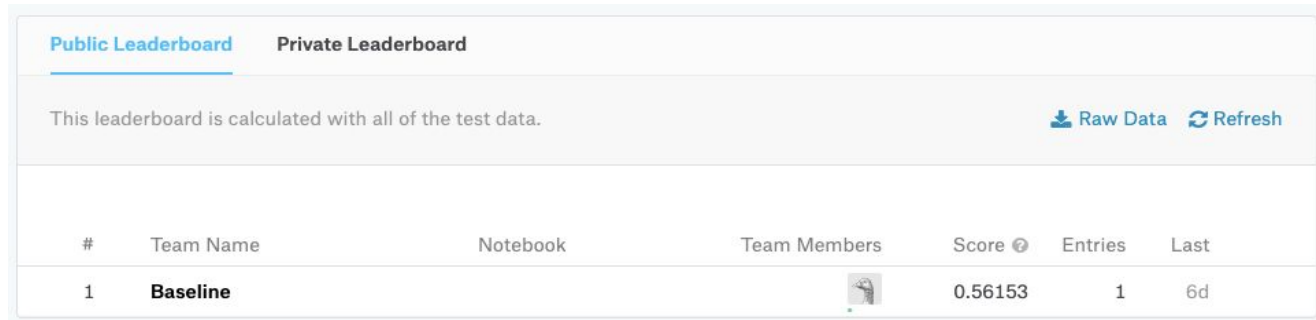
Ph.D. student at National Taiwan University

d08922002@ntu.edu.tw

Homework 1

- **Deadline: 10/17, Thr at 23:59**

1. Finish the Kaggle competition (check the leaderboard)



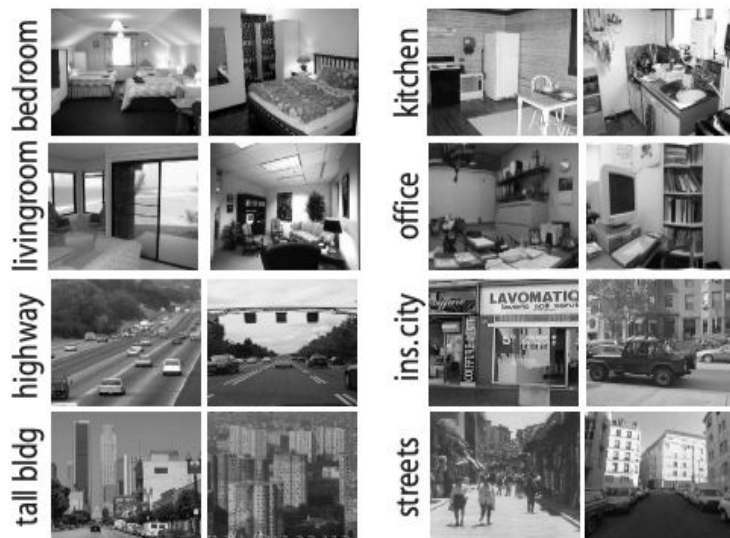
#	Team Name	Notebook	Team Members	Score	Entries	Last
1	Baseline			0.56153	1	6d

2. Mail your reports to d08922002@ntu.edu.tw with subject CS_IOC5008_<STUDENT ID>_HW1



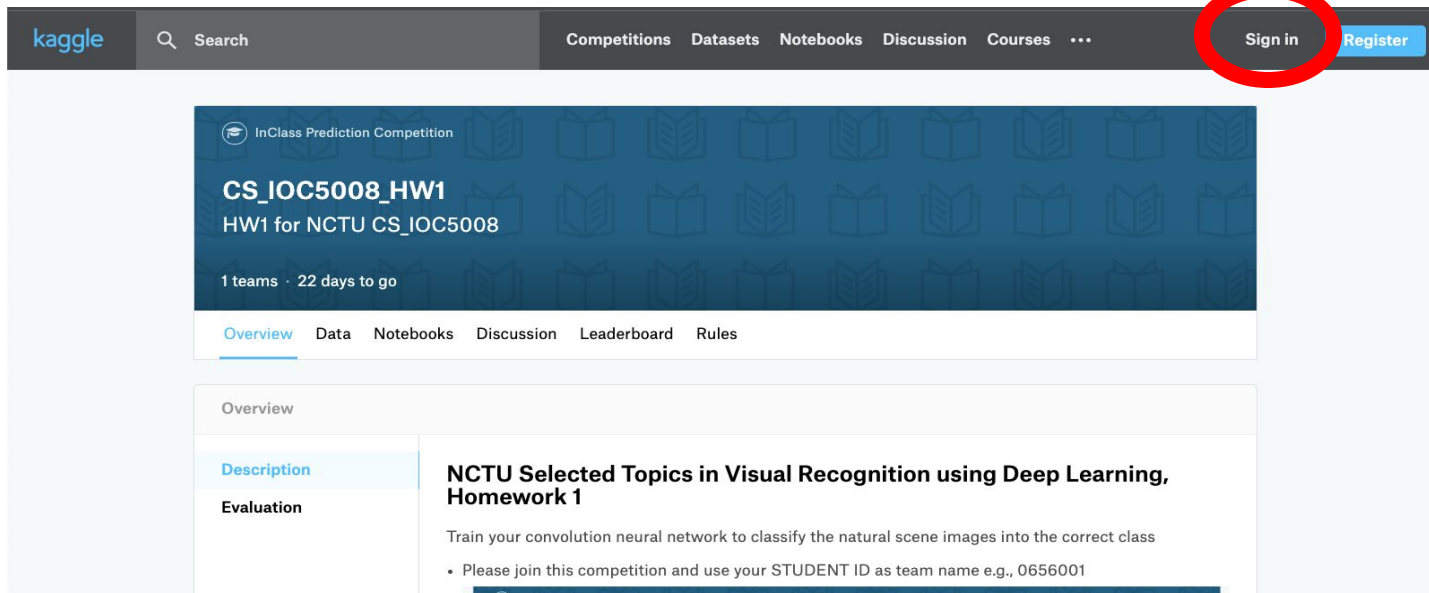
HW1 Introduction

- 3,859 gray images belonging to 13 classes (train: 2,819, test:1040)
- **NO external data should be used to train the model!**



HW1 Kaggle competition: Sign In

- HW 1 Kaggle competition link:
<https://www.kaggle.com/t/2fdf8c614314491f864af265534653c0>
- **Sign In** first! (Create an account if you don't have one)

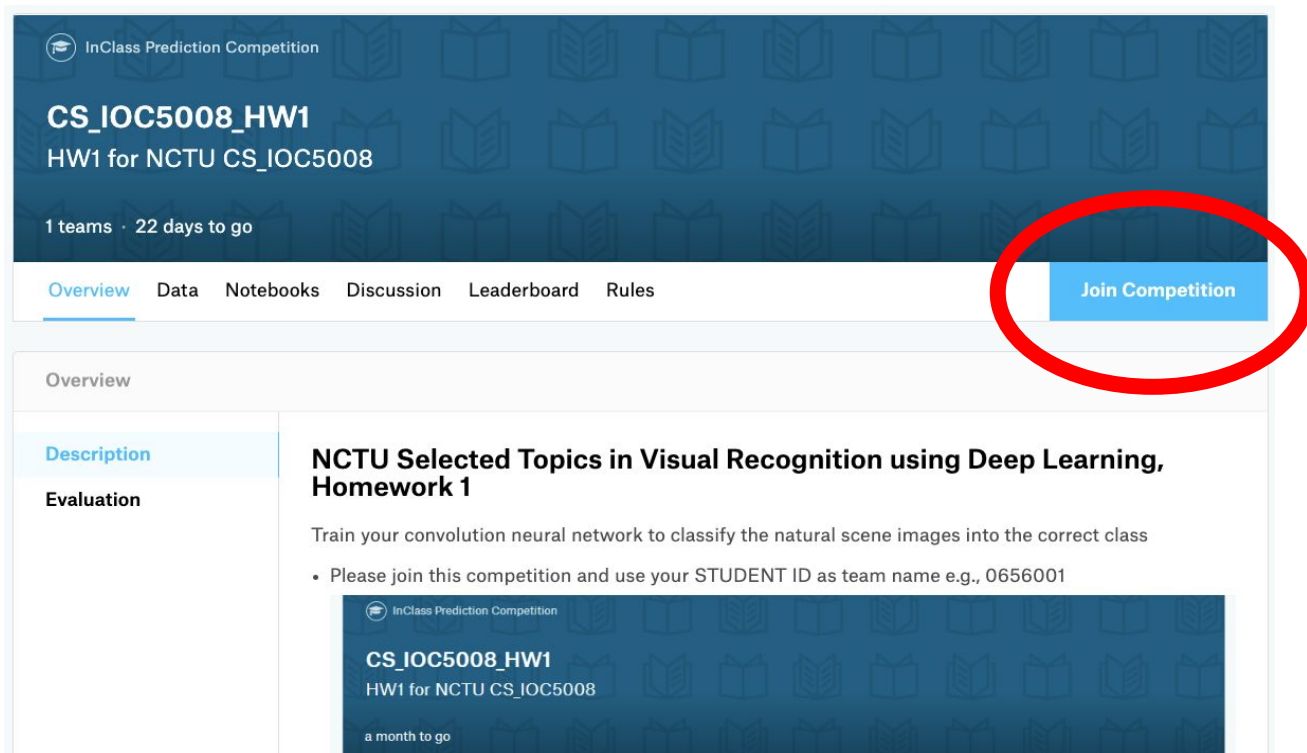


The screenshot shows the Kaggle website interface. At the top, the navigation bar includes the Kaggle logo, a search bar, and links for Competitions, Datasets, Notebooks, Discussion, and Courses. The 'Sign in' button is highlighted with a red circle. Below the navigation bar, the main content area displays the 'InClass Prediction Competition' for 'CS_IOC5008_HW1'. The competition title is 'HW1 for NCTU CS_IOC5008'. It shows '1 teams · 22 days to go'. Below this, there are tabs for Overview, Data, Notebooks, Discussion, Leaderboard, and Rules. The 'Overview' tab is selected, showing the competition description: 'NCTU Selected Topics in Visual Recognition using Deep Learning, Homework 1'. The description includes the goal: 'Train your convolution neural network to classify the natural scene images into the correct class' and a note: 'Please join this competition and use your STUDENT ID as team name e.g., 0656001'.



HW1 Kaggle competition

- Join Competition



The screenshot shows the Kaggle competition page for "CS_IOC5008_HW1". The page has a dark blue header with the text "InClass Prediction Competition" and "CS_IOC5008_HW1 HW1 for NCTU CS_IOC5008". Below the header, there is a navigation bar with links: "Overview", "Data", "Notebooks", "Discussion", "Leaderboard", and "Rules". A blue "Join Competition" button is located on the right side of the navigation bar, circled in red. Below the navigation bar, the "Overview" section is visible, showing the competition title "NCTU Selected Topics in Visual Recognition using Deep Learning, Homework 1" and a description: "Train your convolution neural network to classify the natural scene images into the correct class". A list of instructions follows, including "Please join this competition and use your STUDENT ID as team name e.g., 0656001". At the bottom of the overview section, there is a smaller version of the competition header.

InClass Prediction Competition

CS_IOC5008_HW1
HW1 for NCTU CS_IOC5008

1 teams · 22 days to go

[Overview](#) [Data](#) [Notebooks](#) [Discussion](#) [Leaderboard](#) [Rules](#) [Join Competition](#)

Overview

Description

Evaluation

NCTU Selected Topics in Visual Recognition using Deep Learning, Homework 1

Train your convolution neural network to classify the natural scene images into the correct class

- Please join this competition and use your STUDENT ID as team name e.g., 0656001

InClass Prediction Competition

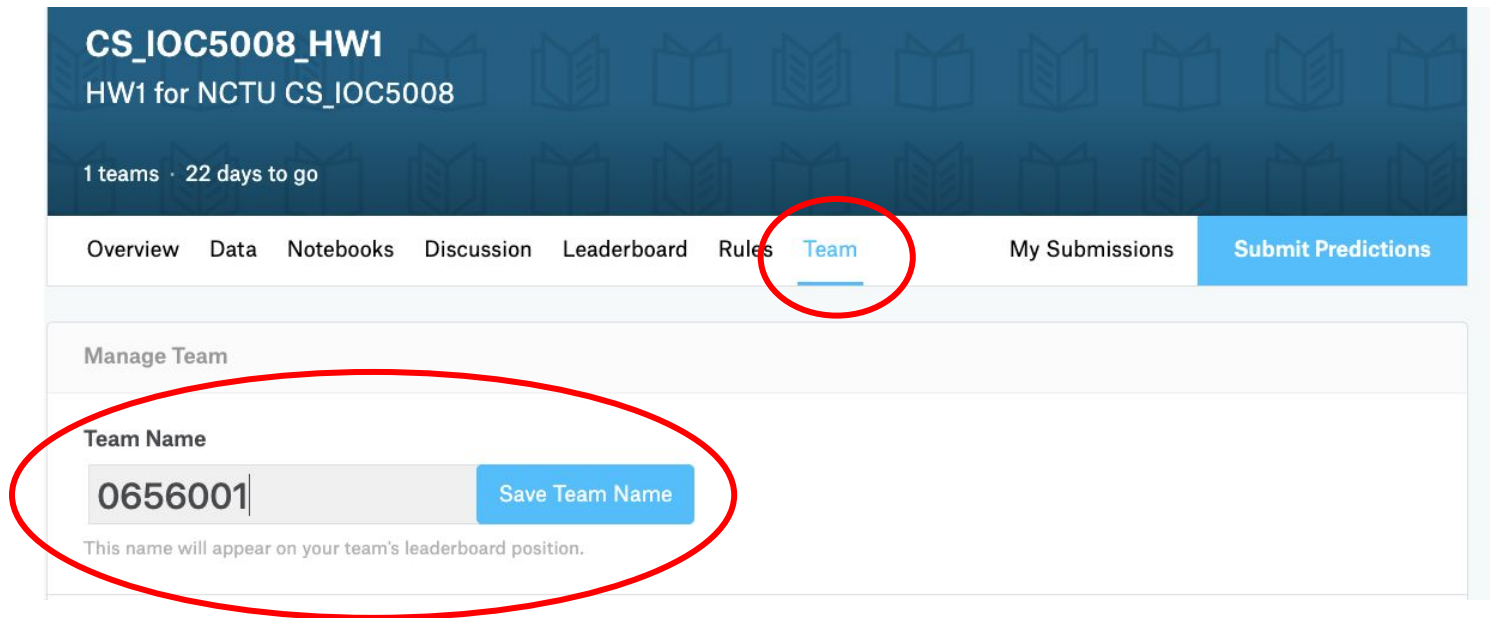
CS_IOC5008_HW1
HW1 for NCTU CS_IOC5008

a month to go



HW1 Kaggle competition: Team name

- Change your team name into your Student ID!! **(Important)**



CS_IOC5008_HW1
HW1 for NCTU CS_IOC5008

1 teams · 22 days to go

Overview Data Notebooks Discussion Leaderboard Rules **Team** My Submissions Submit Predictions

Manage Team

Team Name

0656001 Save Team Name

This name will appear on your team's leaderboard position.



HW1 Kaggle competition: Download data

- Get the data and train your model

CS_IOC5008_HW1
HW1 for NCTU CS_IOC5008

1 teams · 22 days to go

Overview **Data** Notebooks Discussion Leaderboard Rules Team My Submissions Submit Predictions

Data Description

Restriction

- No external data should be used for training your model!
- Only fully-automated methods, that is the methods that require no manual intervention during inferencing

Data (52 MB) API `kaggle competitions download -c cs-ioc5008-hw1` **Download All**

Data Sources

- dataset
 - test
 - train

About this file

No description yet



HW1 Kaggle competition: Submit Predictions

- Inference the test data by your model and submit your predictions with .csv format and check your accuracy on leaderboard

CS_IOC5008_HW1
HW1 for NCTU CS_IOC5008


1 teams · 22 days to go

[Overview](#) [Data](#) [Notebooks](#) [Discussion](#) [Leaderboard](#) [Rules](#) [Team](#) [My Submissions](#) [Submit Predictions](#)

Make a submission for [aetherAIJimmy](#)

You have 6 submissions remaining today. This resets 17 hours from now (00: 00 UTC).

Step 1
Upload submission file



File Format
Your submission should be in CSV format. You can upload this in a zip/gz/rar/7z archive, if you prefer.

Number of Predictions
We expect the solution file to have 1040 prediction rows. This file should have a header row. Please see sample submission file on the [data page](#).

	A	B
1	id	label
2	image_0000	highway
3	image_0001	insidacity
4	image_0002	suburb
5	image_0003	bedroom
6	image_0004	tallbuilding
7	image_0005	tallbuilding
8	image_0006	coast
9	image_0007	forest
10	image_0008	coast
11	image_0009	street
12	image_0010	highway

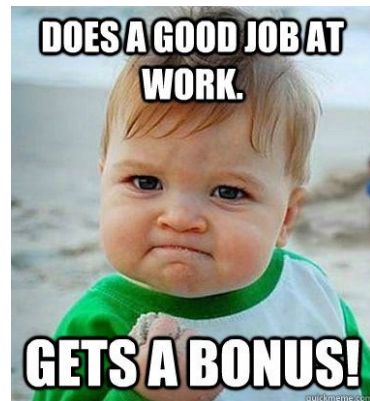


Grading policy: Model performance (70%)

- Get at least 56% ($70\% \times 0.8$) by scoring over the baseline

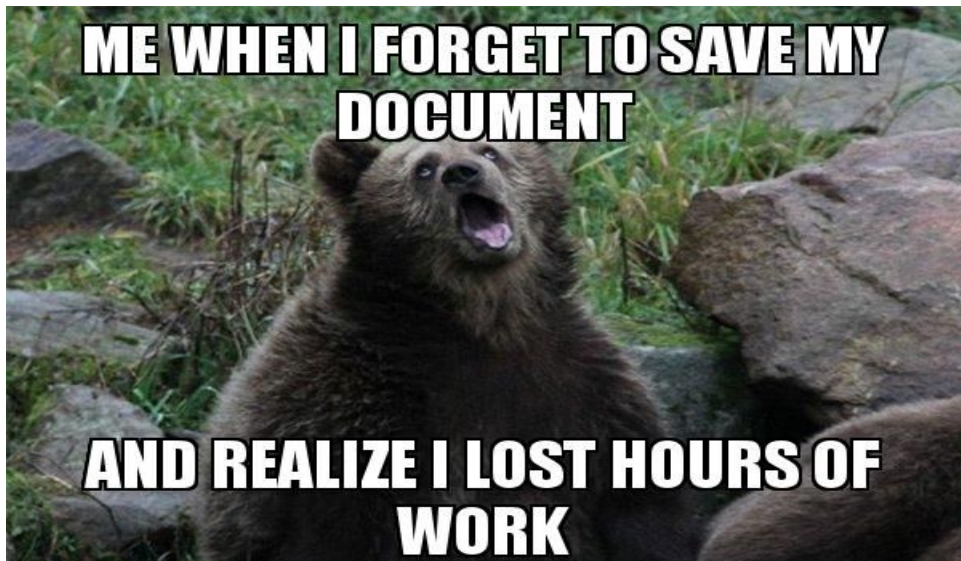
#	Team Name	Notebook	Team Members	Score ?	Entries	Last
1	Baseline			0.56153	1	6d

- Rank top 3 on the final leaderboard will be invited to give a 10 mins presentation to share your methodology and get a bonus on your final score of this course!



Grading policy: Reports (20%)

- Document your work (in PDF)
 - GitHub/ GitLab link of your code
 - Brief introduction
 - Methodology (Data pre-process, Model architecture, Hyperparameters,...)
 - Findings or Summary



Grading policy: Code readability (10%)

- Write beautiful Python code with [PEP8 guidelines](#) for readability. Base requirement: use whitespace correctly!

Python

Recommended

```
def function(default_parameter=5):  
    # ...
```

Not recommended

```
def function(default_parameter = 5):  
    # ...
```

Python

Recommended

```
my_list = [1, 2, 3]
```

Not recommended

```
my_list = [ 1, 2, 3, ]
```

Python

```
x = 5
```

```
y = 6
```

Recommended

```
print(x, y)
```

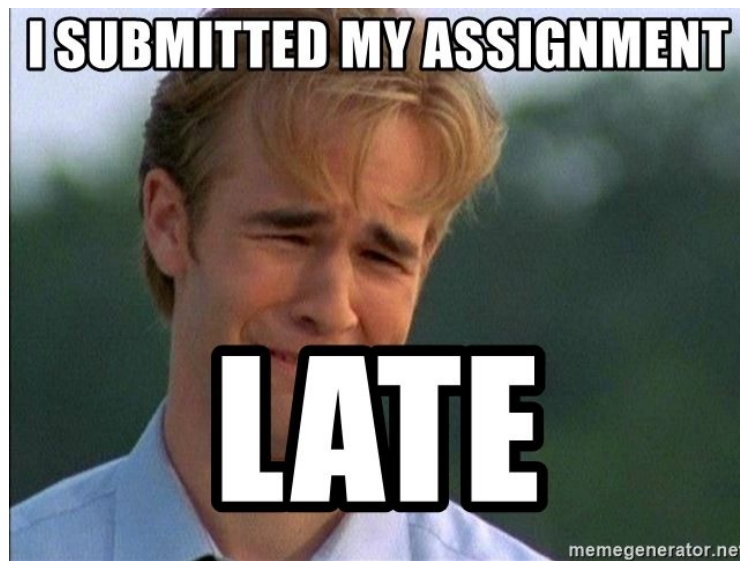
Not recommended

```
print(x , y)
```



Late Policy

- We will deduct a late penalty of 20% per additional late day
- For example, If you get 90% of HW1 but delay for two days, your will get only $90\% - (20\% \times 2) = 50\%$!



Keywords

- Beat the baseline
 - Data preprocess (normalization), Data augmentation, Proper hyperparameter setting (learning rate, optimizer)
- Rank Top 3!
 - Transfer learning, Modern CNN architecture, learning rate schedule, Model ensemble, Hyperparameter tuning, Hard negative mining, ...
 - Image classification



FAQ

- Can I use any code/tools/Library from GitHub or other resources?
 - Yes! We encourage you to learn how to apply existing tools on your own task. Such as Keras: applications, Pytorch: torchvision, TensorFlow: model zoo

But DO NOT copy code from your classmate!

- How to deal with GPU Out-Of-Memory (OOM) errors?
 - Lower your image size / batch size or use smaller network
- Which score will be used if I submit multiple predictions
 - Only the highest one will be used to grade your homework



Notice

- Check your email regularly, we will mail you if there are any updates or problems of the homework
- If you have any questions or comments for the homework, please mail me and cc Prof. Lin
 - Prof. Lin: lin@cs.nctu.edu.tw
 - Jimmy: d08922002@ntu.edu.tw



Have fun!

