

# Practical Lab 1

## Kaggle Image Recognition Challenges

*Minh-Tan Pham, Matthieu Le Lain*

**BUT3 INFO, 2024-2025**

**IUT de Vannes, Université Bretagne Sud**

*minh-tan.pham@univ-ubs.fr*

# Kaggle Competitions

## Background and Required notions

- **Before starting the practical lab, let us remind the principle of Convolutional Neural Networks, course and labs from the 2<sup>nd</sup> semester of BUT2**
  - Lecture 03: CNNs: Architecture
  - Lecture 04: CNNs: Transfer learning and Finetuning
  - Lab03: CNN training from scratch vs finetuning Guided version

**All of them can be found in Moodle space of AL5.A.01 (<https://moodle.univ-ubs.fr/course/view.php?id=9490>)**

# Kaggle Competitions - Examples

- Flower recognition : <https://www.kaggle.com/datasets/apollo2506/flowers-recognition-dataset/data>



GOTAM DAHIYA · UPDATED 3 YEARS AGO

10

New Notebook

Download (236 MB)



## Flowers Recognition Dataset

Recognise Flowers using any Library.



Data Card

Code (1)

Discussion (0)

### About Dataset



Usability ⓘ

8.24

### Data Explorer

Version 4 (239.55 MB)

- flowers
  - flowers
    - daisy
    - dandelion
    - rose
    - sunflower
    - tulip

label\_map.pkl

test.csv

train.csv

validation.csv

# Kaggle Competitions - Examples

- Rock Recognition: <https://www.kaggle.com/datasets/neelgajare/rocks-dataset>



NEEL GAJARE · UPDATED 2 YEARS AGO

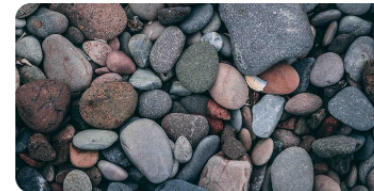
26

New Notebook

Download (624 MB)

## Rock Images

This dataset contains images of 53 rocks.



Data Card Code (1) Discussion (1)

### About Dataset



Usability ⓘ  
8.75

### Data Explorer

Version 3 (627.13 MB)

- ▼ Rocks
  - ▶ Amphibolite
  - ▶ Andesite
  - ▶ Anthracite
  - ▶ Basalt
  - ▶ Blueschist
  - ▶ Breccia
  - ▶ Carbonatite
  - ▶ Chalk
  - ▶ Chert
  - ▶ Coal
  - ▶ Conglomerate
  - ▶ Diamictite

# Kaggle Competitions - Examples

- Insect Recognition: <https://www.kaggle.com/datasets/kmldas/insect-identification-from-habitus-images>



KAMAL DAS · UPDATED 3 YEARS AGO

35

New Notebook

Download (3 GB)



## Insect identification from habitus images

291 Insect specimen images



Data Card Code (4) Discussion (2)

### About Dataset



Usability ⓘ

9.38

### Data Explorer

Version 1 (2.55 GB)

▼ database

- ▶ 1035167
- ▶ 1035185
- ▶ 1035194
- ▶ 1035195
- ▶ 1035204
- ▶ 1035208
- ▶ 1035231
- ▶ 1035290
- ▶ 1035366



# Kaggle Competitions - Examples

- Fish Recognition: <https://www.kaggle.com/datasets/crowww/a-large-scale-fish-dataset>



OĞUZHAN ULUCAN · UPDATED 3 YEARS AGO

950

New Notebook

Download (3 GB)



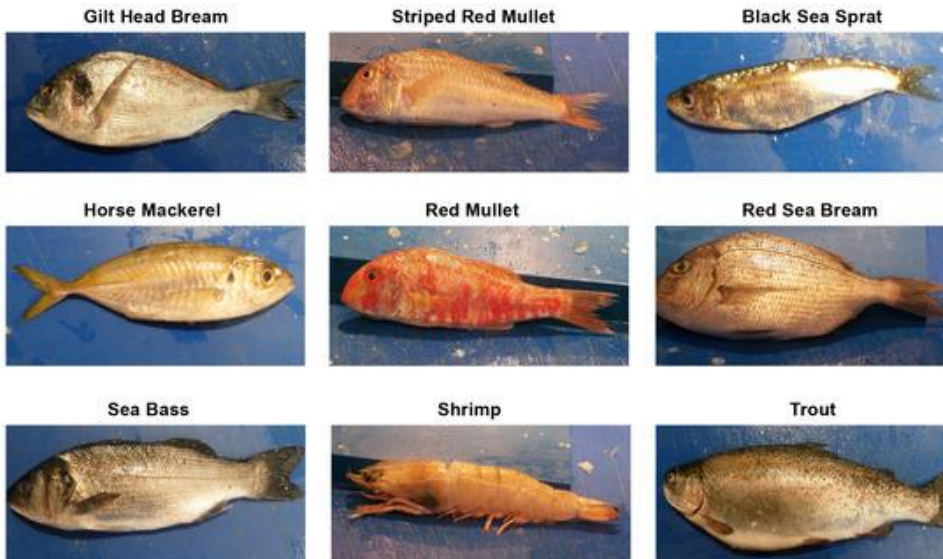
## A Large Scale Fish Dataset

A Large-Scale Dataset for Fish Segmentation and Classification



Data Card Code (222) Discussion (6)

### About Dataset



Usability ⓘ

9.38

### Data Explorer

Version 2 (3.49 GB)

- ▼ Fish\_Dataset
  - ▼ Fish\_Dataset
    - ▶ Black Sea Sprat
    - ▶ Gilt-Head Bream
    - ▶ Horse Mackerel
    - ▶ Red Mullet
    - ▶ Red Sea Bream
    - ▶ Sea Bass
    - ▶ Shrimp
    - ▶ Striped Red Mullet
    - ▶ Trout
    - ▶ README.txt
    - ▶ Segmentation\_exam
    - ▶ license.txt

# Kaggle Competitions - Examples

- Land-use Classification: <https://www.kaggle.com/datasets/apollo2506/landuse-scene-classification/data>



GOTAM DAHIYA · UPDATED 3 YEARS AGO

45

New Notebook

Download (2 GB)



## Land-Use Scene Classification

Use for classifying land scenes in Landsat Images



Data Card

Code (25)

Discussion (2)

### About Dataset



airport



bare land



baseball field



beach



bridge



center



church



commercial



dense residential



Usability ⓘ

8.82

### Data Explorer

Version 3 (2.13 GB)

- ▶ images
- ▼ images\_train\_test\_val
  - ▶ test
  - ▶ train
  - ▶ validation
- {i} label\_map.json
- 📄 readme.txt
- 📄 test.csv
- 📄 train.csv
- 📄 validation.csv

# Kaggle Competitions

## General rules

- **Image data are provided with Train, Valid, Test splits** (*folders or .csv files*)
  - Train + valid sets are provided with labels, used for training and validation
  - Test set is provided without labels. Competitors should predict classes labels then submit their prediction to a server for evaluation
- **Image data provided without splits**
  - Generally we randomly split into train/vali (80/20 for example) to train our model
  - When test images are given, we perform prediction and submit the results



# Lab assignment

## Practical lab1: Comparing training from scratch vs transfer learning on Kaggle datasets

- Based on R413\_Lab3, create a jupyter notebook file named **AL5A01\_Lab1** and work in pairs (binômes)
- You have to choose one of the two following datasets (already downloaded and split into Train/Valid)
  - **Insect dataset:** [https://drive.google.com/drive/folders/1-grJmceDqCL9mymbe\\_uPIQndu40BUasr?usp=sharing](https://drive.google.com/drive/folders/1-grJmceDqCL9mymbe_uPIQndu40BUasr?usp=sharing)
  - **Land-use dataset:** [https://drive.google.com/drive/folders/1Up6TYjS3-OAazigoVG\\_XRSLef6prfUqq?usp=sharing](https://drive.google.com/drive/folders/1Up6TYjS3-OAazigoVG_XRSLef6prfUqq?usp=sharing)
- You need to perform and compare 2 following tasks:
  - **Task 1: CNN from Scratch**
  - **Task 2: Finetuning from existing models**
- All models should be trained with 20 epochs !
- The performance of each task (on validation set) will be reported for competition (with other pairs) !!!
- All remarks, comments, illustrations of results for analysis will be considered for evaluation !

REF: [https://pytorch.org/tutorials/beginner/transfer\\_learning\\_tutorial.html](https://pytorch.org/tutorials/beginner/transfer_learning_tutorial.html)

# References and Sources

- **Convolutional neural networks for visual recognition** - Stanford

<https://cs231n.github.io/>

- **Neural networks and deep learning** (free online book)

<http://neuralnetworksanddeeplearning.com/index.html>

- **Machine learning course** – Oxford

<https://www.cs.ox.ac.uk/people/nando.defreitas/machinelearning/>

- **Neural network course** - Hugo Larochelle

[https://info.usherbrooke.ca/hlarochelle/neural\\_networks/content.html](https://info.usherbrooke.ca/hlarochelle/neural_networks/content.html)

- **Deep learning course** – François Fleuret

<https://fleuret.org/dlc/>