CE7454 Project 1:DeepFashion Attribute Prediction Challenge

Project 1 Specification (v1.0)

Important Dates

Issued: 06 September 2021 00:00 AM

Due: 18 October 2021 11:59PM

Group Policy

This is an individual project

Late Submission Policy

Late submissions will be penalized. We will deduct 10% of the overall score for every 24 hours after the deadline.

Challenge Description

The goal of this mini challenge is to identify the attribute labels depicted in a fashion photograph. Our dataset has 6000 images, divided into 5000 images for training and 1000 for validation. The test set will be hosted online for final evaluation.

The dataset employs 26 attribute labels that are common descriptions of garments. These attributes are grouped into 6 major categories. Every image is annotated with 6 attributes, one from each category.

Your algorithm is required to predict which attributes a given image has. Therefore, this is a multi-label classification problem.

Table 1. The 26 Attributes and Their Categories

Category 1	**Category 2**	**Category 3**	**Category 4**	**Category 5**	**Category 6**
floral	long_sleeve	maxi_length	crew_neckline	denim	tight
graphic	short_sleeve	mini_length	v_neckline	chiffon	loose
striped	sleeveless	no_dress	square_neckline	cotton	conventional
embroidered			no_neckline	leather	
pleated				faux	
solid				knit	
lattice					

Figure 1. Example images for selected attributes (not all attributes are present in the current challenge)

We also provide ground-truth landmarks and bounding boxes for each garment in the training, validation, and test set. You are allowed, but not required, to use these labels in your algorithm.

Assessment Criteria

The grading rubric for Project 1 is as follows:

- Predictive accuracy (30% of the project)

  We will evaluate and rank the performance of each submitted solution based on the average accuracy across all attributes on a test set. Those with higher prediction accuracies will receive higher scores. The general scheme is as follows.

accuracy	≥ 80%	≥ 78%	≥ 76%	≥ 74%	≥ 72%	≥ 70%	≥ 65%
Scores	30	28	26	24	22	20	10

- Optimization and regularization (20%)

  You should describe the steps you take to optimize and regularize the neural network, such as the tuning of the learning rate, the weight decay coefficient,

additional regularization techniques, and so on. You should document their effects on performance.

As suggestions, you may consider adopting the following techniques to improve accuracy.

- Data augmentation, e.g. random flip [1]
- Deep networks such as ResNet-50 [2]
- Alternative loss functions, e.g. focal loss [3]

- Experimental analysis (30%)

  You should analyze and discuss the effects of the techniques you use to improve performance. This could be in the forms of general intuition, mathematical exposition, and/or ablation studies. You should provide support to your analysis using experimental data. Additional points may be awarded if the proposed solution is interesting or novel or if the report can provide proper analysis to justify the proposed solution.

- Quality of report (20%)

  You should submit a zip file with a latex written report and a screenshot of your score on . The report should be clear, concise, and in proper English. The report should follow the CVPR format. You can download the template here.

General Guidelines

Students should improve the classification accuracy of their network models.

- Download the dataset here.
- Train your network using the training set.
- Additional ground-truths of landmarks and bounding boxes are provided.
  - `train_landmarks.txt`, `val_landmarks.txt`, and `test_landmarks.txt` provide the landmark key-points of the fashion garments.
  - `train_bbox.txt`, `val_bbox.txt`, and `test_bbox.txt` provide the bounding box of the fashion garment.
  - You can find more information here.
- There are 6 attribute groups, each having a few attributes. There are 26 attributes in total. You may find the details in “list_attr_cloth.txt”. Your output file

should contain, for each test image, the predicted attribute labels in every category. See the next section for an example.
- All hyperparameter tuning should be done on the validation set.
- Submit predictions of the test set for evaluations and ranking in the mini challenge leaderboard. The test set will be available one week before the deadline, as is common practice of international computer vision challenges.
- No external data is allowed in this mini challenge. Only ImageNet pre-trained models are allowed.
- **You should not use an ensemble of models.**

Step-by-step Submission Procedure

We host the test set on CodaLab. Please following the guidelines to ensure your results will be recorded:

1. The web address of competition is

   https://competitions.codalab.org/competitions/34733

1. Register CodaLAB with your NTU email, with your **matric number as your username.**
2. Submit a zip file containing a single file “prediction.txt” with 1000 rows of your prediction results on the test set. For example, the first 5 line should be like:

   5 2 0 3 2 2

   5 2 1 3 2 2

   5 0 2 0 2 2

   5 0 2 0 5 2

   1 2 2 3 2 2

   … (1000 lines in total)

Note that your predictions should be in the exact same order of images as in test.txt. If you use PyTorch DataLoader, you should set “shuffle=False”.

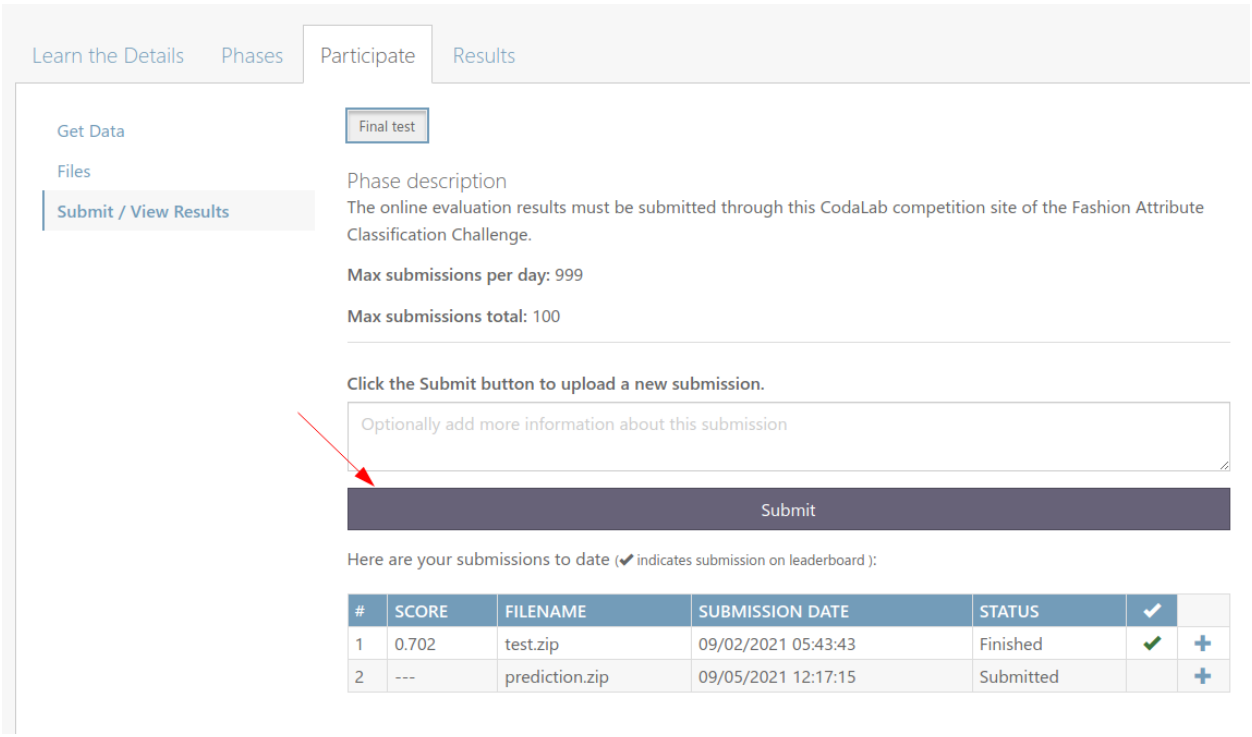
3. **Please refer to the “submission_guideliens.txt” in the shared dataset link. You can find more CodaLab submission format details there, as well as a submission sample.**

4. Resubmission is allowed. Please report your best score in your report.
5. Submit the following (zipped) files to NTU Learn before the deadline:

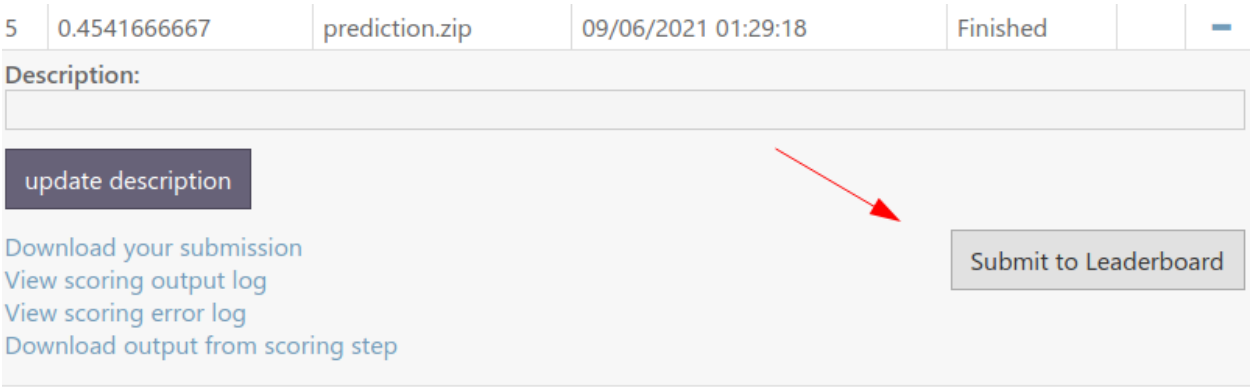
- **Your pdf technical report (in CVPR format). Please name it as**
    - [YOUR_NAME]_[MATRIC_NO]_[project_1].pdf
- A screenshot from the CodaLab leaderboard, with your username and best score. We will use the score from CodaLab for marking, but will keep your screenshot here for double-check reference. An example screenshot is:

#	Username	Score
1	yslan	0.70200

After registering on CodaLab, you can submit your result here:



After submission, you can choose to show your results in the leaderboard”



<u>If the “STATUS” shows “Finished”, you have successfully uploaded your result. **Please note that this may take a few minutes.**</u>

<u>Computational Resources</u>

We don’t provide GPUs for this assignment. You can use Google CoLab or Amazon's EC2 for computation. As a student, you can sign up to receive free $100 credit through

the AWS Educate program. We suggest the use of *g2.2xlarge* instances with Ubuntu for ease of use. The $100 credit should be sufficient for running a *g2.2xlarge* GPU instance for approximately 6 days.

References

[1] He et al. Bag of Tricks for Image Classification with Convolutional Neural Networks, ArXiv 2018
[2] He et al. Deep Residual Learning for Image Recognition, CVPR 2016
[3] Lin et al., Focal Loss for Dense Object Detection, ICCV 2017