CS 203: Software Tools & Techniques for AI

IIT Gandhinagar

Sem-II - 2024-25

LAB 05

Total marks: 10
Submission deadline:
Submission guidelines:

1. Code should be added to a GitHub repository, and the repository details should be shared.
2. Late submissions will be penalized 20% per day.
3. Google form submission link:

Note: By submitting this assignment solution you confirm to follow the IITGN's honor code. We shall strictly penalize the submissions containing plagiarized text/code.

The goal of this assignment is to apply **data augmentation techniques** to improve the performance of an **image classification model** that distinguishes between cats and dogs.

This lab is to be completed in teams of size 2 students. Each team will annotate the data and then compute the inter-annotator agreement scores.

Task 1: Data Augmentation

- Download the Cat & Dog Dataset (https://www.kaggle.com/datasets/samuelcortinhas/cats-and-dogs-image-classification?select=test) (Only download the test dataset; do not take the training dataset)
- Create a train and test set (train-test ratio should be 80:20%).
- Create Custom Function using Augly which will perform multiple random data augmentation according to input. (At least 10 data augmentation needs to be added like rotate, cropping, blur …)

- Perform data augmentation using the above function, only on the train set. (The number of augmented images should be twice the train set, and images should be augmented thrice example: cropped → rotate→Blur)
- Show the statistics of the newly created dataset. (Old dataset count and new dataset count)

Task 2: Model Training

Note: Initial weights of the model should be the same when training with both datasets.

- Choose (microsoft/resnet-50)model from the hugging face and initialize its new weights.
- Train model(created in the above point) on a downloaded dataset, without augmentation.
- Train model(created in the first point) on a downloaded dataset with augmentation.
- Get the precision, recall, F1 score, and accuracy of both the models on the test set.

Evaluation Criteria

Data Augmentation (40%)

- Proper code
- Showing bar graph for counts.
    - Train & Test
    - Augmented Train Set & Without Augmented Train Set
    - Number of Cat & Dog Images in both a train set and a test set.
- Basics of ML (Like cat and dog images in the test set should be balanced)

Model Training (40%)

- Training parameters and information.
- Model taken and its architecture diagram.
- Properly calculating evaluation metrics without any library.
- If getting poor/good results, then give an explanation. (At most 5 lines of explanation)

Documentation (20%)

- Proper documentation of code, graphs, and metrics.