Assignment 2: Affect Recognition from Landmarks

29/11/2024

Försök 1 Pågår

NÄSTA: Lämna in uppgift

Lägg till kommentar

Obegränsat antal försök tillåts

14/11/2024 till 29/11/2024

Information

The objective of Assignment 2 is to assess that you can effectively use the machine learning methods that you learning in Lab 2 for the automatic recognition of human emotions. To pass Assignment 2, you are required to use machine learning algorithms to build a model for the automatic recognition of human emotions. In order to do this, you will be given access to a dataset that consists of images of human faces, a set of features describing facial indicators of people in those images, and emotion labels. This Assignment builds from Assignment 1 and Lab 1, as such you will not be required to extract any feature yourself, but you can use those provided in the dataset. You also should not need the images themselves but it can be useful when visualising the results.

Dataset

▼Angry

You can find the dataset for this assignment here: **dataset.csv (https://uppsala.instructure.com/courses/94646/files/7461878?wrap=1)** **(https://uppsala.instructure.com/courses/94646/files/7461878/download?download_frd=1)** , **test_to_submit.csv (https://uppsala.instructure.com/courses/94646/files/7596290?wrap=1)** **(https://uppsala.instructure.com/courses/94646/files/7596290/download?download_frd=1)**

You can see that we provide two parts of the dataset: `dataset.csv` and `test_to_submit.csv`. While the former contains all the features and labels, the latter only contains features. During this assignment you will train and test a model using the first dataset.

Then, using your trained model, you will be asked to classify the samples in `test_to_submit.csv` and submit the output of your model. We will check, using our internal labels, the performance of your model on this last dataset.

This dataset is made up of images generated through Stable Diffusion feeding it appropriate emotional prompts. We extracted the features from the images using PyFeat. In `dataset.csv` you will find a column with the emotion and to follow a number of columns with **Action Units (AUs)** (https://py-feat.org/pages/au_reference.html) . In `test_to_submit.csv` you will only have the columns for the AUs.

The dataset is big enough for you to be able to train neural nets as well as use different Machine Learning methods seen in Lab 2.

Assignment structure

To pass this Assignment, you are required to perform the following steps:

1. Read and Preprocess the dataset in a format that is appropriate for training
2. Do a balanced split of the dataset for train/val/test.
3. Select an appropriate model for the task. You can choose among the following:
   - A model that was presented during Lab 2
   - A model that is part of **scikit-learn** (https://scikit-learn.org/stable/) that was *not* presented in Lab 2
   - A different model using **PyTorch** (https://pytorch.org/)
4. Do some kind of hyperparameter tuning/model selection using the validation dataset. Some examples are the following:
   - Using different kernels with Support Vector Machines (SVM)
   - Using different `k` values when using `k`-Nearest Neighbours
   - Changing the depth and breadth of a Multi-Layer Perceptron (MLP)
   - Testing different model e.g. `k`-NN vs SVM vs MLP
5. Analyse and report the performance of your selected model with your selected hyperparameter(s) on your test set.
6. Classify the samples of `test_to_submit.csv`
7. Submit everything on Studium

Output to submit

For this assignment you will be asked to submit:

A very brief report (in pdf) with bullet points answering the following questions (also see example answers):

- Name: *Your name*
- Train/val/test split percentage: *70/20/10*
- Selected model(s): `k`*-NN*
- Hyperparameter tuning or model selection: *Hyperparameter tuning*
- If Hyperparameter tuning, parameter that was tuned and range of values: `k` *as in the number of clusters, values: 1, 3, 5, 15*
- Best model/hyperparameter: `k=5`
- Performance of best model on your test set (accuracy): *42%*

If you completed that assignment in a group you also have to add a bullet point describing in detail the contributions of each group member:

- Contributions: member A thought about using X, member B implemented Y, etc.

Beside this, you are also asked to submit a file containing the classifications of your model of the samples in `test_to_submit.csv`. The file **must** be named `outputs` (with no extension i.e. `outputs.txt` will not be accepted) and have exactly one word per line. The word corresponds to the emotion label given by your model i.e. the i-th line of your file indicates the emotion label given by your model to the i-th sample in `test_to_submit.csv`.

Finally, you need to submit your code, in a single script or notebook. Do not zip your files.

Failure to comply to this given name/structure will result in automatic failure of the assignment. In such case, you can still resubmit your assignment until the end of the deadline.

In order to pass this assignment you need to have a minimal accuracy on our internal test. The value is chosen such that your model is better than a random number generator. You are *not* expected to spend time trying to improve the accuracy, any correct implementation of the assignment should pass our test.

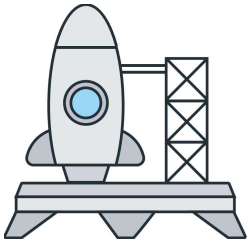
Acknowledgements

The dataset was extracted from **FER-Universe/DiffusionFER** (https://huggingface.co/datasets/FER-Universe/DiffusionFER)

Kom ihåg att den här inlämningen räknas för alla i din Assignment 2 Groups grupp.

Välj en inlämningstyp

Ladda upp | Canvas Studio | Mer



Välj en fil att ladda upp

eller

Webbkamerafoto

Canvas-filer

(https://uppsala.instructure.com/courses/94646/modules/items/1205182)

(https://uppsala.instructure.com/courses/94646/modules/it