Paper #1

**Training an emotion detector with transfer learning**

* **Paper & code:** [**https://towardsdatascience.com/training-an-emotion-detector-with-transfer-learning-91dea84adeed**](https://towardsdatascience.com/training-an-emotion-detector-with-transfer-learning-91dea84adeed)

[**https://github.com/martin-chobanyan/emotion**](https://github.com/martin-chobanyan/emotion)

* **Date**: 29 Oct 2019
* **Advantages**:

1. The model is trained on dataset that consists of 28,709 images
2. Overall accuracy is 87.2%
3. Isolates the face in the image and then transformed to a grayscale image this allows the model to focus on the actual facial expression and not learn any biases that may come with color.

* **Disadvantages**:

1. Detects 5 emotions angry, disgusted, happy, sad, surprised
2. Needs to fine-tune the dataset in order to get good results.

Paper #3

**ProxEmo: Gait-based Emotion Learning and Multi-view Proxemic Fusion for Socially-Aware Robot Navigation**

* **Paper & code:** <https://paperswithcode.com/paper/proxemo-gait-based-emotion-learning-and-multi#code>
* **Date**: 2 Mar 2020
* **Advantages**:

1. Uses RGB egocentric cameras that can be retrofitted onto moving platforms such as robots
2. Uses group convolu- tions to classify pedestrian emotions which improves accuracy
3. Modern research paper ( 2020)
4. Takes into consideration varying pedestrian orientations.
5. Overall pose of skeleton is defined by 16 joint position input from the camera
6. Accuracy is 82.4

* **Disadvantages**:

1. The network predicts only 4 emotions happy,sad,angry and neutral
2. Reliability on real-time 3D skeletal tracking not given videos or photos
3. Doesn't focus on analyzing facial expressions but rather skeleton posture

Paper #4

**SpanEmo: Casting Multi-label Emotion Classification as Span-prediction**

* **Paper&code:**[**https://paperswithcode.com/paper/spanemo-casting-multi-label-emotion#code**](https://paperswithcode.com/paper/spanemo-casting-multi-label-emotion#code)
* **Date**: 25 Jan 2021
* **Advantages**:

1.the model identify three languages English, arabic and spanish

2.can detect 11 different emotions

3,this model outperform its competing models in the three languages

* **Disadvantages**:

1.the model depends only on words not videos or photos ( major disadvantage)

**Emotion Recognition in the Wild using**

**Deep Neural Networks and Bayesian Classifiers**

* **Paper & code:** <https://paperswithcode.com/paper/emotion-recognition-in-the-wild-using-deep>
* **Date**: 12 Sep 2017
* **Advantages**:

1. Group emotion recognition
2. a whole-scene descriptor is used
3. an accuracy of 67:75% on the validation set and 64:68% on the test set.

* **Disadvantages**:

1. The network has only three output units representing the three emotions: positive, neutral, negative.
2. No videos

Paper#10

**Context Based Emotion Recognition using**

**EMOTIC Dataset**

* **Paper & code:** https://paperswithcode.com/paper/context-based-emotion-recognition-using
* **Date**: 30 Mar 2020
* **Advantages**:

1. Face, body pose and scene context are used to recognize the emotions
2. The output is 2 different types of emotion representation: Discrete Emotion Categories and 3 Continuous Emotion Dimensions (Valence, Arousal, and Dominance).
3. 26 Emotion Categories.
4. They set the weights based on the occurrence of each category for each batch. Experimentally, we obtained better results using this approach compared to setting the global weights based on the entire dataset.

* **Disadvantages**:

1. No videos

* **Another Important details:**

1. the dataset contains 23; 571 images and 34; 320 annotated people. Some of the images were manually collected from the Internet by Google search engine.
2. Valence (V), that measures how positive or pleasant an emotion is, ranging from negative to positive; Arousal (A), that measures the agitation level of the person, ranging from non-active / in calm to agitated / ready to act; and Dominance (D) that measures the level of control a person feels of the situation, ranging from submissive / non-control to dominant / in-control.

Paper#11

**Facial Expression Recognition with Deep Learning**

* **Paper & code:**

<https://paperswithcode.com/paper/facial-expression-recognition-with-deep>

* **Date**:
* **Advantages**:

1. More than one model is applied

* **Disadvantages**:

1. No videos
2. Models’ accuracy range from 64% to 73.2%

Paper#12

**Facial Expression Recognition Using Attentional Convolutional Network**

* **Paper & code:** <https://paperswithcode.com/paper/deep-emotion-facial-expression-recognition>
* **Date**: 4 Feb 2019
* **Advantages**:

1. Detects the 6 cardinal emotions (happiness, sadness, anger, fear, disgust, surprise) and neutral.
2. Model was trained on 4 different datasets (one model per dataset) and showed promising results.
3. Framework based on attentional convolutional network, where attention mechanism enables neural networks with less than 10 layers to compete with (and even outperform) much deeper networks for emotion recognition.
4. Deployed a visualization method to highlight the salient regions of face images which are the most crucial parts thereof in detecting different facial expressions
5. Information considering the four different datasets:

* FER-2013 dataset

→ Contains 35,887 images of 48x48 resolution, most of which are taken in wild settings. Also, it has more variation in the images, including face occlusion (mostly with hand), partial faces, low-contrast images, and eyeglasses.

→ The entire 28,709 images were used for training, 3.5k for validation, and 3,589 images for testing.

→ Accuracy rate of around 70.02% on the test set.

* FERG dataset

→ Database of stylized characters with annotated facial expressions, containing 55,767 face images of six stylized characters.

→ 34k images used for training, 14k for validation, and 7k for testing (1k images per emotion in the test set).

→ Accuracy rate of around 99.3% on the test set.

* JAFFE dataset

→ 120 images used for training, 23 images for validation, and 70 images for test (10 images per emotion in the test set).

→ Accuracy rate of around 92.8% on the test set.

* CK+ dataset

→Includes both posed and non-posed (spontaneous) expressions.

→ 70% of the images are used for training, 10% for validation, and 20% for testing.

→ Accuracy rate of around 98.0% on the test set.

1. Ranked #1 on [Facial Expression Recognition on FERG](https://paperswithcode.com/sota/facial-expression-recognition-on-ferg).

* **Disadvantages**:

1. No videos

## DeXpression: Deep Convolutional Neural Network for Expression Recognition

* Code and paper Link : https://paperswithcode.com/paper/dexpression-deep-convolutional-neural-network
* Date: 17 Sep 2015
* Advantages:

Has been tested on both video and image datasets and showed high accuracy in both:

**MMI dataset:**

Consists of 2900 video of 75 persons. The accuracy on this set is 98.6%

**CKP dataset:**

Consists of 573 labeled emotion sequences of 210 people aged from 18 to 50 years old. The accuracy on this set is 99.6%

* Disadvantages:
  + The datasets are relatively small.
  + Some emotions are mixed up since in MMI dataset the emotion of surprise is usually mixed up with disgust with rate of 0.045% while in CKP dataset the emotion of fear is miss detected as surprise with rate of 0.0159%

# Paper #5

# Facial Expression Recognition Based on Weighted-Cluster Loss and Deep Transfer Learning Using a Highly Imbalanced Dataset

**Link**: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7249188/>

**Date:** 5 May 2020

**Advantage:**

-Recognize eight common facial expressions (happy, sad, surprise, fear, contempt, anger, disgust, and neutral).

-Works on solving two problems:

- Small dataset.

- Imbalanced data distribution.

-Solved them by using different loss functions other than the softmax loss.

- Works with **Affect-Net** dataset.

- 20 different Models each 10 same Architecture and each of these 10 with different loss function.

**Disadvantage:** Max Accuracy ~ 61%

8) Emotion detection using deep learning

· Link:<https://github.com/atulapra/Emotion-detection>

· Date: 28 Mars 2021

· Dependencies:

o Python 3.x

o OpenCV

o Tensorflow

· Advantages:

o Acc:79% train but 65%test à overfitting(bad)

· Disadvantage:

o Overfitting

o No grayscale for new images

9) Multimodal-Emotion-Recognition

· Link:<https://github.com/maelfabien/Multimodal-Emotion-Recognition/tree/master/03-Video>

· Date: 11 Jun 2019

· Dependencies:

o Python 3.x

o OpenCV

o Tensorflow

o Keras

· Advantages:

o Working with pipeline

o Grayscale

o Acc : 65%train – 63% testing

o Multi faces

o Applying many models

o Use notebooks

o Overfitting prevented

o Early stopping

o 7 labels

· Disadvantages:

o Small dataset