

Facial expression recognition

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Database

- **Ck+** : 48x48 resolution, Unique, Posed, 6 BEs & 1 Neutral.
- **FER2013** : 48x48 resolution, Wild, Posed and spontaneous, 6 BEs & 1 Neutral.

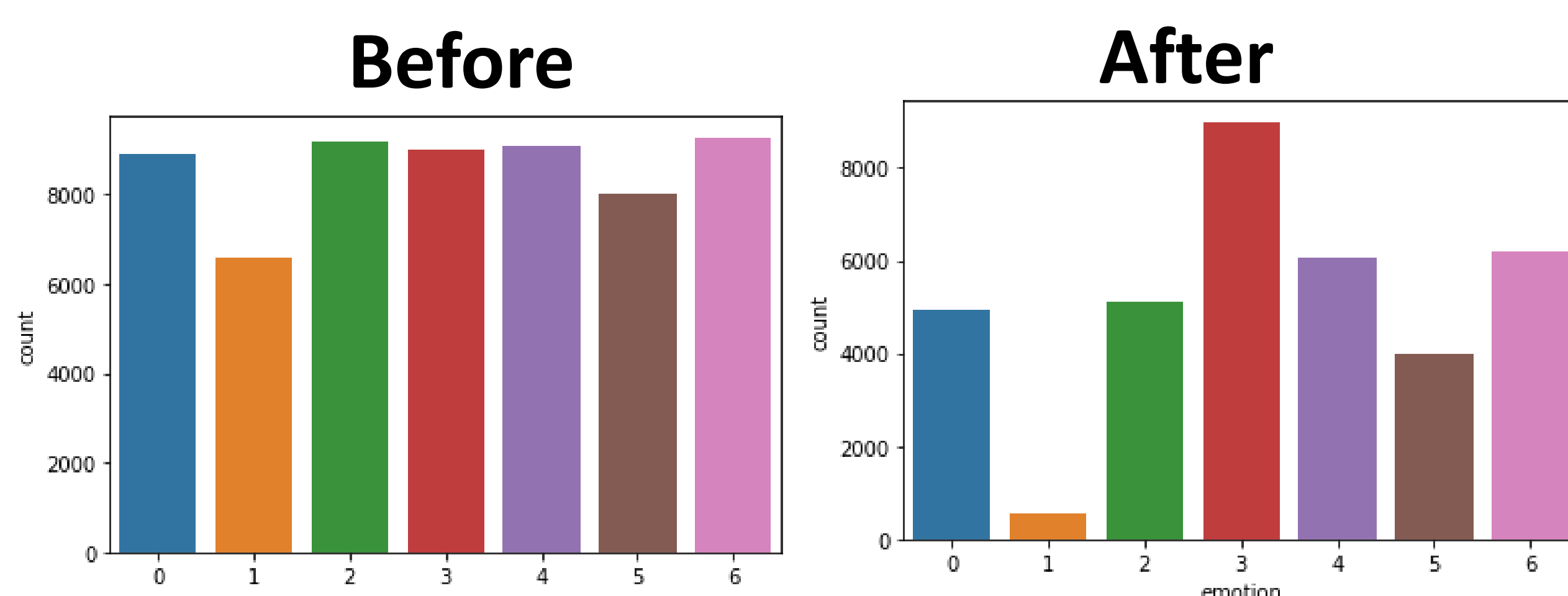


Data preprocessing

As shown in the charts the data is not balanced, so we augmented the dataset fer2013 to achieve data balancing.

Types of data augmentation:

Additive Gaussian Noise, Mirror Flipping, Linear Contrast, Sharpen Images and Crop Images.



{0: 'anger', 1: 'disgust', 2: 'fear', 3: 'happiness', 4: 'sadness', 5: 'surprise', 6: 'neutral'}

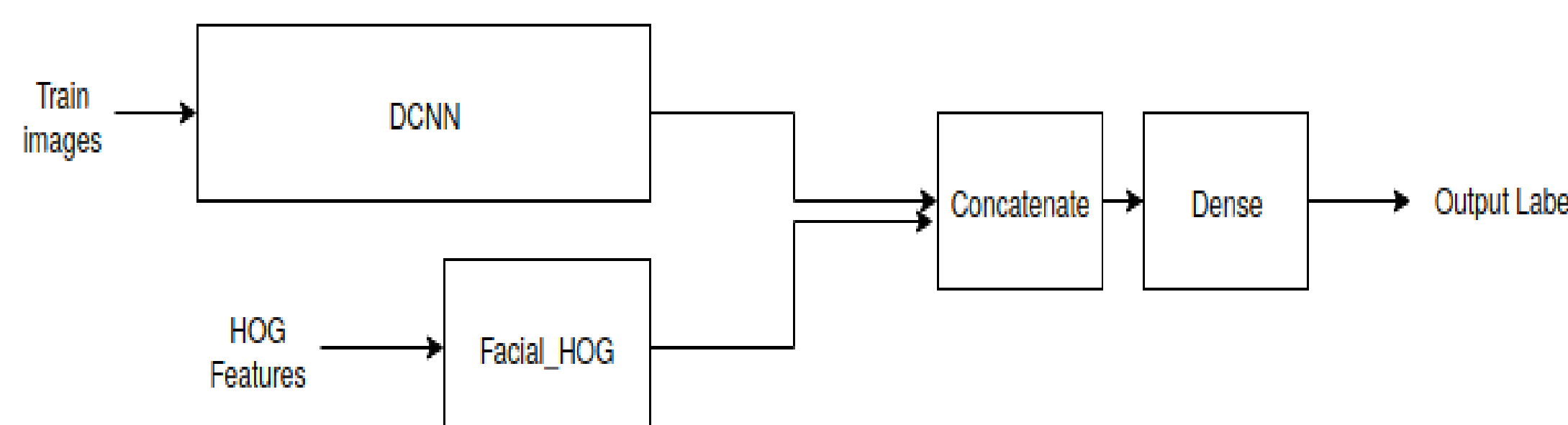
Dataset size become 60061 after data balancing .

Overview

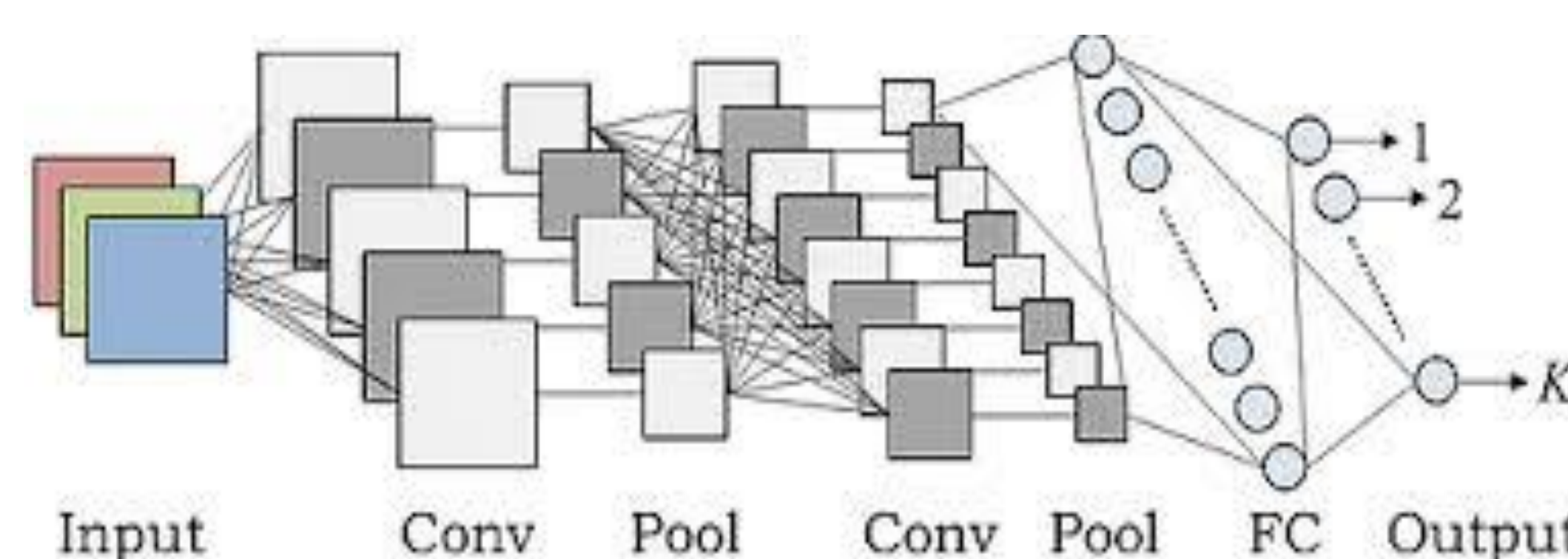
Facial expression recognition software is a sentiment analysis tool and is able to automatically detect the six basic or universal expressions: happiness, sadness, anger, surprise, fear, and disgust beside neutral.

Model Architecture

- **DCNN Hog**
 - Merge two neural networks, The first one is a deep neural network consisting of multiple Conv2d, pooling, batch normalization and dropout layers. The second network is HOG, or Histogram of Oriented Gradients, is a feature descriptor that is often used to extract features from image data.



- **CNN**
 - It is a deep conventional neural network consisting of many layers of conv2d, max pooling, dropout and batch normalization.



Ensemble

- We used the previous two model to obtain better predictive performance than could be obtained from any of the constituent learning model alone.
- Types of ensemble used ,Voting ,Average Weighted average.

Result

- Evaluation Metric, Accuracy derived from confusion matrix.

Model	DCNN_Hog	CNN	Ensemble
Accuracy	73%	72%	85%

Future work

- Consider pose Invariant image by creating a model, which jointly learns face frontalization and discriminative representation end-to-end that mutually boost each other to achieve pose-invariant face recognition.
- Consider other problems that may face facial expression recognition like illumination, pose, aging, and occlusion.

References

- [Fer-using-multiple-pipelines](#)
- [Facial expression databases](#)
- [Deep Facial Expression Recognition: A Survey](#)
- [Suppressing Uncertainties for Large-Scale Facial Expression Recognition](#)