Facial expression recognition application using CNNs

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Abstract

The facial expression recognition is a challenging task in machine learning field, and there is an active research on this topic. Being able to make a machine understand the human emotions is a fascinating goal. The purpose of this report is to exploit all the topics studied during the Vision and Cognitive Services course and others like Machine Learning and Deep Learning in order to implement a system able to predict human emotions. We will describe how we realized this system specifying all the steps performed, from the first CNN we tried to the final model we obtained. We will illustrate all the procedure we used trying to achieve better results. Our target was not very high since this is a challenging task as we said, however with our final model we arrived to a predition accuracy of ... that is better than the human accuracy. Finally using this model we reached our goals implementing a nice application.

1. Introduction

Facial expressions recognition (FER) is an interesting and a challenging problem in machine learning field. It is also a task that can be applied in many important applications. Facial expressions have an important role in every human interaction so having a machine able to recognize and understand human expressions automatically can be very useful in many existing and novel fields. [2.pdf Cap 4 Opportunities]
One of these fields is behaviomedics that are systems which exploit automatic analysis of affective and social signals to aid diagnosis, monitoring and treating medical condition that alter behavior. Facial expression recognition can be also use in data analytics field for example to understand emotions of people that are looking at ads or political debate and make statistics related to people's preferences. Another application field for Facial expression recognition is human-computer interaction, understanding human emotions would make the attitude of systems like vocal assistants or robots much closer to the way that humans interact with each other. Recognizing expressions could also be useful to improve the identification of micro facial expressions which can be used in deceit detection applications. Due to all these possible applications, facial expressions recognition is widely studied also because recognizing human expressions in natural condition environment is a very challenging task. With this project we aim to build a facial expressions classifier able to reach the human accuracy on this task, that with the dataset used is 65.5% [3]. The main idea was focusing mostly on study different types of model in order to understand a good way to achieve valid outcomes. For this reason all preprocessing techniques that can be applied to the input data for improving classification results were not be consider. Dataset Results

2. Related Work

3. Dataset

4. Method

5. Experiments

6. Conclusion

References