Age Classification based on images

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Abstract

Age classification has been a difficult problem to solve, both because it is naturally a difficult problem(it's hard to determine the age of someone just by looking at them) and variations in the image(lighting, pose, expression). In this paper we will discuss different approaches and AI models for this problem, as well as our results. We will compare our results with the results of other already existent approaches.

1 Introduction

With the rise of AI in the technological industry, various types of AI based recognitions and classification have emerged with various needs. One of these algorithms are age classification based on visual images or speech patterns. We will try to solve this problem using visual images, since they are more abundant in knowledge in comparison with the speech aproach one. This problem is however, a difficult one to solve due to the complexity of a human face, which can have various factors that are determined by your age, such as: smootheness, amount of wrinkles, bone re-structuring, maturity of tissue, gravity, and so on(according to [1]).

Age estimation and classification is a tehnique of labelling a human age based on appearance only. The age can be either actual age, appearance age and perceived age. Actual age is the number of years accumulated since birth. The apperance age is the assumption of an age that can should be similar to the actual age, however it cannot always be exact due to the stochastic nature of aging among individuals. Aging is uncontrollable, natural and personalized for each individual. The aging process can be determined by various factors, both internal(genes) and external(life style, working enviroment, health..).

2 Related Work

This topic isn't very sought to achieve in the AI community, thus being very few works for this topic. Usually age recognition is paired with gender/emotion recognition which tend to get more attention from the results, thus overlooking the inaccurate age result.

Based on [2] the previous computation work has been has been carried out in two distinct paradigms. In the first paradigm researchers first extract features such as the eyes, nose, etc., then they relate these features geometrically, and finally they use the geometric relationships to aid in analysis and recognition. The current research has adopted this paradigm of locating features and analyzing them for age classification. The second paradigm treats the complete face image as an input vector and bases analysis and recognition on algebraic transformations of the input space.

3 Overview of the Approach

In this paper we will try a simple supervised learning algorithm based on CNNs, in which we will attempt to achieve better or similar results to the current exis-

tent algorithms. This approach belongs to the second paradigm described earlier, we take the whole image and attempt to train a model to recognise the facial patterns of a certain age type. This however requires a lot of data and will require a lot of training before we can get the needed results.

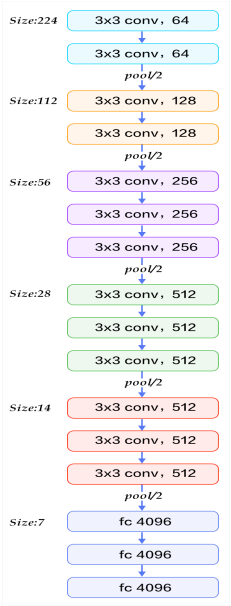

Figure 1: Used Arhitecture

We will start off by using VGG-16 and VGG-19 to see and compare the results on a crawled dataset from the internet. It contains various images of people and their age. The first results are presented in the table 1. The results are not good enough for this, however there will be a need to make the dataset bigger and attempt to give it more time to train.

Another approach is to extend the existent pre-trained models, with a few more layers in order to give them more depth that fits for our problem here.

Since most approaches use the first paradigm, that is to determine key features of the face, we will also try to use that type of approach and compare it with this one.

Model	Accuracy	Mean Error
VGG-16	54%	10 years
VGG-19	44%	14 years

Table 1: First Results

References

[1] R. Angulu, J. R. Tapamo, and A. O. Adewumi, "Age estimation via face images: a survey," *EURASIP Journal on Image and Video Processing*, vol. 2018, p. 42, Jun 2018.

[2] Y. H. Kwon and N. da Vitoria Lobo, "Age classification from facial images," *Computer Vision and Image Understanding*, vol. 74, no. 1, pp. 1–21, 1999.