Detecting the effects of emotions and higher dimensional facial vectorization on facial recognition in a smart mirror system

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Abstract—

As new technologies are introduced; their full potential might not be apparent at first. As facial recognition is used more and more in several different devices and services, one good idea might as well separate one product from the rest. As it has been demonstrated in a previous paper, introducing facial recognition into a smart mirror is not only feasible, it can also be practical. There are DIY solutions that provide the functionality mentioned above, the present concept strives to offer something more.

The aim of this paper was to investigate the possibility of detecting the effect of facial emotions via the same 128-dimensional facial recognition system and compared it one that utilizes 512-dimensional vectors to represent the human face.

The project utilized a face recognition pipeline used Euclidian distances to classify the users. These users were artificially created, with neutral, angry and happy emotions were applied to their faces. All together more than 30000 distances were measured, these were the basis for this paper. General linear model was used to analyze these distances.

The results showed that the solution with 512-dimensional vectors revealed significantly higher distances between different users. Within the same users, the emotional content was able to increase distances, and this effect was more prominent with 512-dimensional vectors compared to 128-dimensional ones.

In conclusion, our result indicate that the 512-dimensional solution had higher sensitivity and the effect of emotional content on facial detection must be considered in later studies.

Keywords— emotion, Euclidean distance, face recognition, neural network, smart mirror