Facial Analysis for the Prediction of Beauty Preferences

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Abstract. Beauty is a factor which is really difficult to measure or evaluate objectively, since every person can have their own preferences. However, it is common for beauty patterns to tend to be similar in communities, mainly because of different cultural factors. The present study proposes the creation of a prediction system capable of determining the level of beauty from face images in different communities.

Keywords: Visual analysis · Prediction · Multi-agent systems

1 Problem Statement and Hypothesis

The different facial features of the human race and the differences among personal likes, make possible the evaluation of that preferences to predict [26,28] how the world communities thinks about the beauty on a picture. By this way, the present work pretends to gather whether or not the personal preferences are similar in a European range population against other ethnic origins like Asians can be.

To do that, the initial approach is based on a gender division as probably there will be differences in the preferences. Furthermore, the main beauty aspects to evaluate on faces can be summarized in five sections depending on the face features: eyes, nose, mouth, ears and chin.

There are many methods for extracting facial patterns. Most of them requires starting from suitable conditions of the image to be processed in order to achieve the best result. The image must be clean, without glasses, or other complements that prevent the correct processing Of the image, as well as, adequate luminosity indexes. Some of these features can be achieved after a preprocessing step.

Then, the first step in the analysis of facial expressions is the detection of the face within the image. Once found, different filters are often applied to reduce the computational load. Subsequently, a series of algorithms are applied to process the easy traits, such as fisherfaces, eigenfaces or Local Binary Pattern (LBP). Finally, the system has to make a decision depending on the gender that has been detected.

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2 Proposal

A multi-agent system [1,3,8,17,32] based on PANGEA [6,18,30] has been designed. Its functionality is divided between the roles that every agent implements and then grouped into three layers. One of them composed of a sub-layer, depending on the affinity of the roles they play [15,31]. Its structure is shown Fig. 2.

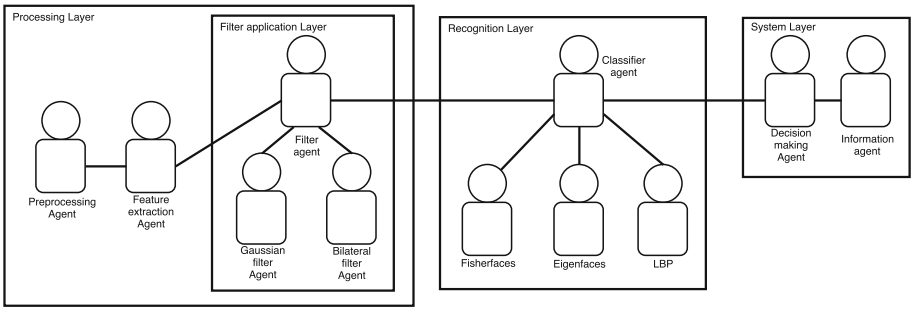

Fig. 1. Example of the system process.

- Preprocessing agent [29]: from the input image, the system obtains the face and detects its position and inclination [21].
- Feature extraction agent: after that, the following features are extracted: eyes, nose, mouth, ears and chin, each of them is processed separately.
- Filter agent: it decides the filters two apply, deciding between Gaussian agent [20] y el Bilateral agent.
- Classifier agent: it decides the classifier to use [12,14], then Fisherfaces agent, Eigenfaces agent or the LBP agent is used for the classification.
- Decision making agent: it compares the results provided by the classifier with the previous results of the database to make a decision.
- Database agent: initially, the database has been created by using the FERET [23] faces database which has been processed and classified manually by humans from different communities.

In the processing layer, the system research about the arrangement and shape of the face parts. An example is shown below in which the sysmte made 9 images following to the image map (Fig. 1).

In the system, the hairstyle matching for each face using the field of visual perception. Recently, the face that outlines of face and parts are curved and to be childish is said to be cute and easy to be likable. We call this “cute face”. The system considers that impression intensity of cute face is higher and complexity

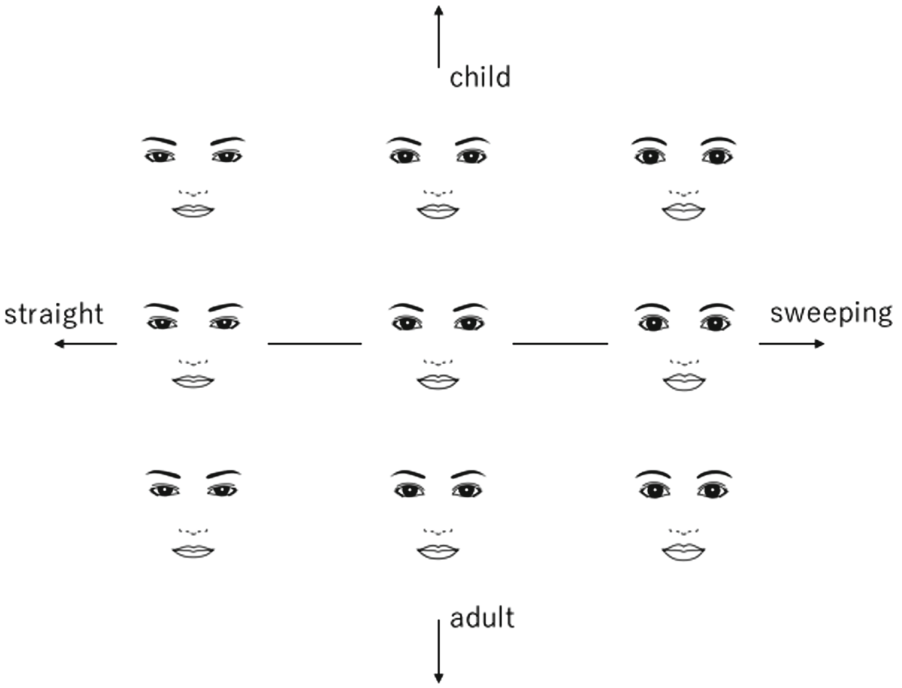

Fig. 2. Image map.

is lower than other faces, and calculates impression intensity and complexity for each face using the field of visual perception. Moreover, the system is capable of analyze what impact the faces will receive and what kind of hairstyle it is good to follow the cute face by adding some hairstyle.

In the image, at right side, outlines of the face parts are curved. As it is to the upper side, the arrangement of the face parts seems to be a child. Therefore, cute face is at upper right.

3 Conclusions and Future Work

The work is currently at a stage where the manually available face data set has been classified. From the presented scheme, the prediction must be evaluated [4, 10]. It is based on the application of the different proposed filters and algorithms for the classification, so that both the Filter agent and the Classifier agent can determine precisely which filter to apply. To this end, we will study the use of artificial intelligence systems, such as artificial neural networks (ANN) [5,25] or case-based reasoning (CBR) systems [4,7,9,27] in distributed environments [34].

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