The age estimation algorithm ~~realises~~realizes hierarchica~~ca~~l approach (fig. 10). First~~ of all~~, the input fragments are divided into~~for~~ three age groups: less~~smaller~~ than 18 years old,~~ from~~ 18–~~ – ~~45 years old, and more~~bigger~~ than 45 years old. Second,~~Afterwards~~ the results of this~~ in the first ~~step~~age~~ are ~~more ~~subdivided into seven smaller~~newer~~ groups,~~ with~~ each limited~~ing~~ to one single decade. Thus, the problem of multiclass classification is ~~therefore ~~reduced to a set of binary “~~"~~one-against-all”~~"~~ classifiers (~~;~~BCs). The~~se~~ classifier~~s calculate:~~ then ranks the~~of~~ images~~each~~ based on~~of~~ the ~~a~~associated~~nalyzed~~ class, and~~.~~ t~~T~~he final~~total~~ decisions are~~is~~ obtained~~ then~~ by~~ the~~ analyz~~s~~ing~~s~~ these~~ previously received~~ rank histograms~~ of ranks~~.

These BCs are constructed using a two-level approach. After ~~ion is applied ~~first~~with the~~ transitioning to an adaptive feature space, as~~ equal to this~~ described earlier, the images are~~,~~ classified using~~and~~ support vector machines~~s classification~~ with RBF kernels.

The i~~I~~nput fragments are~~were~~ preprocessed for their luminance characteristics to align and to transform~~ them ~~ to a uniform~~al~~ scale. This p~~P~~reprocessing step includes color-space transformation and scaling, both operations similar to those used in the~~that of~~ a gender recognition algorithm. Features~~,~~ are calculated for each colo~~u~~r component and~~, are~~ combined to form a uniform feature~~ed~~ vector.

Training and testing require a sufficiently~~huge~~ large~~enough~~ color~~ing~~ image database.~~:~~ We combined~~used~~ the state-of-the-art~~ image databases~~ MORPH and FG-NET image databases with our own image database, ~~gathered ~~obtained from ~~many ~~different sources and~~, which~~ comprising~~ed of~~ 10,500 face images. The f~~F~~aces i~~o~~n the images were detected automatically by the AdaBoost face detection algorithms.

Comment [A1]: “First of all” is not incorrect, but it is unnecessarily verbose. In addition, simply using “First” makes the presentation more uniform if you go on to discuss “second” or “third” points, for example.

Comment [A2]: Here, “histogram of ranks” is not wrong, but feels awkward and unnatural. Often, we can take a phrase such as “A of B” and turn it around like this to give just “B A,” eliminating the “of.” (Note that now, “rank” is singular.)

Comment [A3]: In everyday usage, it may seem natural to talk about a vector of features as a featured vector, but the standard term in the field is “feature vector.”

A total~~ number~~ of ~~seven thousand~~7000 images were used to train and test the first stage of the~~for~~ age classification algorithm~~ training and testing on the first stage~~. Three~~3~~ ~~binary classifier~~BCs were created~~made~~ utilizing 144 adaptive features~~ each of~~.

The first-stage c~~C~~lassification results showed~~on the first stage are:~~ 82~~-~~% accuracy for young faces~~age~~, 58~~-~~% accuracy for middle-~~-~~aged faces, and 92~~-~~% accuracy for elderly faces~~senior age~~. The overall a~~A~~ge classification accuracy for~~rate in~~ the~~a~~ three age categories was~~division problem –~~ 77.3~~-~~%.

The second-stage BC~~Binary classifier~~s~~ of the second stage~~ were constructed in the same way as for~~equal to~~ the first stage (~~-~~described above). Fig. 11 shows a~~A~~ visual example of age estimation by the first stage of the proposed algorithm~~ on its first stage is presented in figs. 11~~.