

# Age estimation using mixed feature vectors

Anurag Singh

M.Tech Student, New Horizon Engineering College, Bangalore, India

\*\*\*

**Abstract** – Age estimation analysis refers to the capability of a system to automatically detect age of a person by using just facial images. This is a topic that is being given a lot of thought and focus. We propose detection and estimation of age by first obtaining the fiducial points on the face of the person. Next, we use an ensemble of models to obtain mixed feature vectors. First, we use BSIF and LBPH and along with this use pixel differentiation to obtain age estimation results with good accuracy.

**Key Words:** Age estimation, BSIF, LBPH

## 1. INTRODUCTION

Age estimation from human face pictures is a to a great degree troublesome issue to comprehend and with applications in legal sciences, biometrics, security and so forth it should be comprehended.

The most normally utilized measure of how proficient age estimation has been done is the mean total blunder (MAE). A current report performed with habitually utilized databases, demonstrate that people have a MAE of 7.27years when they evaluated the age of a man more than 15, contingent upon the database conditions.

People age in an unexpected way. Various elements are in charge of them and some basic ones are stretch, absence of rest, distinctive nourishment propensities, climate presentation and so forth.

Sexual orientation ought to likewise be thought about; this is on the grounds that females age uniquely in contrast to guys. Likewise off late restorative surgeries are averting us to have the capacity to effectively figure somebody's age.

Additionally post-surgery marks, tattoos and so forth assume a stupendous part in undermining the rightness of the made expectations.

Age estimation is a critical for a couple of more reasons specifically, age necessities should be met for specific conditions, for instance a candy machine denying liquor to an under matured individual, biometric frameworks that need a scope of age for its application and so on.

Consequently if a gauge of the age of a man is effectively comprehended it ends up noticeably simpler for such certifiable applications to be ready to work relevantly.

Different conditions that outcome in unfriendly expectations incorporate non-frontal facial postures, light conditions and so forth. Specifically, outward appearances may adversely influence the precision of mechanized frameworks: When a man grins, for case, wrinkles are framed, these can delude when just the appearance prompts are considered.

The most essential factors that are utilized in age order are by and large appearance-based, most quite, the wrinkles framed on the face because of miss happenings in skin tissue.

These variables will play an vital part in having the capacity to assess some individual's age.

Age estimation is a critical for a couple of more reasons specifically, age necessities should be met for specific conditions, for instance a candy machine denying liquor to an under matured individual, biometric frameworks that need a scope of age for its application and so on.

## 2. RELATED WORK

An important part of our approach is to obtain fiducial points of the face. One such approach can be seen in [1] where they successfully managed to obtain more fiducial points than the previous algorithms.

[2] Used the approach from [1] along with LS-SVM regression and Ad a boost to obtain age estimation for facial images.

The factors that influence a system's decision in terms of prediction were illustrated in [3]. Some of these factors include:

- Lighting
- Wrinkles
- Skin color
- Scars on face
- Use of glasses

Another application of age estimation was shown in [4] where a person's age was verified using pixel-pixel subtraction to obtain a classification model for age ranges using k-means clustering.

Another application of age estimation was shown in [4] where a person's age was verified using pixel-pixel subtraction to obtain a classification model for age ranges using k-means clustering.

An automated age estimation algorithm was developed in [5] by using machine learning methods. It was one of the first automatic age estimation methods.

The decision on what classifier to use was tested by [6] by testing each classifier for the same task of age estimation. All classifiers were used to approach the same problem and it was seen that the use of the classifier is a significant part of the algorithm.

In [7] the authors observed that it was possible to extract similar features from ages of the same type. Using this as the backbone of the algorithm, the authors developed a very efficient algorithm for age estimation.

In [8] the authors tested a system's performance against humans by making humans estimate on the same dataset as the system and it was seen that the system could predict ages at a much higher accuracy than the accuracy at which the humans could.

Another method to detect fiducial points was expressed in [9]. This used a combination of machine learning algorithms to aid in this context.

In [10] the authors proposed an innovative algorithm for facial age estimation using bio-inspired features. This algorithm moved away from traditional feature extraction algorithms and proved to be a very successful algorithm based on results.

### 3. PROPOSED APPROACH

The initial phase in the proposed strategy is the identification of the face from the picture. There are various strategies to play out this.

In this we utilize Eigen Face strategy on the AAM picture. Eigen confront strategy is a standout amongst the most usually utilized strategies in confront ID.

Eigen confront strategy is likewise called Principle Component Analysis (PCA). Eigen highlights, for example, eigen mouth, eigen nose, what's more, eigen eyes are utilized to repay the negative impacts of changing facial articulations and appearance.

In this paper, first PCA is utilized to separate the facial parts out. To this the BSIF is utilized. The BSIF restores a factual relationship that we at that point utilize to acquire LBP esteems.

Eigen confront strategy is likewise called Principle Component Analysis (PCA). Eigen highlights, for example, eigen mouth, eigen nose, what's more, eigen eyes are utilized to repay the negative impacts of changing facial articulations and appearance.

In this paper, first PCA is utilized to separate the facial parts out. To this the BSIF is utilized. The BSIF restores a factual relationship that we at that point utilize to acquire LBP esteems.

The LBP administrator recognizes microstructures, for example, spots, edges and level ranges. It is extraordinary compared to other performing surface descriptors and it likewise utilized as a part of surface characterization, division, confront discovery, confront acknowledgment, sex arrangement, and age estimation applications.

The first LBP administrator works in a 33 neighborhood, every pixel would then be able to be named by making utilization of the inside incentive as a limit and considering the outcome as a parallel number.

LBPQR is utilized for pixel neighborhoods and it alludes to Q inspecting focuses on a hover of span R.

Motivated by LBP and Nearby Stage Quantization (LPQ), another nearby descriptor called BSIF (binarized Statistical Picture highlights).

LBPQR is utilized for pixel neighborhoods and it alludes to Q inspecting focuses on a hover of span R.

Motivated by LBP and Nearby Stage Quantization (LPQ), another nearby descriptor called BSIF (binarized Statistical Picture highlights).

The premise vectors of the subspace into which the neighborhood picture patches are directly anticipated are acquired from pictures by making utilization of the ICA. The directions of every pixel are threshold and in that way a parallel code is processed.

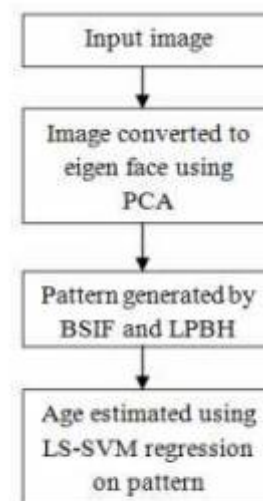


Fig. 1. Workflow of the algorithm

#### 4. RESULTS

There are 2 essential criteria to judge how great an age estimation calculation is, in particular MAE and CS. MAE remains for Mean accuracy error.

It is an amount which measures how near to the first esteem, the anticipated esteem is. The cumulative Score (CS) can be seen as a marker of exactness of the age estimators.

Since the satisfactory mistake level is probably not going to be high the aggregate scores at bring down blunder levels are more essential.

We compare the results against some standard algorithms. Following are the results.

Algorithm	MAE	CS
WAS	8.13	N/A
AGES	6.91	72
AAM	4.23	91
SVM+SVR	4.28	73
NCA+SVR	8.95	42
CA_SVR	5.88	59
BSIF+LS-SVM	4.86	77
Proposed	6.84	71

Table 1-Accuracy Comparison

#### CONCLUSION

We have seen a number of algorithms proposed for the task of face age estimation. We can see that the proposed algorithm provides results close to state of the art.

#### REFERENCES

[1] Gowda, S.N., 2016, November. Fiducial Points Detection of a Face Using RBF-SVM and Adaboost Classification. In Asian Conference on Computer Vision (pp. 590-598). Springer, Cham.

[2] Gowda, S.N., 2016, December. Age Estimation by LS-SVM Regression on Facial Images. In International Symposium on Visual Computing (pp. 370-379). Springer International Publishing.

[3] Albert, A.M., Ricanek, K. and Patterson, E., 2007. A review of the literature on the aging adult skull and face: Implications for forensic science research and applications. *Forensic Science International*, 172(1), pp.1-9.

[4] Gowda, S.N., 2017, July. Human activity recognition using combinatorial Deep Belief Networks. In Computer

Vision and Pattern Recognition Workshops (CVPRW), 2017 IEEE Conference on (pp. 1589-1594). IEEE.

[5] Geng, X., Zhou, Z.H. and Smith-Miles, K., 2007. Automatic age estimation based on facial aging patterns. *IEEE Transactions on pattern analysis and machine intelligence*, 29(12), pp.2234-2240.

[6] Lanitis, A., Draganova, C. and Christodoulou, C., 2004. Comparing different classifiers for automatic age estimation. *IEEE Transactions on Systems, Man, and Cybernetics, Part B (Cybernetics)*, 34(1), pp.621-628.

[7] Geng, X., Yin, C. and Zhou, Z.H., 2013. Facial age estimation by learning from label distributions. *IEEE Transactions on Pattern Analysis and Machine Intelligence*, 35(10), pp.2401-2412.

[8] Han, H., Otto, C. and Jain, A.K., 2013, June. Age estimation from face images: Human vs. machine performance. In *Biometrics (ICB), 2013 International Conference on* (pp. 1-8). IEEE.

[9] Du, S., Tao, Y. and Martinez, A.M., 2014. Compound facial expressions of emotion. *Proceedings of the National Academy of Sciences*, 111(15), pp.E1454-E1462.