**UNIVERSITY OF CALICUT**

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**DEPARTMENT OF COMPUTER SCIENCE MSc. COMPUTER SCIENCE**

**LITERATURE REVIEW**

**Topic:*Age and Gender Detection***

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**LITERATURE REVIEW**

Because of its wide range of applications in a variety of facial investigations, automatic age and gender prediction from face photos has recently gained a lot of attention. Early age estimation techniques rely on computing ratios between various face feature data. After localising and measuring the sizes and distances of facial features (such as the eyes, nose, mouth, chin, etc.), ratios between them are calculated and used to categorise the face into various age groups in accordance with hand-crafted rules. A drawback of those methods is that they require input images to be near-frontal and well-aligned. These methods therefore present experimental results only on constrained data-sets of near-frontal images.

Since research on this topic began at the beginning of the 1990s, the importance of gender recognition and its classification has been widely acknowledged in the fields of research and development. Initially Golomb et al. [1] used multi-layer neural network to generate a solution to the problem of gender classification. The facial image was manually aligned for the experimental purpose. Around 900 unit images were squeezed into 40 images on which the classification was performed. An error rate of 8.1% was reported.

En-Sheng conducted another experiment on the same problem using an unaligned face image, which uses only single face from which various poses were cropped and were combined into a set. The image set were converted into subspaces and correlation coefficient was used to generate the similarity between two subspaces. They used discriminate analysis of Canonical Correlation (DCC) for finding most accurate gender. FERET and MORPH face database were used for the experiment

Shobeirinejad and Gao [3] proposed Interlaced Derivative Pattern (IDP) to extract facial features. IDP produces feature vector by extracting distinct facial features. The IDP image is a four-channel derivative image representing four directions that are 0°, 45°, 90°, and 135°. Thus this method contains more important information about gender face recognition.

LU et al. [4] detected different facial regions to accomplish the task of gender classification. Support Vector Machine (SVM) [5] classifier was used on face images. They used CAS-PEAL database consisting of grey scale images of size 480 × 360. Grey scale image were transformed to a normalized whole face image and a normalized internal face image. Experiments were carried out on seven facial regions of varying resolution. They proposed a method based on significance of different facial regions. This methods based on fusion of multiple facial regions was able to compensate for facial expressions and lead to better overall performance.

Han X. et al. [6] used 3D face GavabDB contains 427 three dimensional facial surface images. They used 61 frontal face images with geometric meshes (45 males, 16 females) are used. In this case non-linear support vector machines (SVMs) were used to perform gender classification. The SVM was applied to triangular meshes representing human faces. They extracted 3-d facial features from corresponding geometry meshes. The evaluated experimental error rate was around 17.44%.

Wang Yiding et al. [7] used Feature extraction and classification using Scale Invariant feature Transform (SIFT) and FSVM. The proposed methodology produced accurate and stable result by reducing the Scale Invariant Feature Transform (SIFT) descriptor dimensions. The results were observed to be more accurate and robust on performing illumination change.

Similarly Ravi and Wilson [8] proposed a methodology which converted the RGB image into the YCbCrcolour space in order to identify the skin regions in a facial image. However to detect the facial features, the RGB images was converted to grey scale images. Then facedetection along with the identification of facial features were combined with gender classification in order to generate accurate results. Support Vector machine classifier was used to generate the solution to the classification problem.

Thus it can be concluded that Gender Detection and its Classification is a three step process where each step has its own significance and expediency

In conclusion, We initiated the classification of gender (his or her image) and age group unfiltered real-world facial images. We pass a task as a multiclass classification of the problem, trained the model or a system according to prediction, and trained the model for the accomplishment of our result. our approach achieves the best result not only for gender but also on age estimation. We trained our network model to classify facial images into eight age groups and enhance the performance or increase the accuracy of the model. Our aim for proposed a model that is originally trained on age and gender prediction on a large data scale. The image pre-processing algorithm handles some of the variability observed in the real-world faces. And this confirms the model relevancy for gender classification and age estimation. For future works, we will consider a Convolutional Neural Network (CNN) architecture for pre-processing an image and age prediction. Also, age prediction or estimating the age of a human’s face will be interesting to explore in the future.