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Recommendation System for Hairstyle Based on Face Recognition Using AI and Machine Learning

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ABSTRACT

Many machine learning algorithms have been introduced to solve different types of problems. Recently, many of these algorithms have been applied to deep architecture models and showed very impressive performances. In general, deep architecture models suffer from the over-fitting problem when there is a small number of training data. In this article the attempt is made to remedy this problem in deep architecture with regularization techniques including overlap pooling and flipped image augmentation and dropout; the authors also compared a deep structure model (convolutional neural network (CNN)) with shallow structure models (support vector machine and artificial neural network with one hidden layer) on a small dataset. It was statistically confirmed that the shallow models achieved better performance than the deep model that did not use a regularization technique. Faces represent complex multidimensional meaningful visual stimuli and developing a computational model for face recognition is difficult. The authors present a hybrid neural-network solution which compares favorably with other methods.

KEYWORDS

Deep Architecture, Overlap Pooling, Flipped Image

1. INTRODUCTION

The hairstyle is one of the most important aspects of people in determining their appearance and mood. People look completely different by changing their hairstyles. Hairstyle can make human appearance attractive or unattractive. If someone chooses an inappropriate hairstyle, then it gives a bad look and loses confidence. A hairstyle means styling hair on the human scalp. Hair gives various fashionable styles to a human's body. The increase of fashion's most people think of hair as their main important thing a beauty expert says that a proper hairstyle for someone depended on their face shapes. It is better to know our face shape and features well before doing hairstyles. Similar face shapes have similar hairstyles. Therefore, it is better to have a hairstyles recommendation system to know about hair styles before doing hairstyles. The major objective of the work is a proposed method to recommend hairstyles based on major face shapes with a combination of hair expert's knowledge. One of significance in the proposed methodology mainly concerns image processing techniques to

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detect face shape rather than using other AI techniques. The proposed classification algorithm is to classify the face shapes into five shapes oval, oblong, square, round and heart.

Hairs are the most important aspect of the human body. It reflects the personality of every individual. Most of the people neglect their hairs and concentrate on their body and physics. But if you have proper hairstyle, it doesn't matter. Everyone think that any hairstyle is fine as long as it does not make them look bad. But they do not realize that they are missing opportunity to enhance their beauty. There are many reasons that tells us why hairstyle completes your entire look.

2. LITERATURE STUDY

According to Y. Zhang, and E.C. Prakash (2008), face shape is also important information for glasses design companies. In this paper, we proposed a non-contact method to classify the face shape by using Support Vector Machine (SVM) technique. This algorithm consists of three steps: head segmentation, face plane identification, and face shape classification. First, as whole 3D body data is captured and used as input of system, Eigenvector is used to define frontal side. Chin-Neck junction, Ellipsoid Fitting Technique and Mahalanobis distance are combined as a head segmentation algorithm to segment the 3D head. Second, face shape can be observed when projected on a plane. Major axes of ellipsoid are used to define a plane along the head called the face plane. Face shape on the face plane is classified into four classes in third step.Face shape is classified into four groups: ellipse, long, round, and square face shape.

Accuracy rate is 73.68%. Significant points for classification are located in 91 positions around the face.

Some research proposed face shape classification for different application. Y. Xu et al. (2010) proposed a method to measure and classify Shanghai female face shape based on 3D image feature. Young female for 201 cases were divided into eight kinds of the face shapes by cluster analysis using SPSS software. Face features used for classification are facies temporal width, bizygomatic breadth, mandibular breadth, maxilla-chin breadth, and physiognomic facial length Eight types of face shape are heart shape, roundshape, ellipse shape, long shape, pear shape, square shape, diamond shape, and melon seeds shape. This paper aims to prove that all indexes is reasonable for classification of human faces. L. Li and et al. proposed a method to classify face shape for person's expression recognition. Existing research proposed detection syndrome from face image. K. Wilamowska et al. (2009) proposed a method to classify between individuals with 22Q11.2 syndrome and general opulation based on face data. This method uses 3D face data, and finds the difference of facial features between two groups of data based on hapebased morphology. 3D snapshot, 2.5D depth image, and curved line of face are used for detection. Classification is performed by using feature vectors combining with the Principle Components Analysis. The accuracy rate ranged from 74% to 76%.

All the earlier work mentioned was trustworthy & verified by Biomedical Signal Processing Laboratory, National Electronics and Computer Technology Center, Thailand. The project is performed under the financial support from National Electronics and Computer Technology Center.

Wisuwat Sunhem et al. (2016) presented a hairstyle recommendation system for women based on hairstyle experts' knowledge and a face shape classification scheme. The system classified the user's face shape into five categories which were suitable for hairstyle recommendation using Support Vector Machine algorithms. The hairstyle e rules were based on beauty experts' suggestions. The system is based on the fine-grained similarity of face shape. However, human face shape changes over time. For example, getting fat due to higher work pressure can change the shape of a person's face. Therefore, our focus is to design and implement a coarse-grain similarity of face shape for hairstyle recommendation. Even their work was observed, verified and granted by National Natural Science Foundation of China

Based on existing research of Y. Zhang, and E.C. Prakash (2008) the face shape classification is applied for many applications. All of research proposed the method based on the assumption that

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