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AI-Personalized Elegance: Optimizing Your Appearance with Smart Hairstyle Recommendations

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Abstract:

Many machine learning algorithms have been introduced to solve different types of problems. Recently, many of these algorithms havebeen 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 deeparchitecture with regularization techniques including overlap pooling and flipped image augmentation and dropout; the authors alsocompared a deep structure model (convolutional neural network (CNN)) with shallow structure models (support vector machine andartificial 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 meaningfulvisual 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.

Keyword

Hair style recommendation; Face recognition; Machine learning; Software Development

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 givesvarious 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 featureswell before doing hairstyles. Similar face shapes have similar hairstyles. Therefore, it is better to have a hairstyles recommendationsystem 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 detect face shape rather than using other AI techniques. The proposedclassification 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.

Literature Survey

A novel framework for a face shape classifier-based hairstyle recommender system , aiming to assist individuals, especially women, in selecting suitable hairstyles based on their face shape. Identifying the correct face shape is considered a crucial initial step in hairstyling. The system enables hands-free hairstyle recommendations from a single face image, potentially impacting the beauty industry significantly. The paper emphasizes the importance of consulting with beauty experts when changing hairstyles, as thereis no universally perfect hairstyle. It categorizes facial shapes into five groups: round, oval, oblong, square, and heart, each with arange of suitable hairstyles. The primary objective is to develop an effective face shape classifier, drawing inspiration from similarclassification approaches but tailored to this specific purpose. The method relies on geometric features derived from landmark locations on the face, obtained using techniques like Active Appearance Models (AAM) and object detection. The research indicates that Support Vector Machine (SVM) with a Radial Basis Function (RBF) kernel yielded the most competitive results in classifying facial shapes according to expert criteria. The challenges of developing an effective hairstyle recommendation system grounded in facial attributes. A central issue highlighted is the scarcity of appropriate largescale datasets essential for training sucha system. To overcome this hurdle, they introduce CelebHair, a substantial dataset originating from CelebA, featuring an impressive collection of over 200,000 facial images meticulously [2] paired with corresponding hairstyles and an array of facial attributes encompassing factors like face shape, nose length, and pupillary distance. While CelebA offers valuable attributes like gender, age, and attractiveness, it falls short in terms of facial landmarks and comprehensive hairstyle-related features, presenting certain limitations. Conversely, the Beauty e-Expert dataset, though rich in beautyrelated attributes, is constrained by its limited volume, absence of male representation, and oversimplified hairstyle labels.

On a different note, the Hairstyle30k dataset is primarily focused on hairstyles but lacks the inclusion of comprehensive facial attributes beyond hairstyle information, potentially rendering it inadequate for the holistic task of providing personalized hairstylerecommendations based on facial features. These dataset considerations underscore the critical role they play in advancing researchwithin the domain of personalized hairstyle recommendations. In recent years, the rapid advancement of convolutional neural networks (CNN) and generative adversarial networks (GAN) has spurred the widespread application of artificial intelligence (AI)and deep learning in various domains, including beauty-related fields, as explored [3] in this study. Particularly, image recognition and separation have gained significance in automation and smart city development. Moreover, the COVID-19 pandemic has led todiversified ways in which individuals express their personalities, often through makeup, accessories, and hairstyling. Hairstyling, in particular, has become a pivotal avenue for individuals to convey their unique selves and is a prominent facet of contemporary self-expression.

Methodology

The methodology for the proposed system encompasses data collection of diverse hairstyles and user images, employing Python with the Flask framework for backend development and utilizing LDA for facial attribute extraction. MLP models are trained to recognize facial shapes and correlate them with suitable hairstyles. Front-end development using HTML, CSS, and JavaScript creates an interactive user interface for image uploads and real-time input. The system generates personalized hairstyle recommendations based on facial attributes and prioritizes cost-efficiency and accessibility for low-powered systems. Rigorous testing and validation precede deployment, ensuring StyleSage provides a non-invasive, data-driven, and user-friendly solution, revolutionizing the hairstyling experience. The modules used in the proposed system are:

A. Image Upload Module The "Image upload" module in the proposed system serves as the initial user input step. Clicking the "Try Now" button on the front page directs users to the image input page, offering two options: "Image Upload" and "Capture Photo." In the first option, users can upload an image by clicking the "Upload" button, which opens a file dialog for selection. The chosen image is then retrieved for processing. Alternatively, users can opt to "Capture Photo" by clicking the respective button, launching the device's camera interface for real-time image capture. This interface provides options to capture the photo or return tothe image upload page. These streamlined choices facilitate user input for subsequent analysis.

B. User Preferences Module The "User Preferences" module enhances user engagement and satisfaction with the recommendationsystem by allowing them to personalize their hairstyle recommendations. Once the user's facial shape is predicted, this informationis seamlessly carried forward. The predicted facial shape is displayed to the user for confirmation. Users can then customize their preferences by specifying their desired hair length and, if opting for longer hair, indicating their interest in updo hairstyles. These preferences significantly influence the types of hairstyles recommended. After inputting their choices and clicking the "Predict" button, the system processes the data, incorporating the user's preferences and predicted facial shape to generate tailored hairstyle recommendations. The results are rapidly displayed, presented in an intuitive and visually appealing manner, enabling users to visualize how the recommended hairstyles would appear on them. This module empowers users to actively participate in refining their personalized recommendations.

C. Face Detection and Shape Prediction Module The "Face Detection and Shape Prediction" module operates silently in the background, harmonizing inputs from various sources to enhance accuracy and relevance. It leverages the user's uploaded facial image, the previously predicted face shape, and personalized preferences from the "User Preferences" module to ensure a cohesiveand tailored experience.

D. Hairstyle Recommendation Module The output from the "Face Detection and Shape Prediction" module, consisting of the accurately predicted facial shape harmonized with the user's personal preferences, seamlessly feeds into the **"Hairstyle Recommendation" module.** This output plays a pivotal role as a crucial input, guiding the system in tailoring hairstyle recommendations that perfectly align with the user's individual facial features, style preferences, and chosen hair length.

This module is the heart of StyleSage, as it uses this comprehensive input to generate personalized and visually appealing hairstylerecommendations, ultimately enhancing the user's confidence and satisfaction with their hairstyle choices

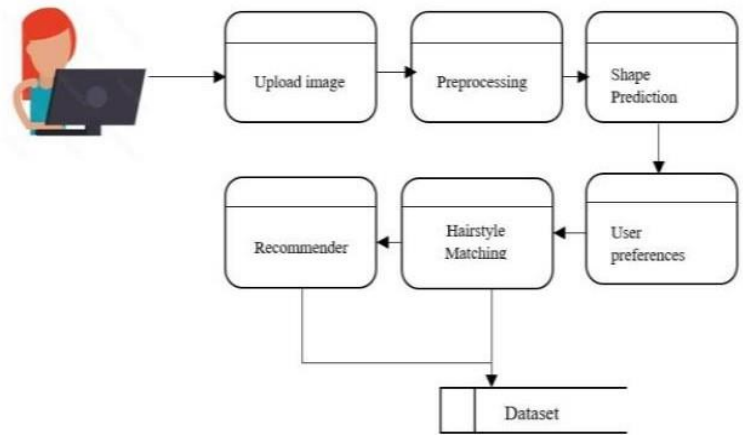
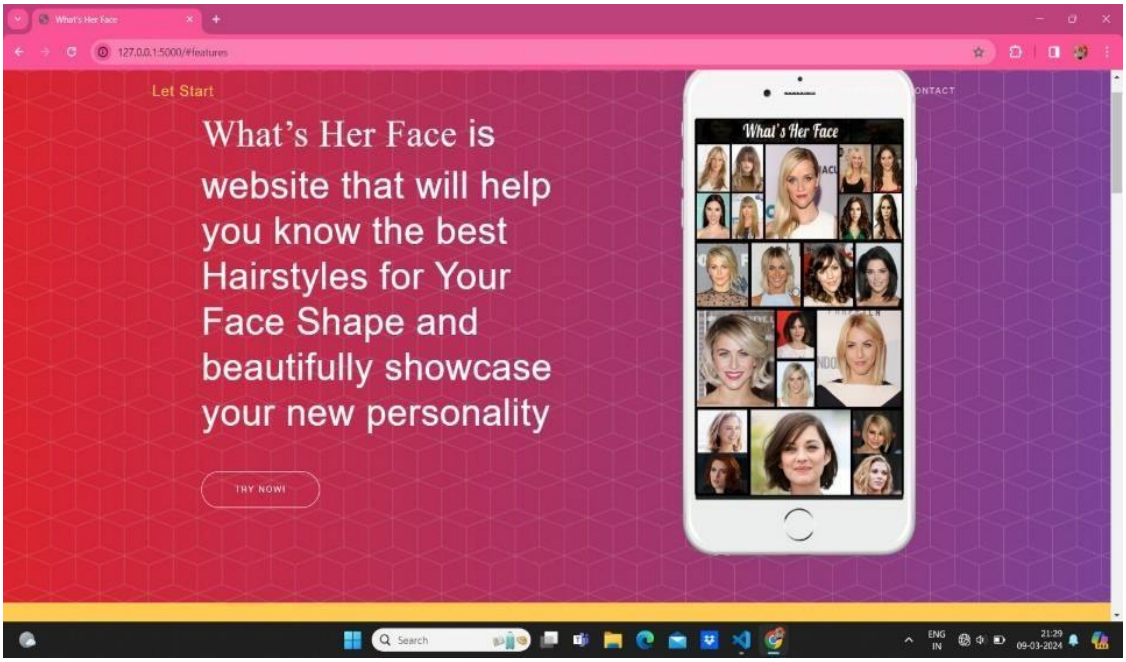


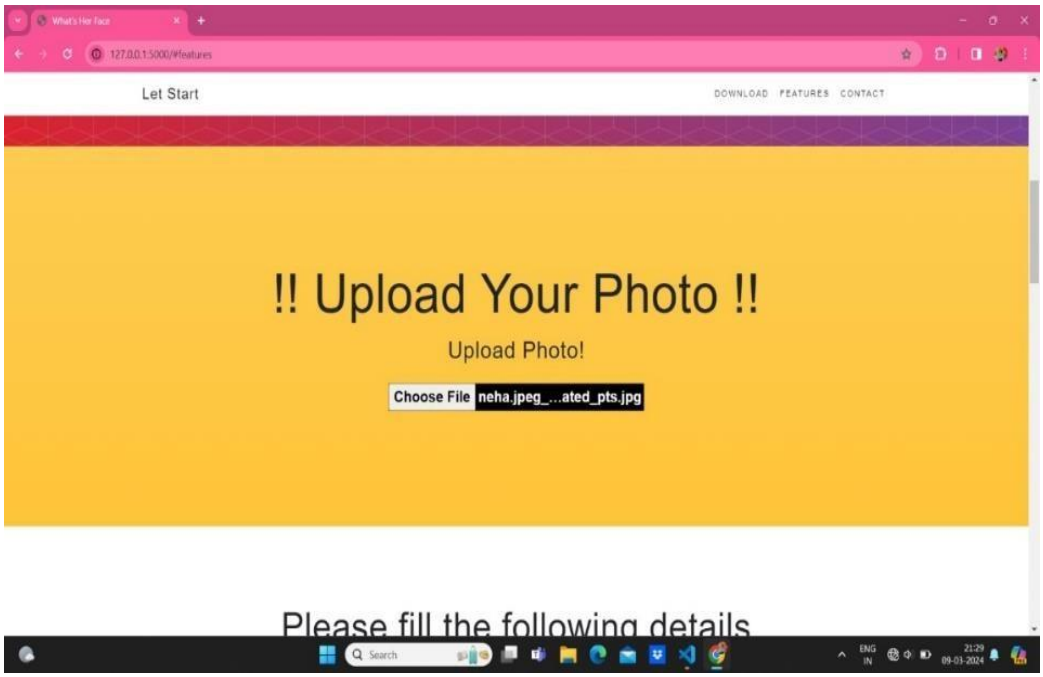
Fig 1 Overview of the Proposed System

RESULTS

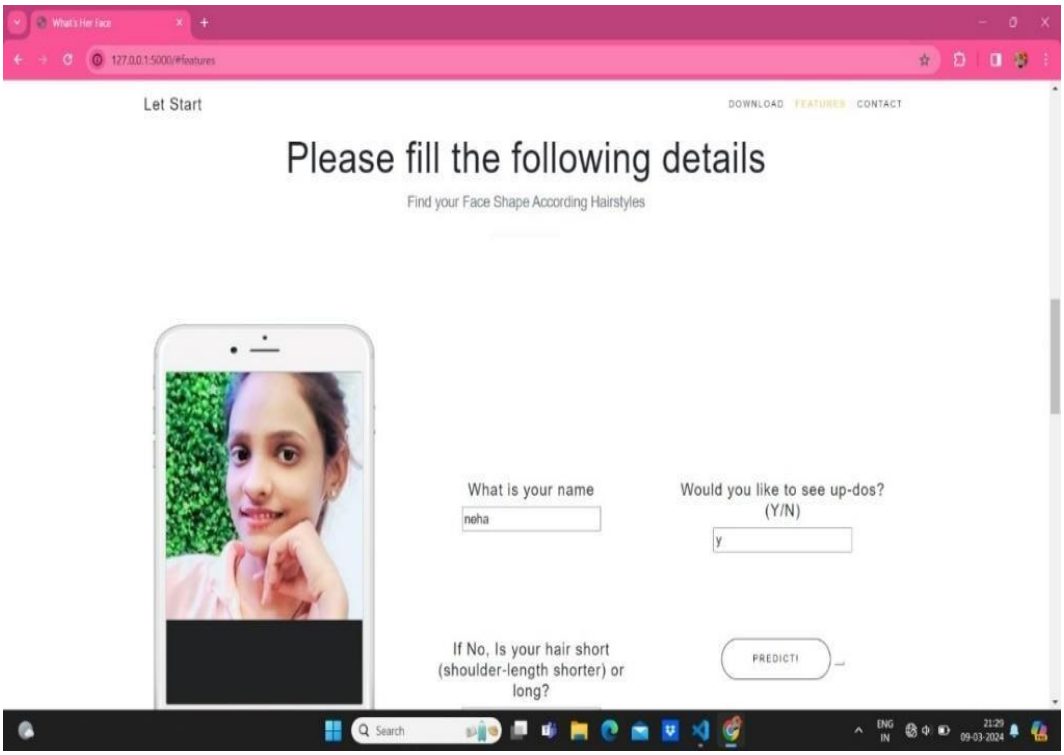
Step-1:- The main window



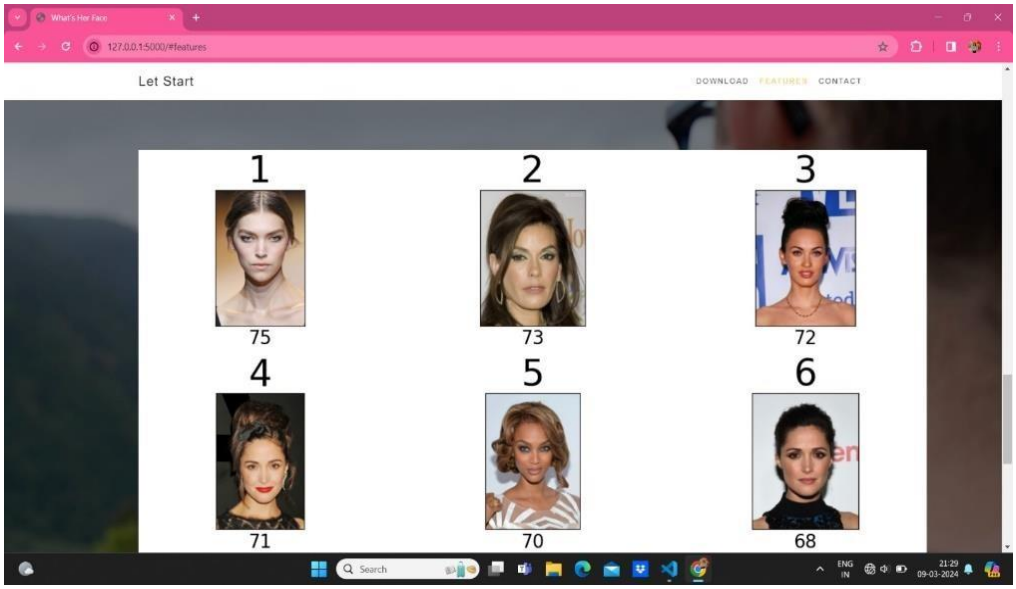
Step 2:- Click on the choose file, Then choose the file and upload file.



Step 3:- After uploading the file fill the detail.



Step 4:- Clicking the button, Then Display the Label of identified output for " **Hairstyle Recommendations**".



Conclusion

In this paper, we have introduced a new large-scale dataset, CelebHair, containing 100 celebrity faces with hairstyles, face shapes, and other essential hairstyle-related facial attributes for hairstyle recommendation. Compared with existing similar datasets, CelebHair has a larger volume and more varied features. Consequently, CelebHair provides sufficient support for models that require large-scale data, and should thus refine the performance of hairstyle recommendation models. Moreover, we give several possible applications to illustrate the usability of our dataset, such as building a hairstyle recommendation system with the Random Forests algorithm and visualizing the effect of hairstyle try-on[4] using face-swapping.

Future experiments are planned for further utilizing this dataset. We want to refine the hairstyle try-on experience for users by usingInterface GAN [5], which enables more natural facial semantic manipulation than simple image rotation and projection.

References

1. A hybrid approach to building face shape classifier for hairstyle recommender system, Kitsuchart Pasupa, Wisuwat Sunhem,Chu Kiong Loo
2. CelebHair: A New Large-Scale Dataset for Hairstyle Recommendation based on CelebA, Yutao Chen, Yuxuan Zhang,Zhongrui Huang, Zhenyao Luo
3. Development of Hairstyle Conversion System Based on Mask R-CNN, Seong-geun Jang, Qiaoyue Man and YoungIm Cho.
4. Shen, Y., Gu, J., Tang, X., Zhou, B.: Interpreting the latent space of gans for semantic face editing. In: Proceedings of theIEEE/CVF Conference on Computer Vision and Pattern Recognition. pp. 92439252 (2020)
5. Wang, W., Chen, Y., Kao, C.: Integrating augmented reality into female hairstyle try-on experience. In: 2011 SeventhInternational Conference on Natural Computation. vol. 4, pp. 21252127 (2011).
6. https://livrepository.liverpool.ac.uk/3155800/1/201239927_June2022.pdf
7. **.https://www.bing.com/search?pglt=41&q=AI 3.https://doi.org/10.1109/ICNC.2011.6022427**
8. (PDF) Personalisation the artificial intelligence way (researchgate.net)