IndoStyleAI

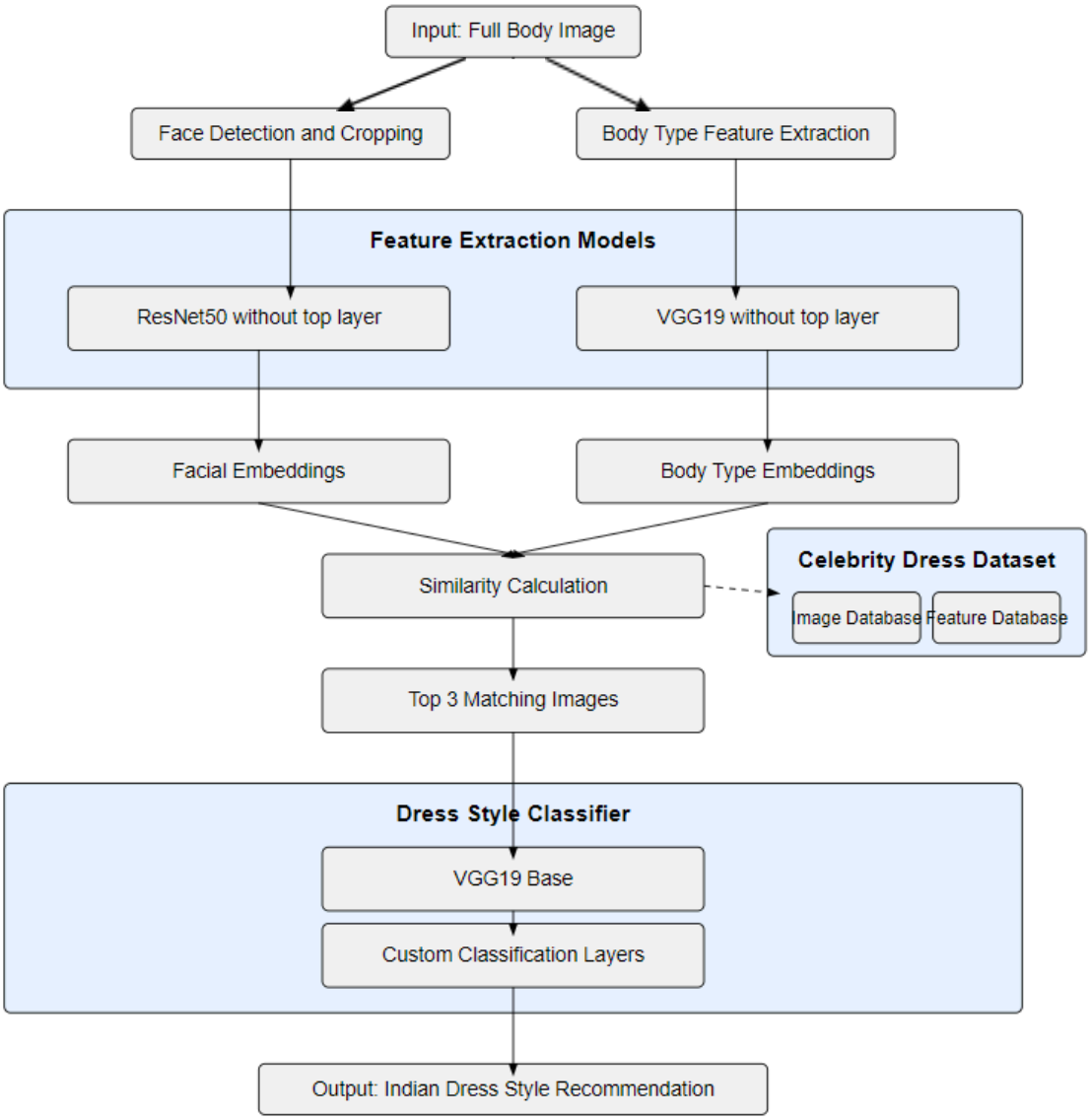
Overview:

IndoStyleAI, an AI-based system, helps Western people plan their attire for an Indian-themed costume party by recommending dressing styles based on the profiles of Indian celebrities. The system analyses facial features and body types to provide culturally appropriate and visually appealing outfit suggestions. By leveraging machine learning and facial recognition techniques, the AI matches Western people with Indian celebrity-inspired outfits that complement their unique physical characteristics.

Key Features:

- ***AI-Based System:*** IndoStyleAI utilizes artificial intelligence to assist Western individuals in selecting attire for Indian-themed costume parties.
- ***Facial and Body Feature Analysis:*** The system analyzes both facial features and body types to provide personalised outfit recommendations.
- ***Diverse Style Options:*** It offers suggestions based on eight different styles of Indian dresses, catering to various preferences.
- ***Body Type Consideration:*** The AI evaluates three distinct body types to ensure that the recommended outfits are flattering and suitable.
- ***Celebrity Inspiration:*** Recommendations are inspired by the profiles of 30 Indian celebrities, allowing users to emulate popular styles.
- ***Pretrained models for feature extraction:***
    - Uses the ResNet50 model for extracting facial features, excluding the top layers.
    - Employs the VGG19 model for body feature extraction, without top layers.
- ***Custom Dress Classification:*** The VGG19 model is enhanced with additional custom layers specifically designed for classifying dresses based on the extracted features.

System Design Diagram:



Approach:

- *Face Detection and Cropping:* The process begins by detecting and cropping the face from the full-body image.
- *Facial Feature Extraction:* The cropped face is analyzed using a ResNet50 model (without top layers) to extract facial feature embeddings.
- *Cosine Similarity Comparison:* These embeddings are compared with pre-extracted celebrity facial feature embeddings using cosine similarity to identify the top similar Indian celebrities.

- *Body Feature Extraction:* The full-body image is then processed through a VGG19 model (without top layers) to obtain body shape feature embeddings.
- *Celebrity Profile Dataset Comparison:* Both facial and body feature embeddings are compared against a dataset of Indian celebrities that includes images of their dresses and faces using cosine similarity to assess similarity scores.
- *Score Combination:* The similarity scores from facial and body features are combined, and the image with the lowest score is identified as the best match.
- *Dress Style Classification:* To determine the recommended dress style, the matched image is passed through a VGG19 model with additional custom layers specifically for dress classification.
- *Final Recommendation:* The system outputs the dress style worn by the identified celebrity, effectively mapping the user's full-body image to an Indian celebrity based on both facial and body features.

Reasoning:

- ResNet50 for Facial Feature Extraction:
    - *Residual Learning:* Utilizes skip connections to mitigate the vanishing gradient problem, allowing for deeper networks and improved training efficiency.
    - *Feature Richness:* Captures complex and nuanced facial features, essential for accurate celebrity matching.
    - *Transfer Learning:* Pretrained on large datasets (like ImageNet), enabling effective feature extraction with minimal additional training, saving time and resources.
    - *Robustness:* Performs well across diverse facial expressions and orientations, enhancing matching accuracy.

- VGG19 for Body Feature Extraction and Dress Classification:
    - *Deep Architecture:* Consists of 19 layers, which effectively extracts high-level features from body images, crucial for identifying body shapes.
    - *Customizable:* Easily modifiable with additional layers for specific tasks like dress classification, making it adaptable to project requirements.

    - *Strong Performance:* Proven track record in image classification tasks, ensuring reliable feature extraction and classification results.

Future Work:

- *Enhanced Dataset Diversity:* Expand the dataset to include a wider range of Indian celebrities, incorporating various styles and body types to improve recommendation accuracy.
- *Real-Time Processing:* Implement real-time facial and body feature extraction to allow users to receive instant outfit suggestions via a mobile application or web interface.
- *User Personalization:* Integrate user preferences and feedback mechanisms to personalize recommendations further, considering individual tastes and cultural sensibilities.
- *Virtual Outfit Application:* Develop functionality that allows users to apply the recommended dress style directly onto their input image, enabling them to visualize how the outfit would look on them.
- *Diverse Dress Variety Display:* Provide users with a wide array of dresses within the recommended style category, allowing them to explore various options and make informed choices based on their preferences.

Conclusion:

IndoStyleAI offers a unique and innovative solution for Western individuals seeking culturally appropriate attire for Indian-themed events. By leveraging advanced machine learning techniques and facial recognition, the system provides personalized outfit recommendations that enhance user experience and confidence. This not only fosters cultural appreciation but also empowers users to embrace diversity in fashion, making it easier for them to connect with Indian traditions in a visually appealing way. Ultimately, IndoStyleAI serves as a bridge between cultures, promoting inclusivity and creativity in personal style choices.