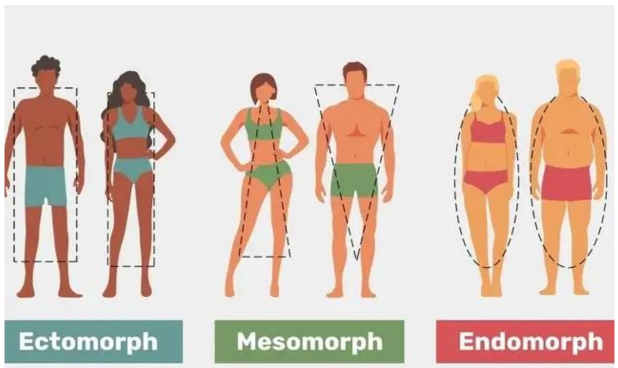

HUMAN BODY SHAPES DETECTION

Deep Learning Project Proposal

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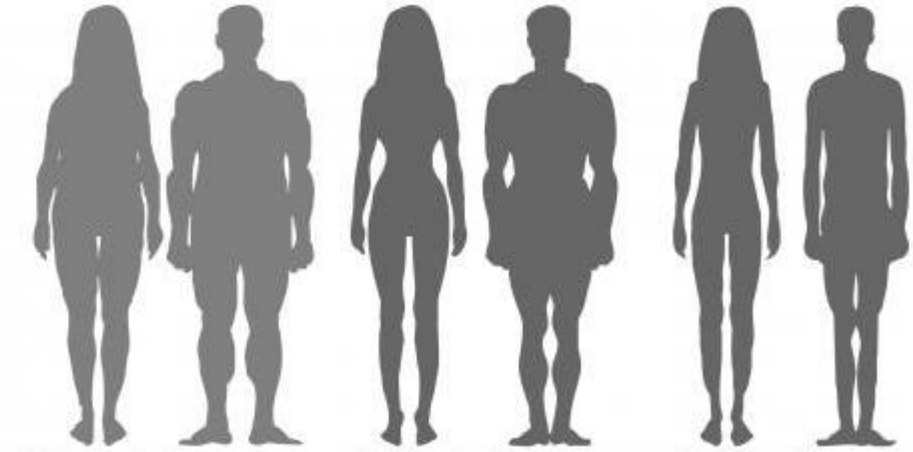
Date of submission – 20th March 2024



Introduction :

Our project aims to revolutionize body shape recognition using deep learning techniques, with a primary focus on benefiting the fashion and textile industries. By employing advanced algorithms, we seek to accurately detect and categorize various body shapes, providing invaluable insights for personalized clothing recommendations, virtual fitting rooms, and size optimization. This innovative approach has the potential to streamline garment production, enhance customer satisfaction, and catalyze advancements in the apparel and fashion industries.

Problem to be solved- Accurately recognizing body shapes for textile and fashion industry purposes.

Goal - Developing a robust deep learning model capable of accurately identifying and categorizing diverse body shapes.

Literature Review & Summaries

1. Real-Time Human Detection Using Deep Learning on Embedded Platforms: A Review

This study focuses on the application of deep learning for body shape detection, particularly emphasizing its implementation on embedded platforms like Jetson TX2 and Nano. It underscores the performance advantages of these platforms for computer vision tasks, aided by acceleration libraries that optimize deep neural network processing.

Key findings include the evaluation of various models for human detection, with SSD MobileNet V2 identified as highly accurate and efficient. Its fast computation time enables real-time applications on embedded systems. Additionally, the paper references related works in computer vision and deep learning, covering areas such as real-time object detection, accident detection in traffic surveillance, and medical image analysis.

In essence, this study provides valuable insights for researchers and practitioners interested in deploying deep learning solutions for body shape detection, particularly on embedded platforms like Jetson TX2 and Nano.

2. Indirect deep structured learning for 3D human body shape and pose prediction

The document outlines a deep learning approach for detecting body shapes in 3D human models. It introduces a method called "indirect deep structured learning," which aims to predict 3D human shape and pose without requiring labeled 3D human shape and pose data for training on real-world images. Instead, it leverages a decoder trained on artificial data.

The approach involves comparing different architecture choices for both the encoder and decoder on artificial and real datasets. The decoder architectures are evaluated based on predicted silhouette segmentation quality using metrics such as global accuracy, class average accuracy, and intersection over union. Similarly, the encoder architectures are evaluated based on the quality of fit for 91 landmark points across the body and silhouette segmentation accuracy.

Experiments on artificial and real datasets demonstrate that the proposed indirect learning approach achieves high segmentation accuracy on artificial images and relatively good fits on real images despite not being exposed to real image and corresponding shape and pose parameter pairs during training. However, it also shows slightly lower 3D model fitting quality compared to direct learning approaches that use labeled 3D human shape and pose data.

Overall, the document presents a novel method for 3D human shape detection using deep learning techniques, highlighting the potential of indirect learning approaches for structured prediction tasks.

Boundaries :

1. The project will implement augmentation techniques to diversify the dataset while maintaining the images' semantic meaning.

2. Avoid introducing unrealistic variations that could negatively impact the model's performance or introduce biases.

3. The model will be evaluated on a diverse set of real-world examples to ensure its effectiveness beyond the augmented dataset as its ability to generalize to real-world scenarios should not solely rely on augmented data.

Assumptions :

1. Data augmentation techniques will effectively increase the amount of training data available for the deep learning model and that augmented data will provide meaningful variations of the original images, enhancing the model's ability to generalize.

2. Deep learning techniques are reliable and precise when it comes to identifying and classifying different body shapes.

3. The data used to train the model is inclusive of all body shapes.

Future deployment :

Our work involves developing a deep-learning model for accurate body shape recognition. We hope to meticulously train and fine-tune the model to ensure robust performance across diverse body types.

In terms of future deployment, we envision integrating our application into platforms such as online retail websites, virtual fitting rooms, and mobile apps. we aim to collaborate with the fashion industry to implement our technology, thereby revolutionizing how consumers interact with clothing and accessories. Through strategic partnerships and continuous refinement, we aspire to make our application ultimately shape the future of fashion retail.