TA'AM "used Clothes Application"

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Introduction

The clothing industry ranks fourth in environmental impact, responsible for 10% of global carbon emissions and 20% of wastewater. To address this, extending the lifespan of clothes and choosing second-hand over new ones can significantly reduce the industry's carbon footprint and wastewater contributions.
In today's fast-paced fashion world, sustainability is more important than ever. *TA'AM* is here to revolutionize the way we think about fashion by creating a vibrant, user-friendly platform where you can buy and sell pre-loved clothes effortlessly. Our app bridges the gap between trendy and eco-friendly, offering a seamless experience for fashion enthusiasts and environmentally conscious consumers alike.

Methods

When a user uploads a product image, the system processes the image to extract attributes like "Category," "Color," and "Size" to generate a post of the product. This process is initiated based on either meeting quality assessment criteria or performing an image search, following a sequence of models designed to achieve these tasks.

1- Quality Assessment

The BRISQUE model was used to compute the image quality score, applying a 30% threshold for assessment. This no-reference image quality assessment algorithm predicts perceived quality without needing reference images. It extracts features such as contrast, brightness, and texture, and uses Support Vector Regression (SVR) to map these features to perceived quality scores. The mapping is learned from a large dataset of images that have been manually rated for quality.

2- Reference Object Detection

The process of extracting the ID card involves contour analysis, a vital technique in image processing and computer vision. Contour analysis entails enhancing the image using methods like thresholding, edge detection, and morphological operations to isolate regions of interest and reduce noise.

3- Classification and Validation

This model validates whether the image contains clothes, returning the classified category or "Other." If the result is "Other," the image is rejected. For category classification, we utilized the ResNet34 architecture on Agrigorev's custom dataset, achieving an accuracy of 88.5% after 50 epochs.

4- Key Points Detection

Thirteen pre-trained ResNet50 models were employed to extract key points for each category. The height and width of the product were determined by calculating the distances between specific key points.

5- Size Calculation Equation

The measurements obtained from centimeters were mapped to real-world clothing sizes "S, M, L, XL" using the EN 13402 Standard for clothing size designation.

6- Color Detection

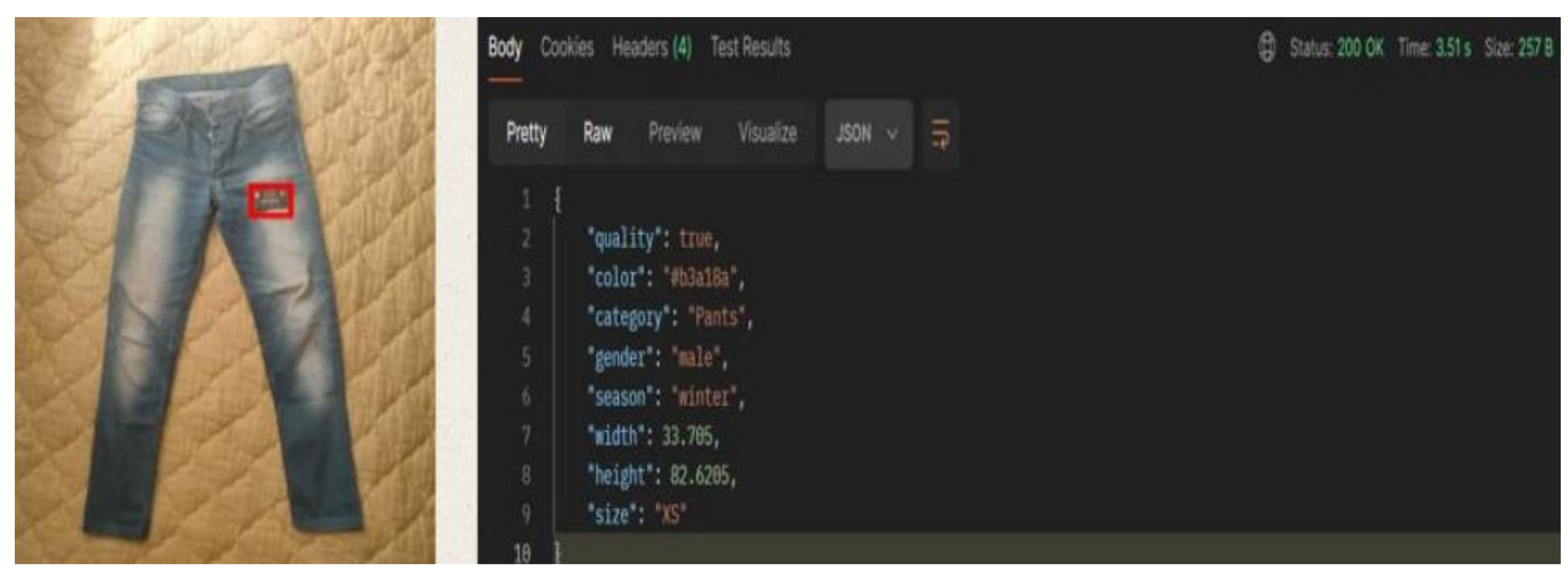
The image was cropped to remove the background using key points. K-means clustering segmented the image into regions of similar colors to create a color palette. Extracting the three most dominant colors takes about 0.1 seconds.

6- Feature Extraction

The MobileNet model extracts features from an image in 20-50ms and identifies the closest 5 products from 5000 images in 0.7-1s using cosine similarity. By reducing dimensions with AvgPooling and Dense Layers and limiting comparisons to the same category, the process is 13 times faster, now completing in about 30-50ms.

Results

After applying the models, two experiments were applied to test the results and they were promising as shown.



Conclusions

This project uses advanced models to enhance clothing image processing and search. Deep learning identifies details like category, size, and color, while BRISQUE checks image quality. Key point analysis improves size estimation and user experience. ResNet34 is trained on Agrigorev's Custom dataset for classification, and ResNet50 on DeepFashion2 for key-point estimation, enabling effective handling of diverse clothing items.

Bibliography

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