Clothing Item Recognition with Machine Learning

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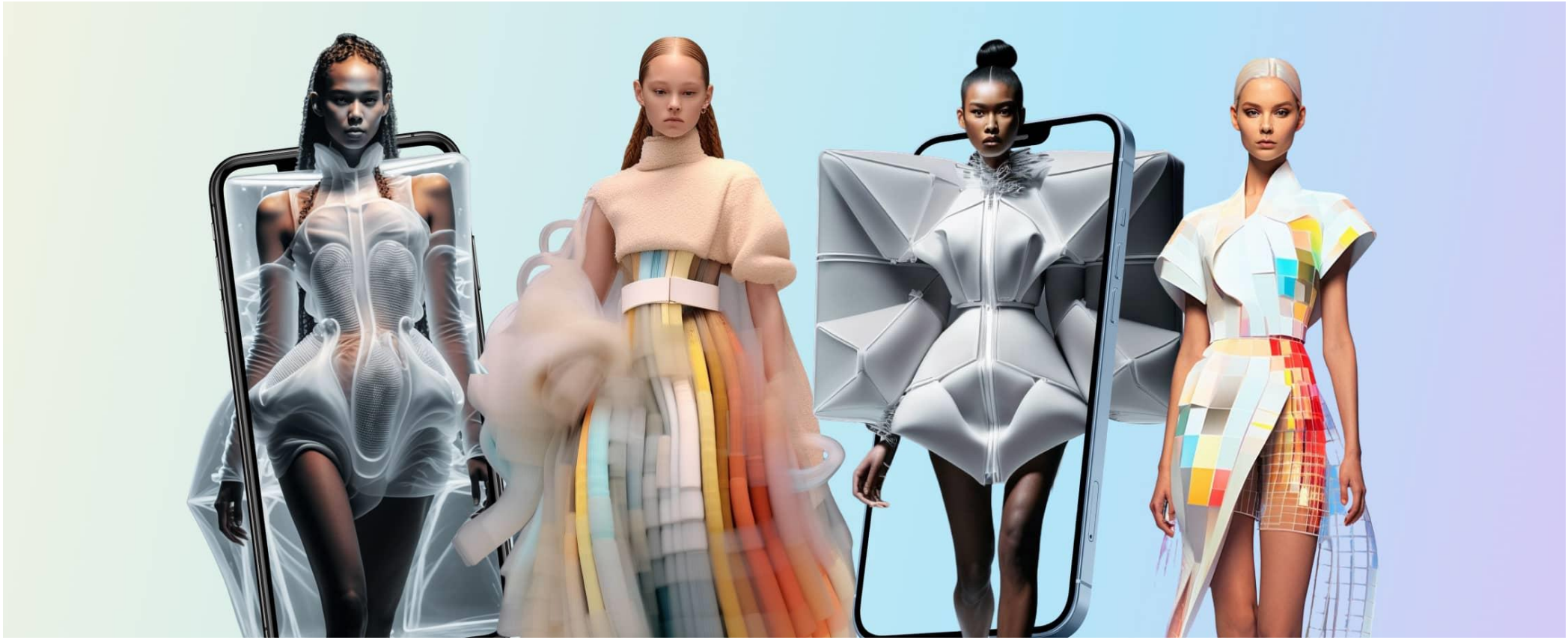
2106102001-2006102023

- Can we empower technology to accurately identify and label clothing items in images, opening doors for innovation in e-commerce, fashion, and accessibility?



Project Goal

- Develop a highly accurate machine learning model for automatic clothing item recognition. Integrate this model into diverse applications, transforming how we interact with fashion.

Potential Impact

- Enhanced online shopping experiences with personalized recommendations and visual search. Facilitated fashion design and trend forecasting through deeper image analysis. Improved accessibility for individuals with visual impairments, enabling independent clothing identification and management.

Progress Report: Delving into the Data

- Dataset Highlights: Extensive collection of fashion images, meticulously paired with corresponding segmentations and fine-grained attributes. Provides a rich foundation for both image segmentation and classification tasks.
- Related Research: Building upon previous works in image segmentation and classification using CNNs Incorporating insights from studies on fine-grained attribute recognition.

Methodology: Crafting the AI's Mind

- Data Preprocessing: Resizing and normalizing images for model compatibility. Employing data augmentation techniques to enhance model robustness and prevent overfitting. Creating a custom dataset class for seamless data loading and management.
- Model Architecture: Leveraging a convolutional neural network (CNN) based on ResNet18, a well-established architecture renowned for its performance and efficiency. Adapting the final layer to accommodate the specific classification task of clothing item recognition.
- Training Regimen: Optimizing the model using the cross-entropy loss function, a common choice for classification problems. Employing the Adam optimizer, known for its adaptive learning rate capabilities. Closely monitoring training progress to assess convergence and performance.

Experimental Evaluation: Putting the Model to the Test

- Dataset Division: Strategically splitting the dataset into training and validation sets for a comprehensive evaluation of the model's generalization capabilities.
- Image Transformation: Applying appropriate transformations to images prior to feeding them into the model, enhancing its adaptability to real world scenarios.
- Training and Validation: Meticulously training the model while continuously tracking training loss, a key indicator of the model's learning progress. Evaluating the model's performance on unseen data using validation accuracy, ensuring its ability to generalize to new images.

Preliminary Results: Glimmering with Promise

- After just 5 epochs of training, the model exhibits promising performance with a notable decrease in training loss. Validation accuracy demonstrates a strong grasp of clothing item recognition, even on previously unseen images.

Encouraging Outcomes

- After just 5 epochs of training, the model exhibits promising performance with a notable decrease in training loss. Validation accuracy demonstrates a strong grasp of clothing item recognition, even on previously unseen images.

Next Steps

- Fine-tuning the model architecture and hyperparameters for further performance optimization. Implementing data augmentation techniques to foster model resilience and adaptability to diverse image variations. Evaluating the model's performance on a completely unseen test set for a comprehensive assessment of its real-world capabilities.