

# INNOVATION ON DEMAND: DESIGNING CUSTOMIZED CLOTHING WITH GAN

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**Abstract** – It is an innovative approach that aims to enhance the fissionability of a given outfit by proposing minimal adjustments that have a maximal impact. The approach utilizes a deep image generation neural network that is trained to synthesize clothing based on learned per-garment encodings. The encodings are factorized according to shape and texture, enabling direct edits for both fit/presentation and color/patterns/material. This approach also employs a web-photo bootstrapping technique to automatically train a fissionability model and an activation maximization-style approach to transform the input image into a more fashionable version. The proposed edits range from swapping in a new garment to tweaking color, fit, and the way an outfit is worn. These adjustments can include rolling up sleeves, making pants baggier, or adding accessories. The model suggests these edits by using automated metrics and human opinion to determine their success. Experiments demonstrate that Fashion++ successfully provides edits that are deemed fashionable by both automated metrics and human opinion. This approach presents an intriguing new vision challenge and an effective method for enhancing the fissionability of an outfit through minimal adjustments. With its ability to suggest minimal yet impactful changes, Fashion++ has the potential to revolutionize the way people approach fashion and styling. The project aims to generate high quality designs without having knowledge of technical and artistic skills in drawing. In recent years, GAN technology has been used in the fashion domain. We focus on a new problem of using artificial intelligence to generate new images. Basically, the dataset having more than 9000 cloth images of various designs is used. The main objective of the project is: 1) To generate unique and new designs. 2) To provide variety and effective fashion styles. The user can be introduced to a variety of choices of styles and design within a less amount of time. The manual efforts can be reduced. The merging of different style looks can generate a unique style. To make the system more effective, GAN technology and its modified versions can be used. It will not only give us the variety of results but also in an automated way within a required amount of time. The user interface will make the interaction feasible and attractive. The main idea behind the project is to merge two input images of two different kinds and generate their results by varying some parameters of them. The color contrast, sleeve varieties, style fusions, seasonal - traditional- occasional fashions from bottom to top can be achieved.

**Keywords:** fissionability, Design, Styles, Unique generation.

## 1. INTRODUCTION

Clothing is a vital aspect of human civilization, and the fashion industry is increasingly turning to artificial intelligence (AI) technology to aid in the design and production process. However, the creative process of fashion design can be challenging due to designers' tendency to stick to a particular mental frame and high emotional involvement in their first ideas, limiting their capacity for innovation. Additionally, the fashion industry's increasing diversity of consumer wants, fierce global competition, and the need for quick fashion make this problem even more difficult. Therefore, recent advancements in deep generative models have opened up new avenues for automated production and editing of design concepts, which can help designers overcome these cognitive challenges. The Generative Adversarial Network (GAN) is a generative model that can produce high-quality artwork or designs by studying the probability distribution of a large dataset of images, without requiring drawing expertise. The objective of this project is to create and combine photos of apparel to produce new designs. The user can determine the structure or fashion of the garment while mixing images and adjust its properties, such as adding a jacket, dress, or coat, or altering its color to create a unique, fashionable outfit. By leveraging the power of GANs, this project aims to aid in the fashion design process and provide designers with a new tool to generate innovative and trendy clothing designs.

## 2. Motivation

An AI clothing design generator has the potential to revolutionize the fashion industry by enabling designers to create unique and customizable designs more efficiently and cost-effectively. It provides a platform for designers to explore a wider range of creative options and styles, while also allowing customers to personalize their clothing choices. Additionally, the implementation of AI technology in fashion can help reduce the environmental impact of clothing production by optimizing fabric usage and minimizing waste.

### 3. Methodology

Block Diagram:



**1. DataSet Acquisition :** I used the clothing dataset lookbook created by Donggeub Yoo in the paper. The dataset has 84,748 images comprising 9,732 upper clothing images with clean backgrounds that are associated with the rest of 75,016 fashion model images.

**2. Training the model:** Using StyleGAN model to train the neural network to generate high resolution images based on training set of images

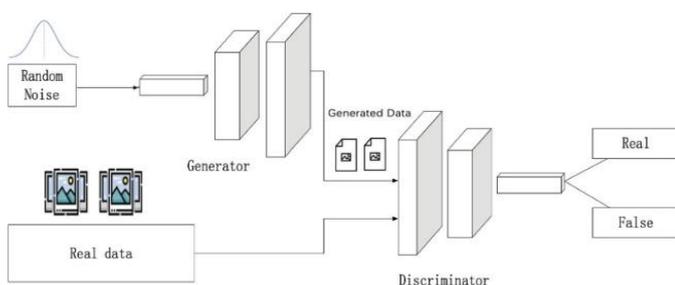
**3. Semantic Editing :** A latent spaced based semantic editing method to provide semantic editing capabilities. By adjusting the input vector across the latent space of GAN models, latent-space manipulation discreetly alters the images.

**4. Building UI:** The python library “Gradio” is used to demonstrate the machine learning models with a friendly interface

**5. Deployment:** The Hugging Face Deployment Services is a platform for ML app deployment and also it integrates the Gradio and streams it efficiently.

### 4. Design in Details

**Algorithm:**



- A powerful class of neural networks called generative adversarial networks (GANs) is used in unsupervised learning.

-Ian J. developed and unveiled it. Goodfellow in 2014.

-GANs fundamentally consist of a system of two neural network models that are in competition with one another and can analyze, capture, and copy variations within a dataset.

### 5 .Results



**Editing Options:**

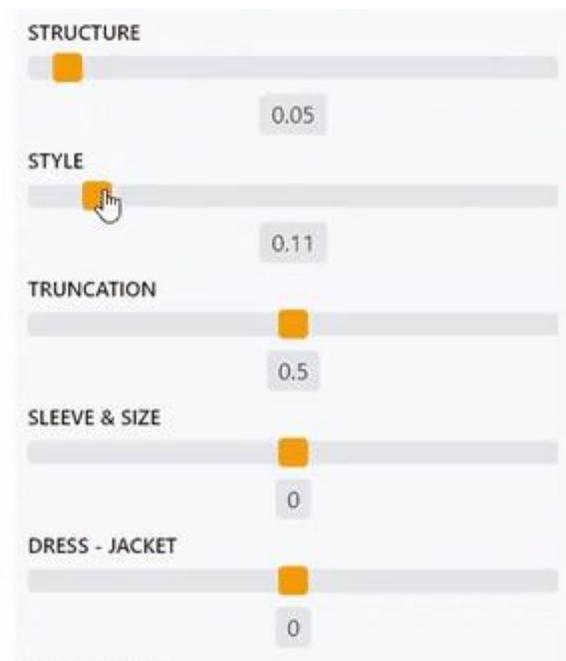


Fig -1: Figure

Charts

## 6. CONCLUSIONS

Based on generative adversarial networks (GANs) from the deep learning paradigm, this model will take the clothes bought by users as input and generate unique and new designs of clothes. The main idea behind the project is to merge two input images of two different kinds and generate their results by varying some parameters of them. The color contrast, sleeve varieties, style fusions, seasonal - traditional-occasional fashions from bottom to top can be achieved. Here, we have used the clothing dataset created by Donggeun Yoo in the PixelDTGAN paper. In future, Some features that can be added are appearance transfer, image inversion (uploading & editing real image), generating the fashion model itself etc. Also, using three stages of generator-discriminator pairs we can improve performance.

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## REFERENCES

1. Q. Wu, B. Zhu, B. Yong, Y. Wei, X. Jiang, R. Zhou and Q. Zhou (2021), "ClothGAN: generation of fashionable Dunhuang clothes using generative adversarial networks", *Connection Science*, 33:2, 341-358, DOI: 10.1080/09540091.2020.1822780
2. M. Singh, U. Bajpai, S. Prasath, "Generation of fashionable clothes using generative adversarial networks: A preliminary feasibility study", April 2020, *International Journal of Clothing Science and Technology*
3. Y. Lang, Y. He, J. Dong, FYang, H. Xue(2020), "DESIGN-GAN: CROSS-CATEGORY FASHION TRANSLATION DRIVEN BY LANDMARK ATTENTION", ICASSP 2020 - 2020 IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP).doi:10.1109/icassp40776.2020.9053
4. Q. Ping, B. Wu, W. Ding, J. Yuan, "Fashion-AttGAN: Attribute-Aware Fashion Editing with Multi-Objective GAN", *IEEE/CVF Conference on Computer Vision and Pattern Recognition Workshops*
5. K. Sohn, C. E. Sung, G. Koo & O. Kwon(2021), "Artificial intelligence in the fashion industry", *Research Features magazine*
6. M. Moosae, Y. Lin, A. Akhazhanov, H. Chen, F. Wang, H. Yang, "Outfit GAN: Learning Compatible Items for Generative Fashion Outfits", *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR) Workshops, 2022*, pp. 2273-2277