TRY2BUY

Solution for Dataset 1: Adidas and Nike Products

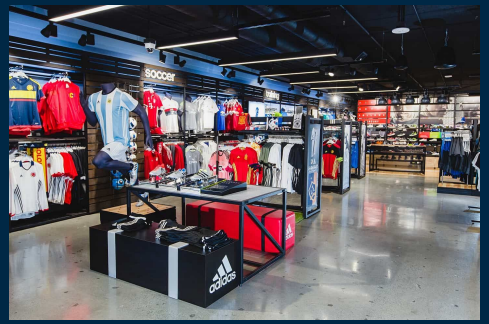
Team: Let Them Pick - Code: 69

01 Introduction

- Challenge: accurately **visualizing products** and **ensuring customer satisfaction**.
- Solved by **virtual try-on solutions**, which offer users an immersive and realistic preview of how clothing items look on them before making a purchase.
- Our **Minimum Viable Product (MVP)** addresses the growing demand for a tailored and engaging online shopping experience, focusing on **two major sportswear brands — Nike and Adidas**.
- Platform used: **web-based**, where users can select among products, and virtually try on selected product.
- This **enhances users' confidence** in online purchases and minimizing the uncertainty associated with size, fit, and style, revolutionizing the way users interact with and choose sportswear from these iconic brands.

02 Problem Statement

- Address lies in the **inherent limitations** of **online apparel shopping**, particularly in the **sportswear** sector represented by Nike and Adidas.
- **Pain points or inefficiencies:**



- **Trying on clothes in physical stores: time-consuming, inconvenient**, and **sometimes unhygienic**. It requires the user to travel to the store, wait in line, and try on multiple clothes to find the right fit and style.
- **Frustrating online shopping experience** for customers who cannot try on the clothes before purchasing them. Customers often grapple with **uncertainty** regarding sizing, fit, and overall aesthetic, leading to an **increase in return rates** and **operational costs** for both consumers and retailers.

02 Problem Statement

- Present online retail landscape **lacks a comprehensive solution specifically tailored to Nike and Adidas sportswear**, and while there are generic virtual try-on platforms available, their lack of specialization results in suboptimal user experiences. Competitors in the virtual try-on space offer broader solutions but lack the specificity needed to address the unique challenges associated with Nike and Adidas sportswear.
- **The MVP seeks to fill this void, providing a targeted and immersive virtual try-on experience** that not only addresses current inefficiencies but also distinguishes itself from competitors by catering specifically to the distinct needs of sportswear enthusiasts.

03 Solution Overview – Task Analysis

The task involves a process known as image-to-image translation, which is a type of image synthesis in computer vision and graphics and can be achieved using deep learning techniques, specifically Generative Adversarial Networks (GANs).

Our solution - Virtual Fitting Room - involves 3 processes as follow:

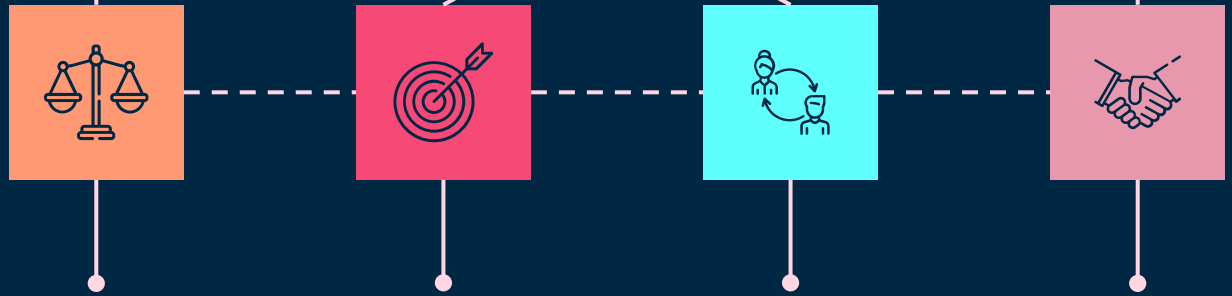
1. **Data Preparation:** Collect a dataset of images of clothes and people wearing different types of clothes from Adidas and Nike.
2. **Clothes Segmentation:** Use U-2-NET model to identify and extract the clothes from the image that contains the target clothing, in the form of a binary mask. This step is skipped if the image only shows the clothes.
3. **Clothes Transfer:** Feed the image of person X (who will try on clothes) and the binary mask Y of the clothes into the trained generator network (C-VTON). The generator should output an image of person X wearing the clothes Y (Or the given image of the clothes, instead of the clothes on person y).

03 Solution Overview – Task Analysis

The user will communicate with this virtual fitting room via a website that is built by Flask. Users will upload images of themselves to the website and pick clothes they want to try on. The website will then return a new image with the user wearing the new clothes.

03 Solution Overview

How this solution is innovative



Convenient way for people to try on clothes

No need to travel to physical stores

24/7 availability

Helps customers make more informed decisions about size and fit, decreases return rates and associated costs for both consumers and retailers.

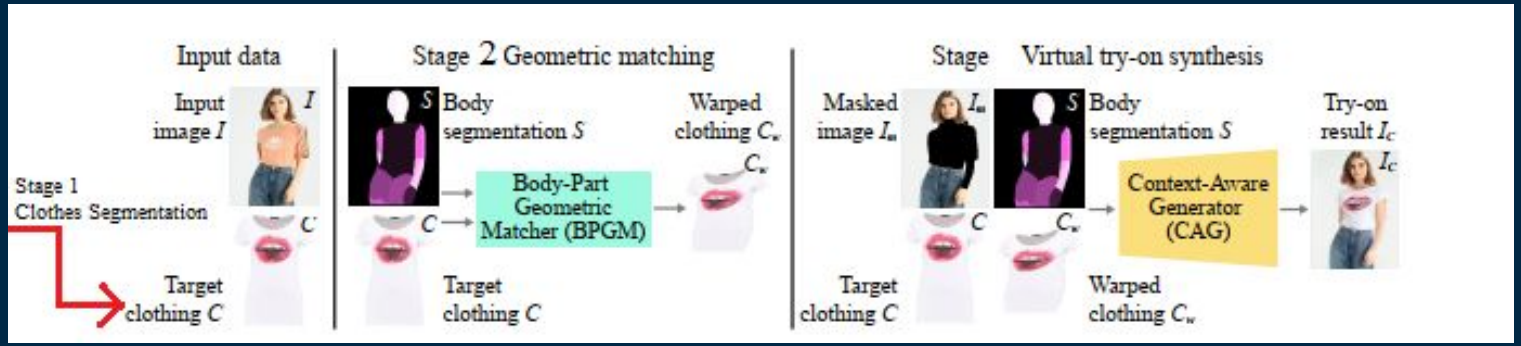
04 Methodologies – Overview

Supposing we have:

- **Input X**: image of person we want to fit the clothes on.
- **Target Y**: either image of only the targeted clothes, or image if model that is wearing the targeted clothes.

We want to retrieve the clothes from **Y** and apply that on input **X** to create a simulation of the targeted clothes on input **X**.

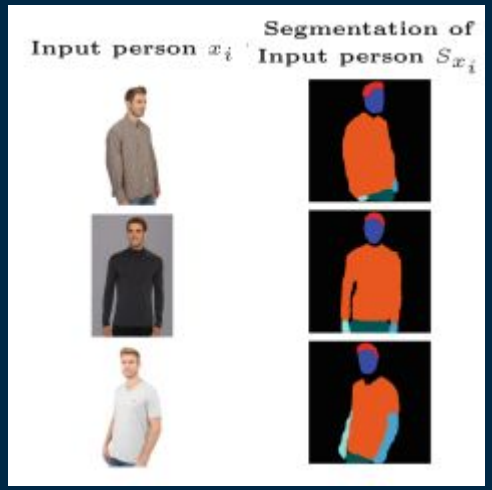
04 Methodologies – Architecture



INPUT DATA:

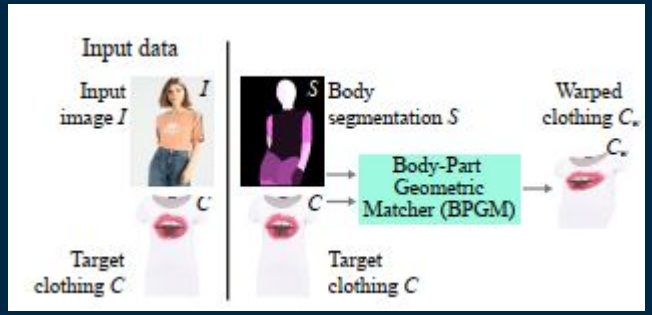
- **Input Image I:** The full image body of the user
- **Target clothing C:** Which can happen in 2 cases:
  - The target clothing is an image of the clothes.
  - The target clothing is worn by a human model.

04 Methodologies – Architecture – Stage 1 (Clothes Segmentation)



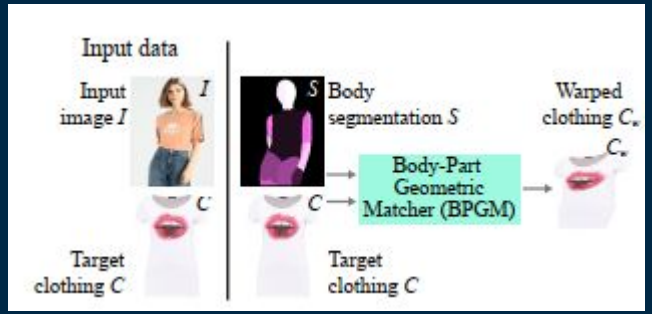
- **Optional** stage
- Solves the case of **target clothing C** being an **image of clothes worn by a human model.**
- The segmentation model identifies and **extracts clothes** from the given image, producing a binary mask.
- Segmentation of clothes is achieved by using the **U-2-NET model**.

04 Methodologies – Architecture – Stage 2 (Geometric Matching)



- A simplified geometric matching module named **body-part geometric matcher (BPGM)** is used.
- It **warps the target clothing item** so that it matches the geometry of the person's body in the input image.
- This involves **adjusting the shape and orientation** of the clothing item to look like it's being worn by the person.
- This module can solve the problem of **challenging poses and arm configurations**.

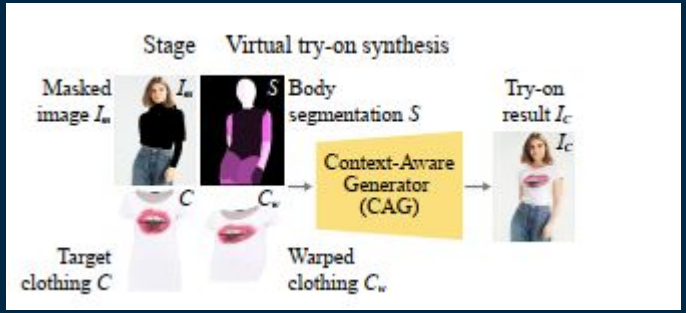
04 Methodologies – Architecture – Stage 2 (Geometric Matching)



STEPS:

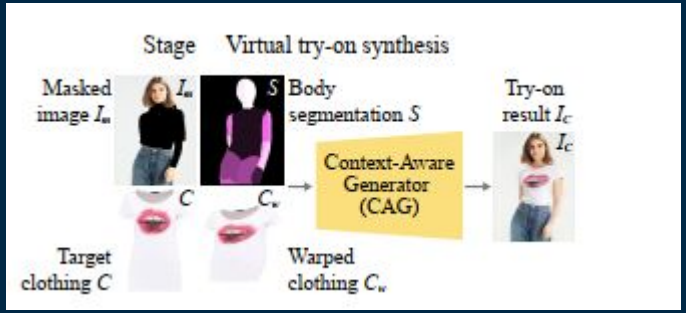
- **DensePose** model is applied to generate the body segmentations **S** from input image **I**.
- The target clothing **C**, along with **S**, is fed into 2 distinct encoders to generate 2 corresponding feature representations.
- These feature representations go through a few preprocessing before being organized to compute a correlation matrix.
- The correlation matrix is used to define a 2n^2-vector that represents the **warped clothing Cw**.

04 Methodologies – Architecture – Stage 3 (Visual Try-on Synthesis)



- Involves a **context-aware generator (CAG)**.
- Takes the warped clothing item from Stage 2 and integrates it with the original person image to create a final image.

04 Methodologies – Architecture – Stage 3 (Visual Try-on Synthesis)



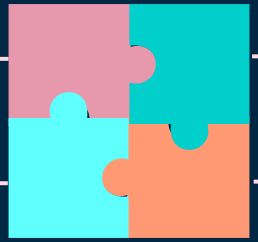
STEPS:

- Define **Image Context (IC**) as a channel-wise concatenation of S, C, Cw and masked input image Im.
- **Context-Aware Normalization (CAN)**: a normalization layer used in the CAG module. It adjusts the features of the images based on the local context and the group information. This helps to preserve the details and textures of the clothes and the body parts.
- **CAG** consists of **a sequence of ResNet blocks** augmented with **CANs** added before every convolutional layer. These CAN layers efficiently utilize the IC and feed the generator with critical contextual information.

05 Core Functionality

Simple and intuitive interface

Gallery of possible clothes to try on



Letting users upload images

Virtual fitting room (main function)

06 Performance Metrics

		
Frechet Inception Distance	**Speed**	**User satisfaction**
A **lower** FID indicates that the generated samples are more similar to the real data.	How fast the virtual try-on system can process the input and output images.	How happy the users are with the virtual try-on system and its features.

07 Roadmap

01 Market Research and User Needs Analysis

02 Scope Definition

03 Design UI

04 Backend Development

05 Frontend Development

06 Testing

07 Launch

08 Feedback Loop

08 Conclusion

AI solution for virtual try-on: Try2Buy presents a system that can generate realistic images of people wearing different clothes, given an input image of a person and a binary mask of the clothes.

Key components: The system consists of image-to-image translation, clothes segmentation, clothes transfer, data preparation and evaluation techniques.

Benefits and impact: The system can enhance customer experience, boost sales and marketing, and promote sustainability and innovation in the fashion industry.