A Holistic Hybrid Adaptive Geometric Deep Learning and Perceptual (HHAGP) Fashion Recommender System with Applied Metaverse for size-fit problems in online shopping

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Introduction

- Clothing is the most frequently returned item on e-commerce platforms.
- In India alone, the return rate for purchases online is 25-40% and the key contributor is size-fit.
- Consequence: poor user experience, increased carbon footprint & resource wastage.
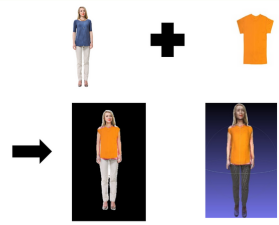
Contributions

- A new RecSys that models recommendations based on user size, and fit preferences while also allowing users to virtually try garments.
- A holistic and hybrid FP module that adaptively models user fashion preferences while maintaining item compatibility.
- A VTON module that allows 2D and 3D full-body virtual try-on of clothing.
- A GPF module that enables the scoring of clothing fit and compatibility based on perceptual and geometric heuristics.
- A data collection methodology for developing an immersive fashion dataset for the Indian body size and fit.
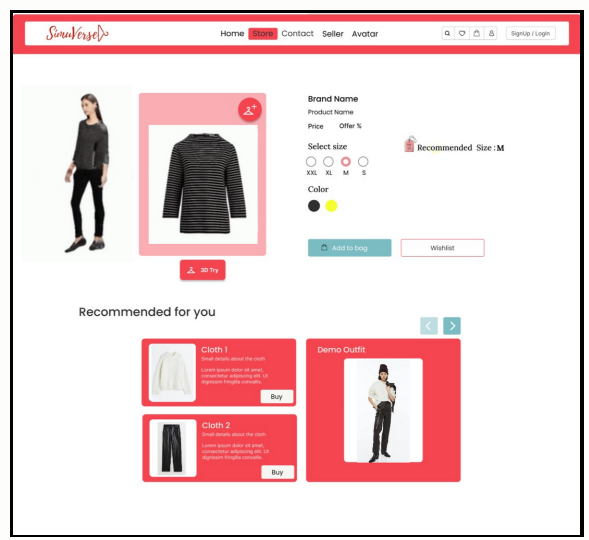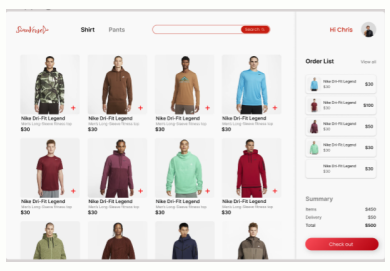
Methodology

The HHAGP System:
- Fashion Preference (FP) Module.
- Virtual Try On (VTON) Module.
- Geometric and Perceptual Fit (GPF) Module.

The FP module learns the user's fashion preferences and narrows down the recommendations for the VTON module. The VTON module allows the user to visualize the garments. The GPF module evaluates the fit of the garment on the user's body geometrically and perceptually. The three modules work in conjunction to allow a user to obtain recommendations based on their fashion preferences, ensuring a visually and physically pleasing fit while also allowing the user to visualize the garment in 2D and 3D prior to purchase.

Application: SimuVerse

Simuverse is a user-centric fashion e-commerce platform addressing the size-fit problem. The Simuverse platform allows users to virtually try-on clothing and provides sizing recommendations to its users. Simuverse also enables its user to make more informed purchase decisions by providing fashion outfit ratings and recommendations.