

INTEGRATING DEMOGRAPHIC DATA FOR TAILORED OUTFIT RECOMMENDATIONS

With the changing trends and the growing fashion rental business, it is evident that personalization is at the core of user satisfaction and retention. On the contrary, existing recommender systems have focused either on collaborative filtering or content-based methodologies, and these systems tend to face problems such as data sparsity and cold start issues. The need to address this problem has arisen by incorporating demographics in the recommendation models. Thus, it provides the development of a recommendation engine that considers the users' age, gender, where they live, and their profession.

Table 1. Demographic Data Metrics [1], [2]

Metrics	Describe
<i>Age</i>	<i>Age</i> often correlates with style preferences, lifestyle needs, and rental frequency because younger users prefer trendy items, while older users may look for classic or professional clothes. Age-based segmentation helps refine recommendations to better align with lifestyle and fashion expectations.
<i>Gender</i>	<i>Gender</i> can impact preferences for specific cuts, colours, and styles and help narrow down categories to recommend. For unisex items or accessories, gender information can also inform stylistic recommendations by matching typical preferences observed in past user behaviours.
<i>Location (geographic region)</i>	Location impacts clothing needs due to climate and cultural trends. Users in colder regions may receive more winter apparel recommendations, while those in warmer regions could see lighter, more breathable items. In addition, urban users might lean towards fashion-forward options, while suburban users may prefer practical, everyday styles.
<i>Occupation</i>	The job can signal preferred dress codes (e.g., formalwear for corporate roles and casualwear for tech workers). Understanding occupation enables the platform to suggest items suited for work-related events, daily wear, or special occasions aligned with professional life
<i>Marital/family status</i>	Family status may affect rental choices, as users with children may prioritize practical, versatile clothing, while single users might focus on trendy or event-specific attire. This insight can refine recommendations for items suited to everyday convenience or special events.
<i>Fashion style preference</i>	If a user's general style preferences are known, developers can fine-tune recommendations by aligning them with distinct aesthetics. For instance, if a user frequently rents items tagged as "casual," the system can prioritize similar styles and enhance the relevance of recommendations.
<i>Event-based insights</i>	Indicators of user interest in renting for specific occasions, like weddings, vacations, parties, etc. If a user frequently rents for events, the recommendation system can prioritize occasion-based outfits and suggest items suited for the time of year or upcoming holiday season.
<i>Past purchase and rental history</i>	Past purchases can reveal solid preferences or aversions to certain items, brands, or styles. Users who repeatedly rent or purchase specific items may prefer those, allowing the platform to prioritize these or similar items in future recommendations.
<i>Cultural or ethnic affiliation (if available)</i>	Information on the user's cultural background or ethnic affiliation, if shared by the user. Cultural factors can influence preferences for specific styles, colours, or types of clothing; for example, users from specific regions might favour traditional garments or modest styles.
<i>Income level (if available)</i>	Platforms with these insights can optimize recommendations, suggesting items within a user's preferred price range or rental budget. Users with higher incomes prefer premium options, while others may lean toward more budget-friendly rentals.

Including demographic profiling in recommendation systems enhances the operations of fashion rental platforms to consider various categories of users. These could incorporate systems where age, gender, region, and even cultural factors allow such systems to make recommendations that synchronise with a way of life or activity at a particular time.

References

1. Anand, S., Mobasher, B. Contextual Recommendation. Workshop on Web Mining. Vol. 4737. 2006. pp. 142-160. <http://surl.li/qltlui>.
- Ashurst, C., Weller, A. Fairness without demographic data: A survey of approaches. Proceedings of the 3rd ACM Conference on Equity and Access in Algorithms, Mechanisms, and Optimization. 2023. pp. 1-12. [10.1145/3617694.3623234](https://doi.org/10.1145/3617694.3623234).