BUSINESS REQUIREMENTS DOCUMENT (BRD)

Project Name: Fashion Trend Identification and Personalized Outfit Generation

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Date: 29th March 2025

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1. Executive Summary

The "Fashion Recommendation Using Machine Learning" project aims to provide personalized outfit recommendations based on user preferences, past purchases, and trending fashion styles. This system leverages advanced machine learning algorithms to enhance customer experience, improve sales conversion rates, and optimize user engagement on e-commerce platforms. By analyzing data such as browsing history, purchase behavior, and fashion trends, the system generates dynamic and relevant recommendations, making online shopping more intuitive and efficient.

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2. Business Objectives

- Enhance user experience by providing personalized fashion recommendations tailored to individual preferences.
- Increase customer retention and engagement on fashion e-commerce websites by delivering relevant product suggestions.
- Improve sales conversions by offering data-driven recommendations aligned with user tastes and emerging fashion trends.
- Reduce search time for users by predicting their preferences and streamlining the discovery process.
- Strengthen brand loyalty by creating an intelligent recommendation system that understands and evolves with customer behaviour.
- Provide an innovative competitive advantage for e-commerce platforms by leveraging machine learning for personalized styling.

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3. Scope of the Project

3.1 In-Scope

- Development and implementation of machine learning models for personalized fashion recommendations.
- Analysis of user data, including purchase history, browsing behavior, and demographic preferences.
- Real-time outfit recommendations based on user interactions, seasonal trends, and market analysis.

- Feature enhancement to refine recommendations by incorporating user feedback and social influence.
- Optimization of recommendation accuracy through continuous learning and model fine-tuning.

3.2 Out-of-Scope

- Development of a standalone e-commerce platform; the system is designed for integration with existing marketplaces.
- Payment gateway, order fulfillment, and inventory management functionalities, as these are handled by the e-commerce platforms.
- Direct manufacturing or sourcing of fashion products.
- Physical store integration for in-person recommendations.

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4. Stakeholders

- **Project Team:** Rohit, Mannat, Saurabh, Tushar
- **End Users:** Online shoppers, fashion enthusiasts, and style-conscious consumers
- **Marketing Team:** Responsible for product adoption, branding, and promotional strategies
- **E-commerce Partners:** Fashion retailers integrating the recommendation engine into their platforms

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5. Business Requirements

- The system should analyze customer purchase history, browsing behaviour, and style preferences to generate personalized recommendations.
- It must provide real-time outfit suggestions that consider user feedback and trend analysis.
- The machine learning model should continuously learn and improve its accuracy by leveraging new data.
- The recommendation algorithm should factor in external influences such as seasonal fashion trends, celebrity styles, and social media trends.
- The system should be able to handle a large volume of users and scale effectively during high-traffic periods.
- The solution should comply with data privacy and protection regulations.

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6. Functional Requirements

- Users should be able to create and update their fashion profiles, specifying style preferences, favourite colours, and preferred clothing types.
- The recommendation engine should generate personalized outfit suggestions based on user preferences, historical interactions, and current trends.
- The system should support a feedback mechanism that allows users to rate and refine recommendations.
- The recommendation engine should be accessible via web and mobile interfaces for seamless user experience.

- A social sharing feature should be included, enabling users to share outfit recommendations with friends and seek opinions.
- The system should provide recommendations in different formats, including full outfits, individual clothing pieces, and accessory suggestions.
- Real-time updates should ensure that users receive the latest trending styles and seasonal outfit inspirations.
- Users should have the ability to filter recommendations based on occasion, weather conditions, and budget constraints.

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7. Technical Requirements

- **Tech Stack:** Python, TensorFlow, Scikit-learn, Flask/Django (Backend), React/Angular (Frontend).
- **Database:** PostgreSQL / MongoDB for storing user data and fashion trend analysis.
- **Security:** End-to-end encryption for data protection and compliance with industry standards.
- **Scalability:** The system should support a growing user base without performance degradation.
- **Logging & Monitoring:** Implement monitoring tools to track recommendation accuracy, user engagement, and system performance.

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8. Assumptions & Constraints

8.1 Assumptions

- Users will provide accurate fashion preferences for better recommendations.
- E-commerce platforms will allow API-based integration without significant infrastructure modifications.
- The system will have access to a large volume of high-quality fashion data to train the recommendation models effectively.
- Seasonal trends and influencer recommendations will be relevant to user preferences.
- The machine learning model will be updated regularly to maintain recommendation accuracy.

8.2 Constraints

- Model accuracy and recommendation quality depend on the availability of high-quality training data.
- System performance is subject to cloud computing limitations and resource costs.
- Integration with third-party e-commerce platforms may require modifications to existing APIs.
- Compliance with legal and regulatory requirements for user data protection.
- Algorithm bias must be minimized to ensure fair and diverse recommendations.

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9. Risks & Mitigation

Risk	Impact	Mitigation Strategy

Poor model accuracy	High	Enhance data preprocessing, retrain model with diverse datasets
Data privacy concerns	High	Implement encryption, anonymization, and GDPR compliance
Integration issues	Medium	Use standardized and well-documented API services
High computation costs	High	Optimize model efficiency and leverage cost-effective cloud solutions
User engagement challenges	Medium	Improve UI/UX for personalized experiences and seamless interaction

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10. Success Criteria

- System provides at least 85% accuracy in outfit recommendations.
- User engagement increases by at least 20%, as measured by interaction rates and repeat visits.
- Seamless integration with at least three major e-commerce platforms within six months.
- Reduction in search time for users by at least 30%, improving their shopping experience.
- Positive user feedback and reviews reflecting system effectiveness and usability.
- Measurable increase in fashion e-commerce sales due to personalized recommendations.

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11. Approvals

Name	**Role**	**Approval Date**
Mr. Ashish Sharma	Sponsor	29th March 2025
Rohit (22CSU149) Mannat (22CSU279) Tushar (22CSU489) Saurabh (22CSU159)	Project Team	29th March 2025