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BNU Research and Enterprise Conference 2024

Empowerment Through Research: Bridging Academia and Society

Revolutionize Fashion AI powered recommendation system for sustainable style.

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Introduction

In a world where environmental consciousness meets consumer demand our innovative AI recommending system is revolutionizing the fashion industry. The journey towards eco-friendly fashion choices tailored to your individual preferences. Explore personalize recommendations, predictive analytics and data-driven insights designed to empower you while transforming the way we consume fashion. In an era of increasing environmental consciousness, the fashion industry faces the challenge of adapting to sustainable practices while meeting consumer demands.

Objectives

- To analyse consumer buying patterns, preferences, and willingness to pay premium prices for sustainable fashion brands.
- To integrate machine learning models, including collaborative filtering techniques and content-based approaches, to capture user preferences and item characteristics.
- To predict consumer likelihood of purchasing sustainable fashion using regression models trained on datasets encompassing consumer behaviour, product reviews, and social media trends.
- To evaluate the effectiveness of the recommendation system in delivering personalized and eco-friendly fashion recommendations.

Methodology

The research methodology involves the development of an AI recommendation system that integrates machine learning models such as collaborative filtering and content-based approaches. We have collected data from consumer behaviour datasets, product reviews, and social media trends. Sentiment analysis was performed using Long Short-Term Memory (LSTM) networks, which analysed customer reviews to determine their attitudes towards sustainable fashion. Neural collaborative filtering was employed to predict the likelihood of customers purchasing sustainable clothing items based on user-item interactions. The collaborative filtering model utilized embeddings and multi-layer perceptron's to capture complex patterns and generate personalized recommendations. The outputs from sentiment analysis and neural collaborative filtering were integrated to create a hybrid recommendation system that considered both customer preferences and sentiments.

Results

The performance of the AI recommendation system for sustainable clothing was evaluated using a confusion matrix heatmap and a classification report. The confusion matrix provided a visual representation of the model's predictions compared to the actual outcomes, revealing a strong correlation between the predicted and true labels. The classification report quantified the model's performance using metrics such as precision, recall, and F1-score. Despite limited data availability, the recommendation system achieved a promising accuracy of 0.98, demonstrating its effectiveness in correctly identifying customer sentiment and recommending relevant sustainable clothing items. To further optimize the model, hyperparameter tuning was implemented. By employing grid search and cross-validation, the model was fine-tuned, mitigating the impact of limited data and improving the quality of the recommendations.

Analysis

The high accuracy of the recommendations suggests that such technologies can significantly influence consumer behaviour and drive the adoption of sustainable fashion choices. The cumulative moving averages of the model's performance metrics, including accuracy, loss, precision, and recall, were visualized to gain insights into the system's effectiveness. Figure 1 shows the model accuracy over the training epochs, demonstrating a consistent improvement in both training and validation accuracy. The model achieved a high level of accuracy, indicating its ability to accurately predict and recommend sustainable clothing items to customers.

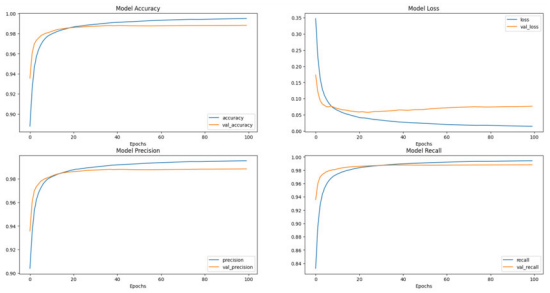

Figure 1: Model History

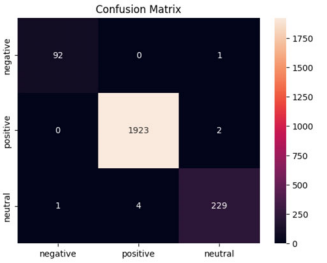

Figure 2: Confusion Matrix h

Figure 3: WordCloud

Conclusion

The research introduces an innovative AI-powered recommendation system to revolutionize sustainable fashion consumption. By leveraging machine learning techniques and integrating diverse data sources, the system provides personalized recommendations aligned with individual preferences and eco-friendly values. The evaluation results demonstrate the system's effectiveness in accurately predicting and recommending sustainable clothing items. However, the research acknowledges limitations and future research directions, such as expanding the dataset, integrating real-time data, and exploring explainable AI techniques. In conclusion, this research presents a significant step towards revolutionizing sustainable fashion consumption through AI, with the potential to pave the way for a more sustainable future in the fashion industry.

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