


# Chapter 8


## Empowering Sustainable Recommendations in Retail Banking Using Explainable AI

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### ABSTRACT

*This research explores the pivotal role of Explainable AI (XAI) in enhancing transparency, trust, and decision-making processes within personalized retail banking recommendation systems. Leveraging methodologies from popular XAI library packages, including LIME, SHAP, Yellowbrick, ELI5, and Alibi, a profound examination of machine learning models was conducted to comprehend and validate recommendations. The collaborative insights of these XAI techniques led to the identification and removal of a detrimental feature, significantly improving model accuracy and precision. Graphical representations and analyses provided by these*

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*methods guided model refinement strategies, exemplifying the power of XAI in promoting both accuracy and interpretability in the decision-making process. Despite challenges related to data complexity and reliance on synthetic data, this research contributes valuable insights to the potential of XAI in retail banking recommendation systems, emphasizing future avenues for exploration and refinement.*

## **I. INTRODUCTION**

In the retail banking industry, personalized product recommendations have become crucial for enhancing customer experiences and driving business growth. The integration of digital channels has significantly streamlined shopping and transaction processes through customized technological solutions. Nevertheless, concerns surrounding trust and transparency have emerged due to the growing utilization of AI models, particularly in tasks such as detecting fraudulent transactions (A. B. Mishra, 2025b). The opaque nature of algorithmic processes has prompted a demand for research into explainability in the field of AI. This challenge has prompted the exploration of methods to enhance the transparency of AI models (A. Mishra, 2025b). An important aspect under consideration in this investigation is Explainable AI (XAI), which offers insights into decision-making processes, enabling users to gain a deeper understanding of the subtleties influencing model predictions (A. B. Mishra & Singh, 2024b) ). In the realm of personalized retail banking, Explainable AI (XAI). is essential for ensuring transparency in product recommendations (A. Mishra, 2025a). The ability of XAI to elucidate the decision-making pathways of these algorithms offers retailers a clear understanding of how specific recommendations are generated (Mohammed Usman et al., 2023). This transparency not only aids retailers in refining and customizing their offerings but also enables them to align recommendations with customer preferences more effectively (A. B. Mishra & Singh Ritika, 2024). Moreover, as customers gain insight into the rationale behind AI suggestions, they are more likely to trust and engage with the personalized recommendations, fostering a sense of confidence and reliability in the retail banking experience (A.Mishra, Dodke, 2024). Furthermore, in an era where data privacy concerns are paramount, the transparency afforded by XAI contributes to a more ethical and accountable deployment of AI in retail banking. XAI helps mitigate apprehensions regarding the privacy and security of personal information. Consequently, the incorporation of Explainable AI not only enhances the efficacy of personalized retail banking product recommendations but also serves as a crucial element in establishing and maintaining a trustworthy relationship between retailers and their customers (Othman et al., 2022). The paper is organized in the following manner as: Section II, describes the related work. Section III deals with

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