

PREDICTIVE DATA SCIENCE AND MLOPS FRAMEWORKS FOR AI-DRIVEN MARKETING ANALYTICS AND DECISION SUPPORT

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ABSTRACT

The rapid growth of Artificial Intelligence (AI), predictive data science, and Machine Learning Operations (MLOps) has transformed modern marketing by enabling organizations to make faster, more accurate, and data-driven decisions. Businesses increasingly rely on predictive analytics to understand customer behavior, forecast market trends, evaluate marketing campaign performance, and optimize strategic decision-making. However, many organizations continue to face challenges related to model deployment, scalability, continuous monitoring, data quality, and the integration of machine learning models into real-world business environments. This study proposes a Predictive Data Science and MLOps framework for AI-driven marketing analytics and decision support that integrates predictive modeling, automated machine learning deployment, continuous model monitoring, and intelligent business analytics into a unified system. The proposed framework enhances marketing efficiency by enabling organizations to generate accurate customer insights, optimize resource allocation, improve campaign effectiveness, and support evidence-based decision-making. MLOps practices ensure that predictive models remain reliable, scalable, secure, and continuously updated as new marketing data become available. The study adopts a quantitative research approach to evaluate the effectiveness of the proposed framework using data collected from marketing professionals, business analysts, and data scientists. The expected findings indicate that integrating predictive data science with MLOps significantly improves forecasting accuracy, marketing performance, customer segmentation, and organizational decision-making. Furthermore, the framework supports continuous model improvement while reducing operational risks associated with machine learning deployment. This study contributes to the growing field of AI-driven marketing analytics by presenting a practical framework that combines predictive intelligence with modern MLOps practices to improve business performance, strategic planning, and competitive advantage in dynamic marketing environments.

KEYWORDS: Predictive Data Science, MLOps, Artificial Intelligence, Marketing Analytics, Decision Support.

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