



# Propensity Modeling and Patient Prediction in Osteoporosis Market



# Background



A leading pharmaceutical company operating in the osteoporosis market sought to improve targeting precision for both personal and non-personal HCP outreach.

The objective was to identify likely future patients for a specific osteoporosis treatment and determine which HCPs were most likely to engage with these patients.

The client needed a comprehensive understanding of treatment pathways, patient/HCP characteristics, and predictive insights to inform marketing efforts and boost conversions efficiently.



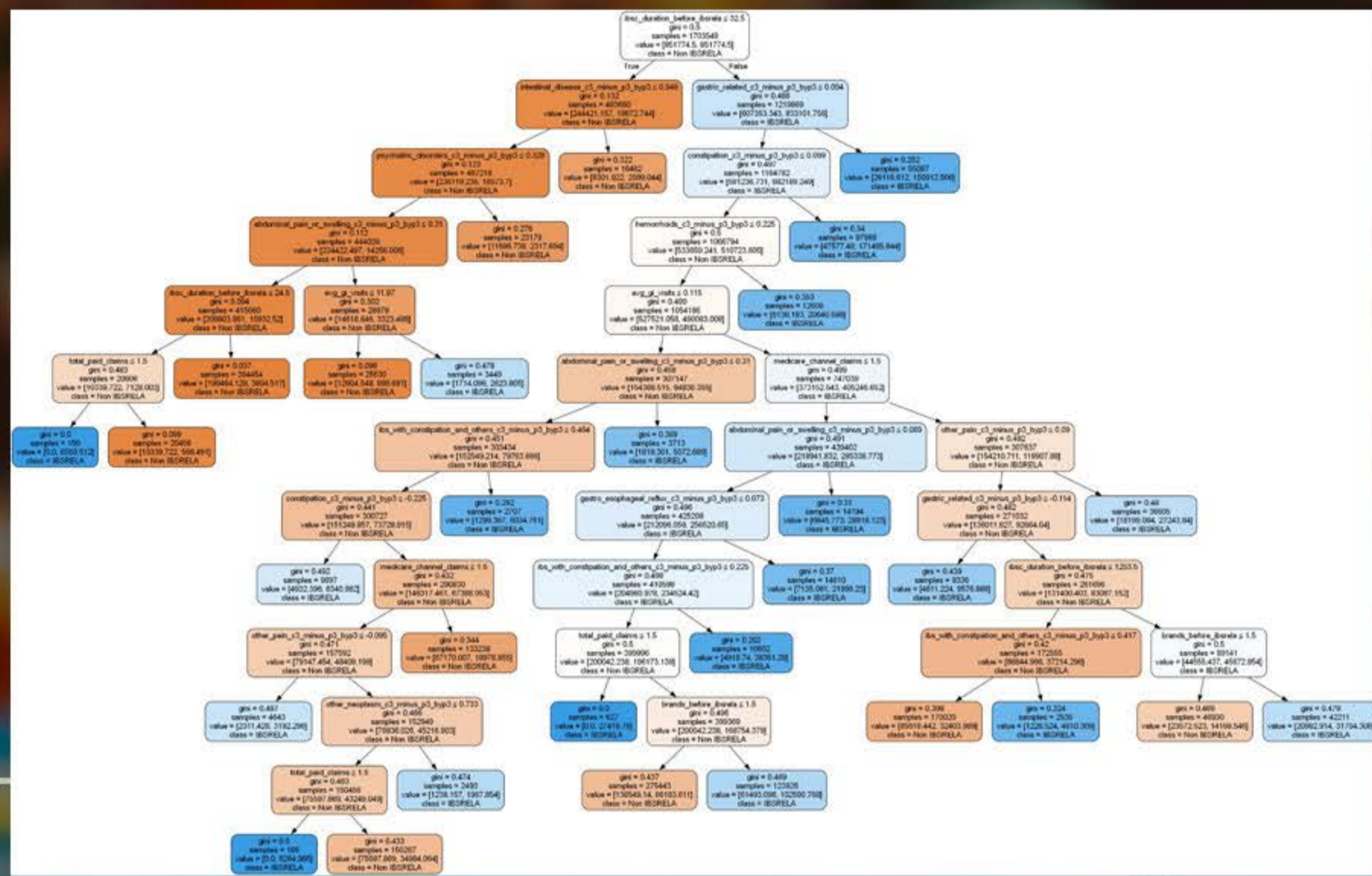
## Our Solution

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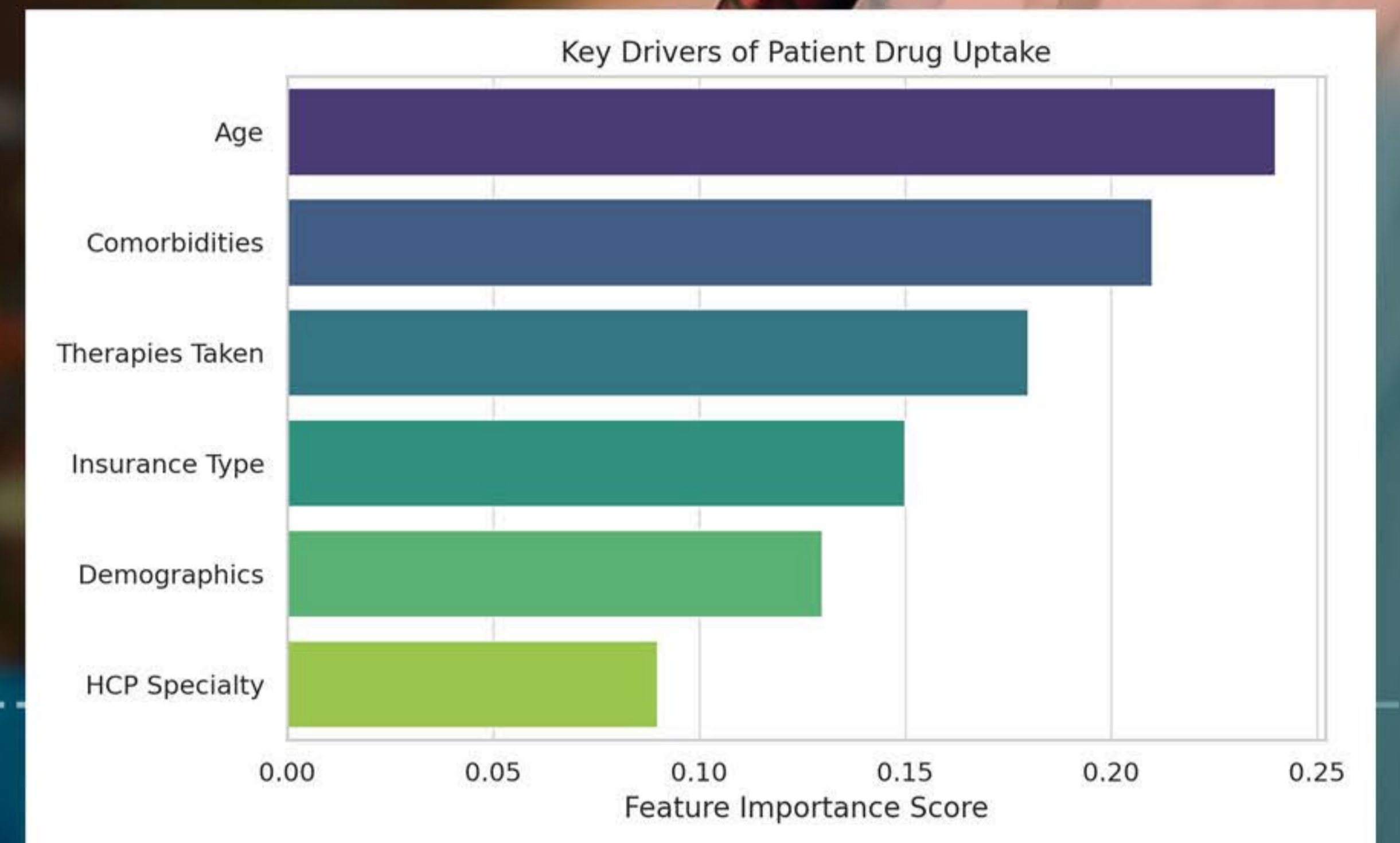
- Created patient-level features: age, comorbidities, insurance type, therapy history & Developed explainable (Random Forest, XGBoost) and deep (LSTM) models to predict initiation
- Built HCP propensity scores based on patient profiles and treatment behavior Delivered actionable HCP and patient segments for omnichannel promotion

# Business Impact

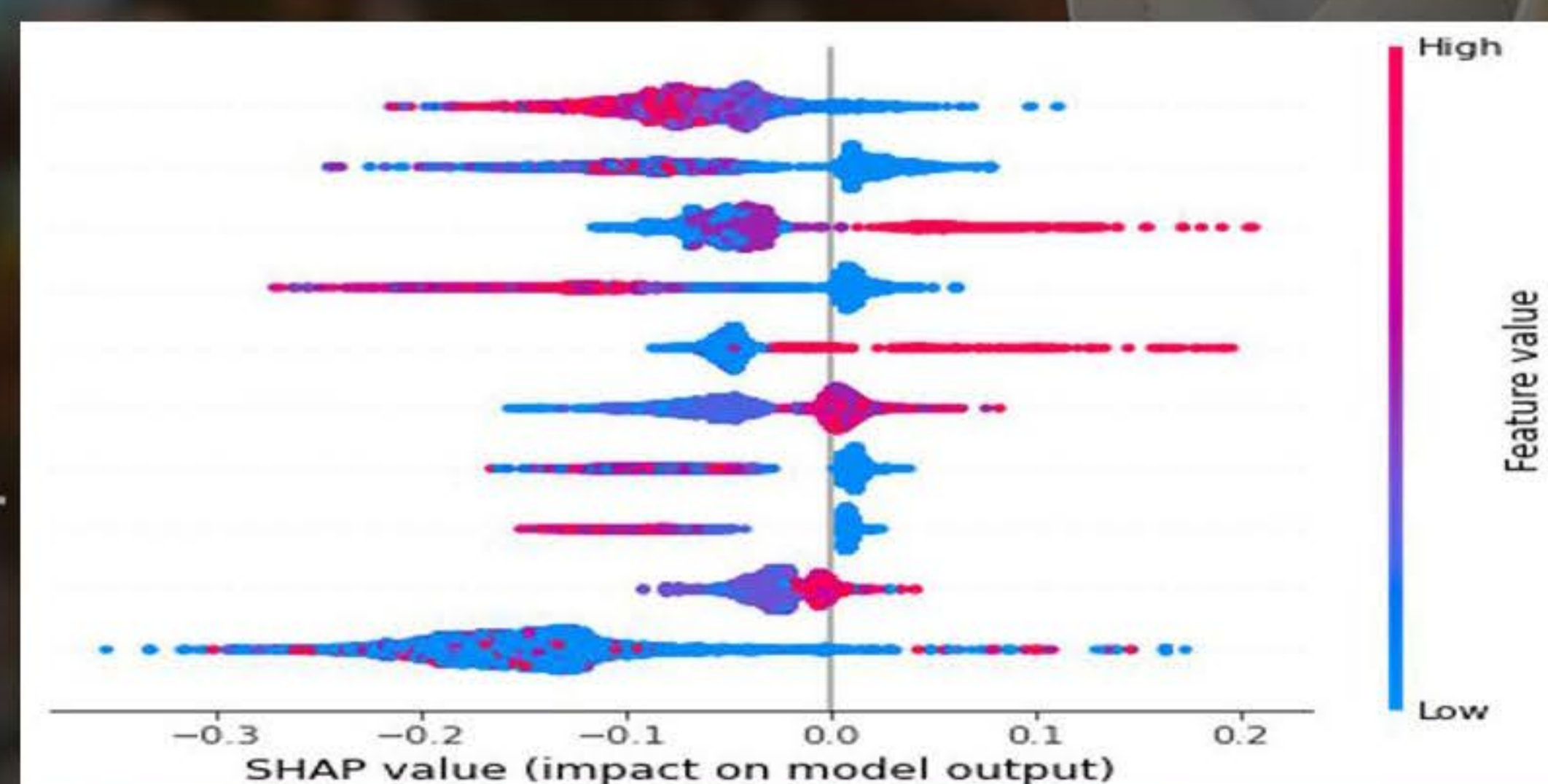
- Enabled marketing to prioritize high-propensity HCPs
- Improved outreach precision and reduced promotional waste
- Boosted patient starts and campaign ROI with data-driven targeting



Decision Tree — Visualizes the decision logic behind patient behavior and HCP influence to uncover the most impactful clinical and demographic splits



SHAP Feature Importance — Quantifies the relative contribution of each patient and market feature to the final model prediction to aid interpretation



Model Performance — Highlights predictive accuracy across patient segments to validate model robustness and business applicability



# About Circulants

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