Churnflix: Bank Churn Prediction App

This presentation will introduce Churnflix, a machine learning powered application designed to predict and mitigate customer churn for financial institutions.

Key Features

Modern UI

Netflix-inspired dark-themed interface for user-friendliness

Predictive Analytics

AI-driven customer churn prediction using XGBoost

Custom Reports

Dynamic reports for analyzing business insights

FastAPI Backend

Efficient backend for handling ML predictions

How It Works

1

Step 1: User Input

The user provides key financial details (e.g., Credit Score, Age, Balance)

2

Step 2: Model Prediction

The backend processes the input using a trained XGBoost model

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Step 3: Churn Forecast

The system predicts whether the customer is likely to churn

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Step 4: Feature Importance

XGBoost explains which features had the most impact

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Business Impact

Reduce Customer Loss

Identify at-risk customers early to minimize churn

Increase Retention

Enable personalized marketing campaigns & offers

Explainable AI

Use XGBoost feature importance to understand churn drivers

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Customer Distribution and Churn Analysis

Customer Retention

The majority of customers (80%) remained with the bank.

Churn Rate

Only 20% of customers (2,000 individuals) churned.

Key Insights

This suggests a high level of customer satisfaction among those who stayed.

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Machine Learning Approach

- **Gender Distribution:** 54% male, 46% female. This indicates a relatively balanced customer base.
- **Age Groups:** Customers aged 35-55 have the highest churn rate. This highlights a potential area for targeted retention efforts.
- **Product Holdings:** Customers with fewer products exhibit higher churn probabilities. This suggests a need to incentivize product diversification.

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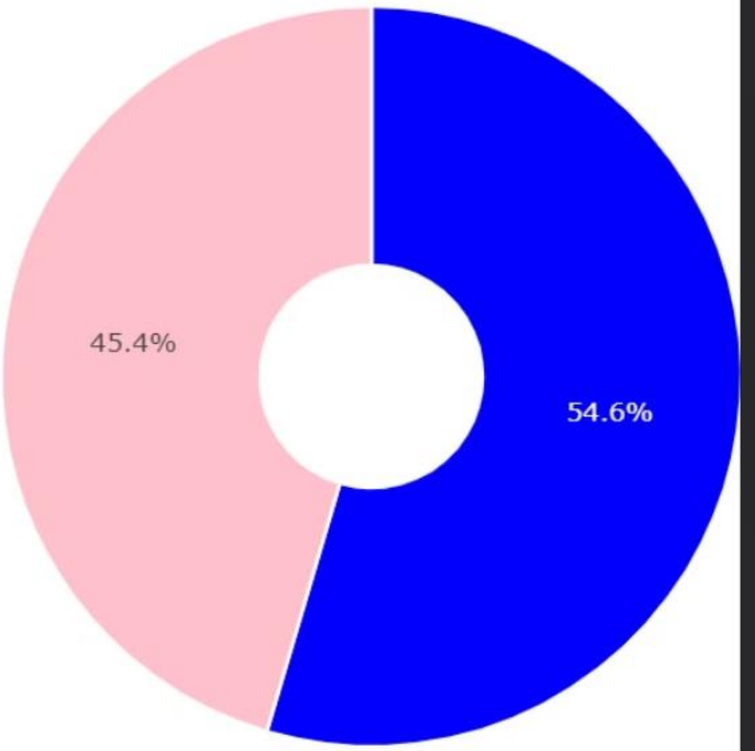

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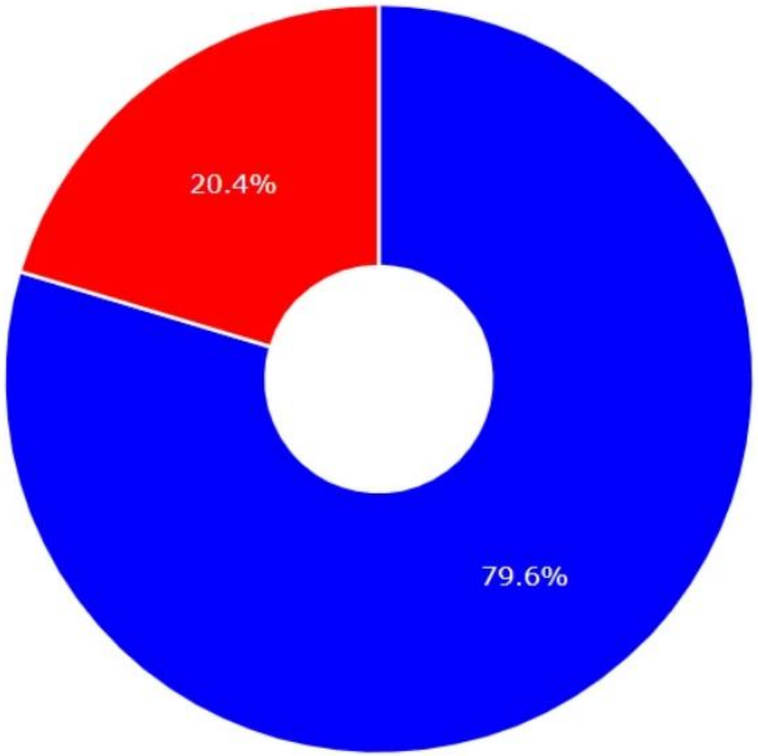

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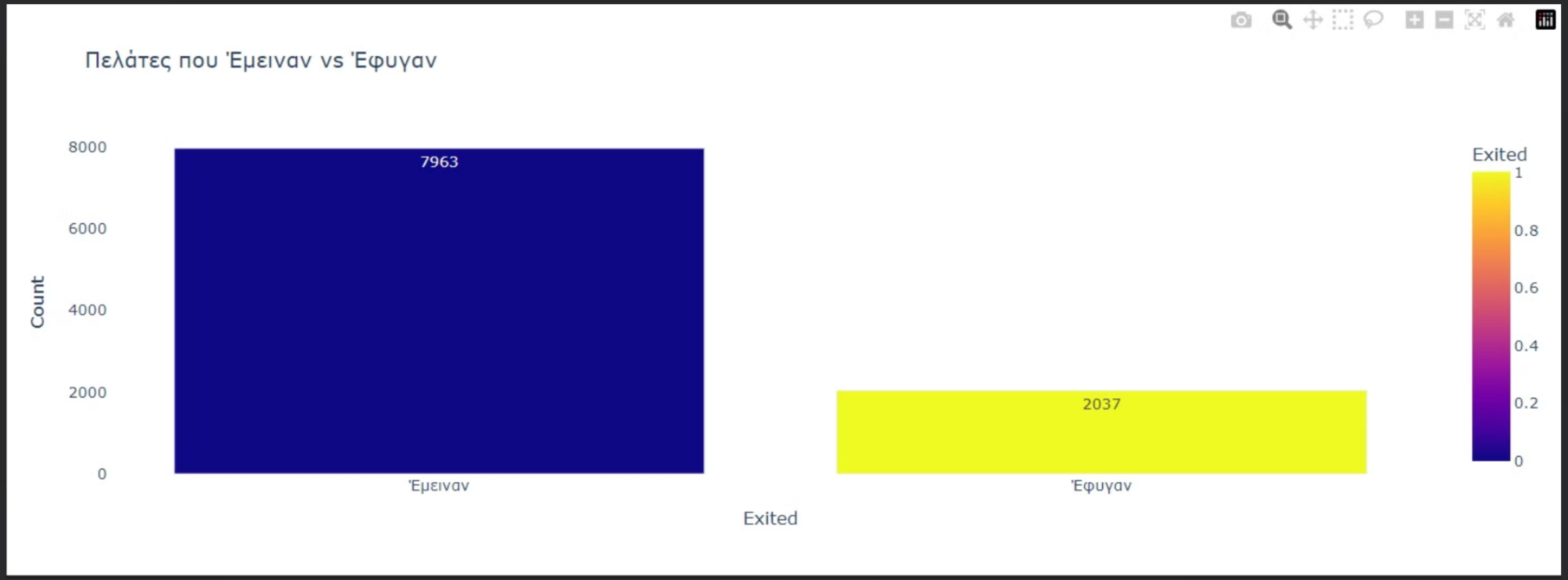

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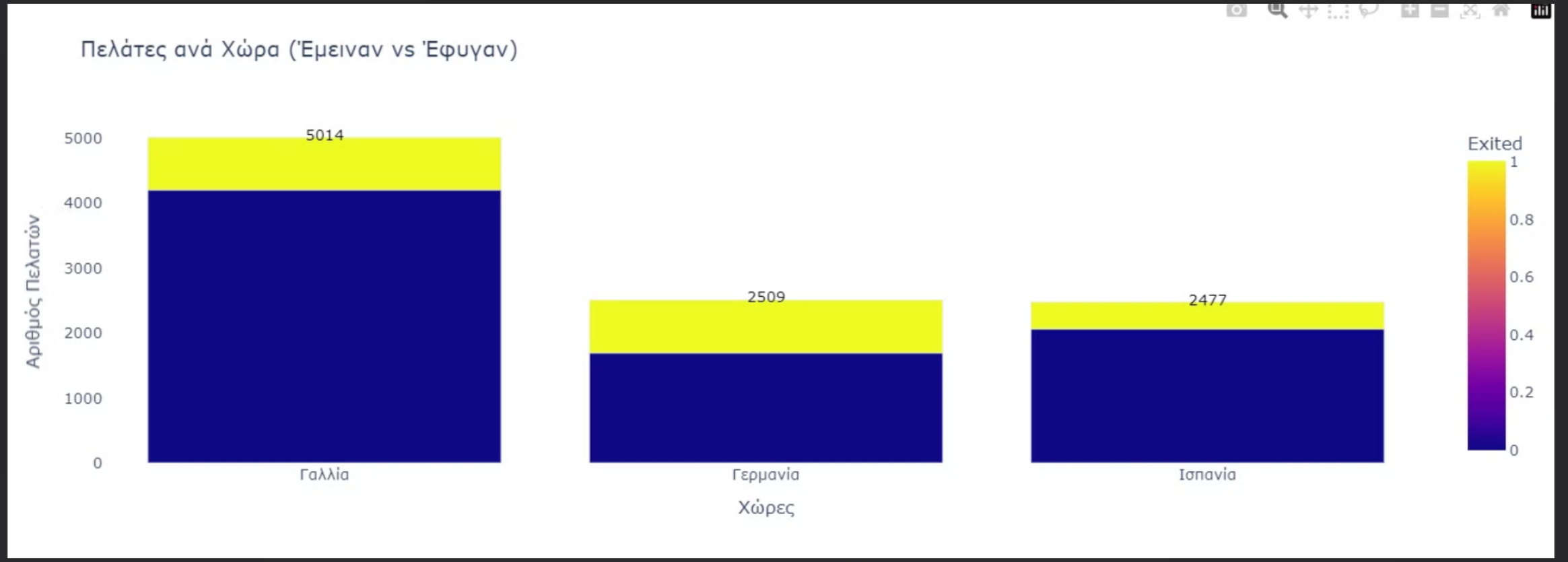

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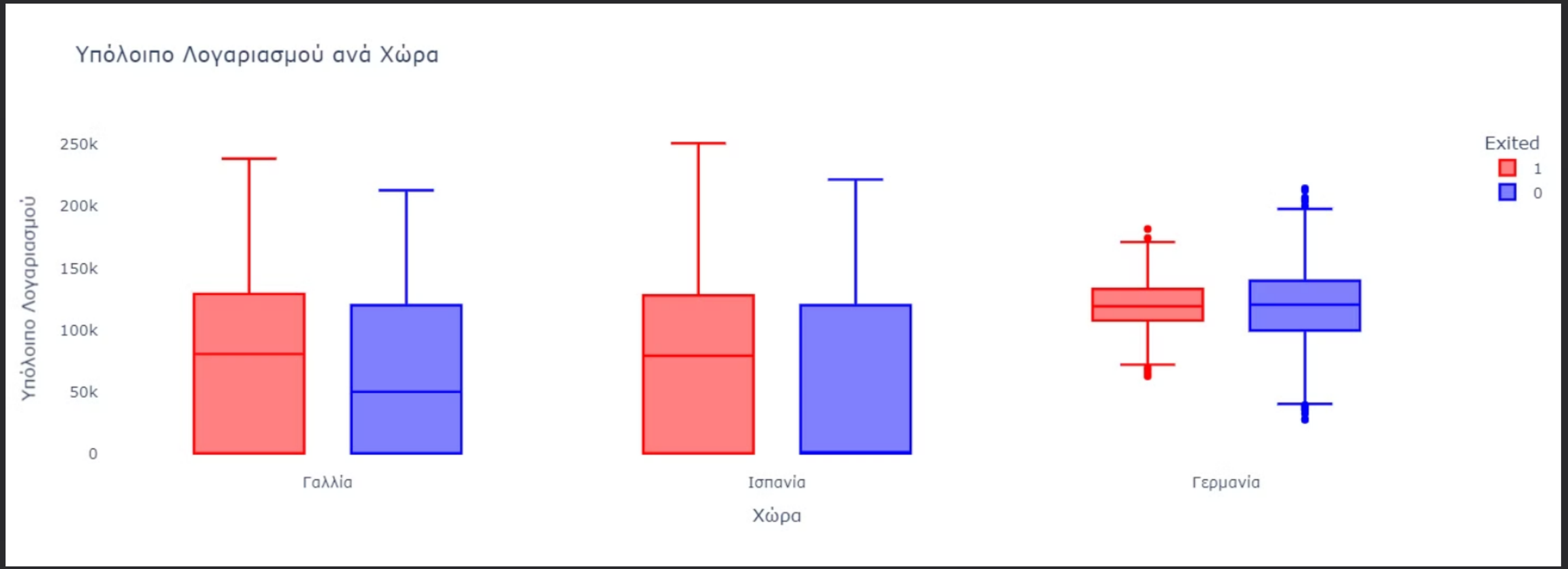

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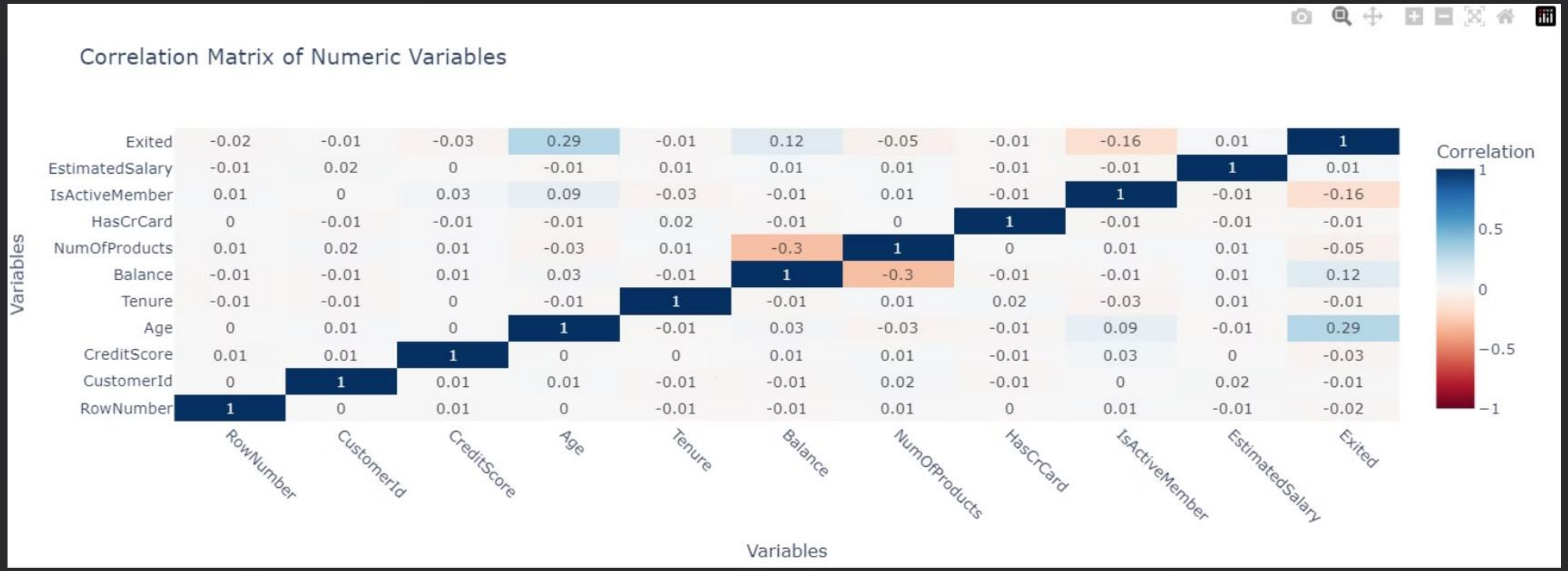

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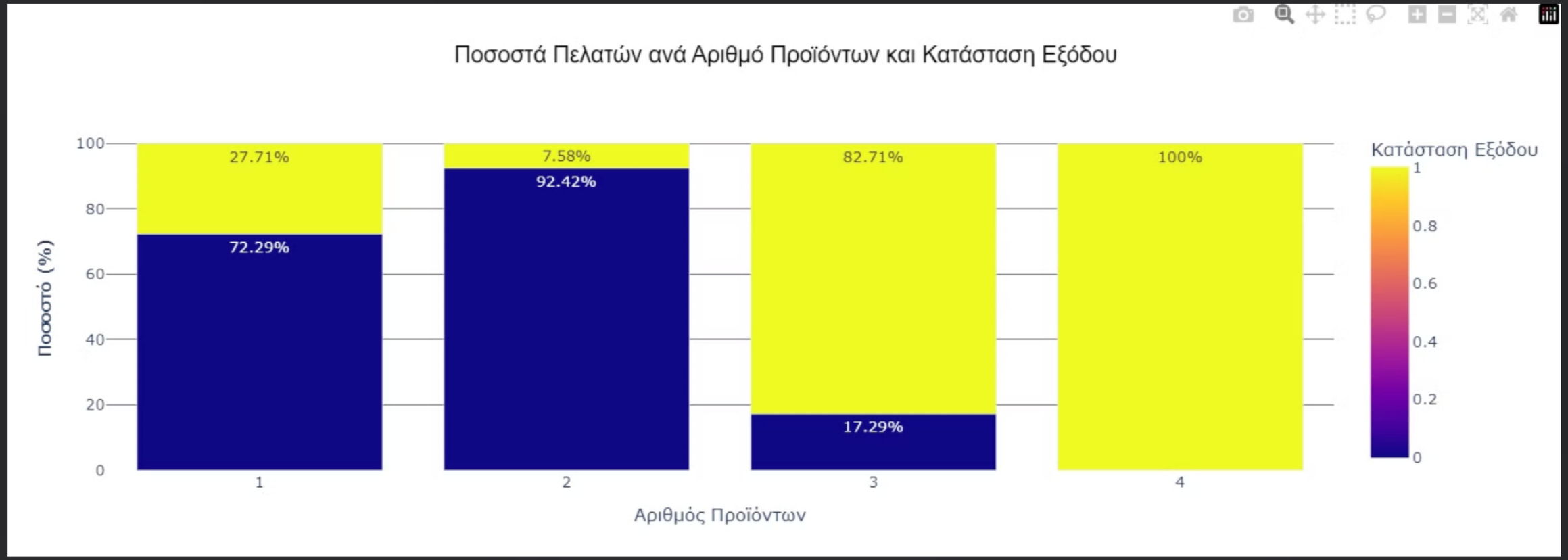

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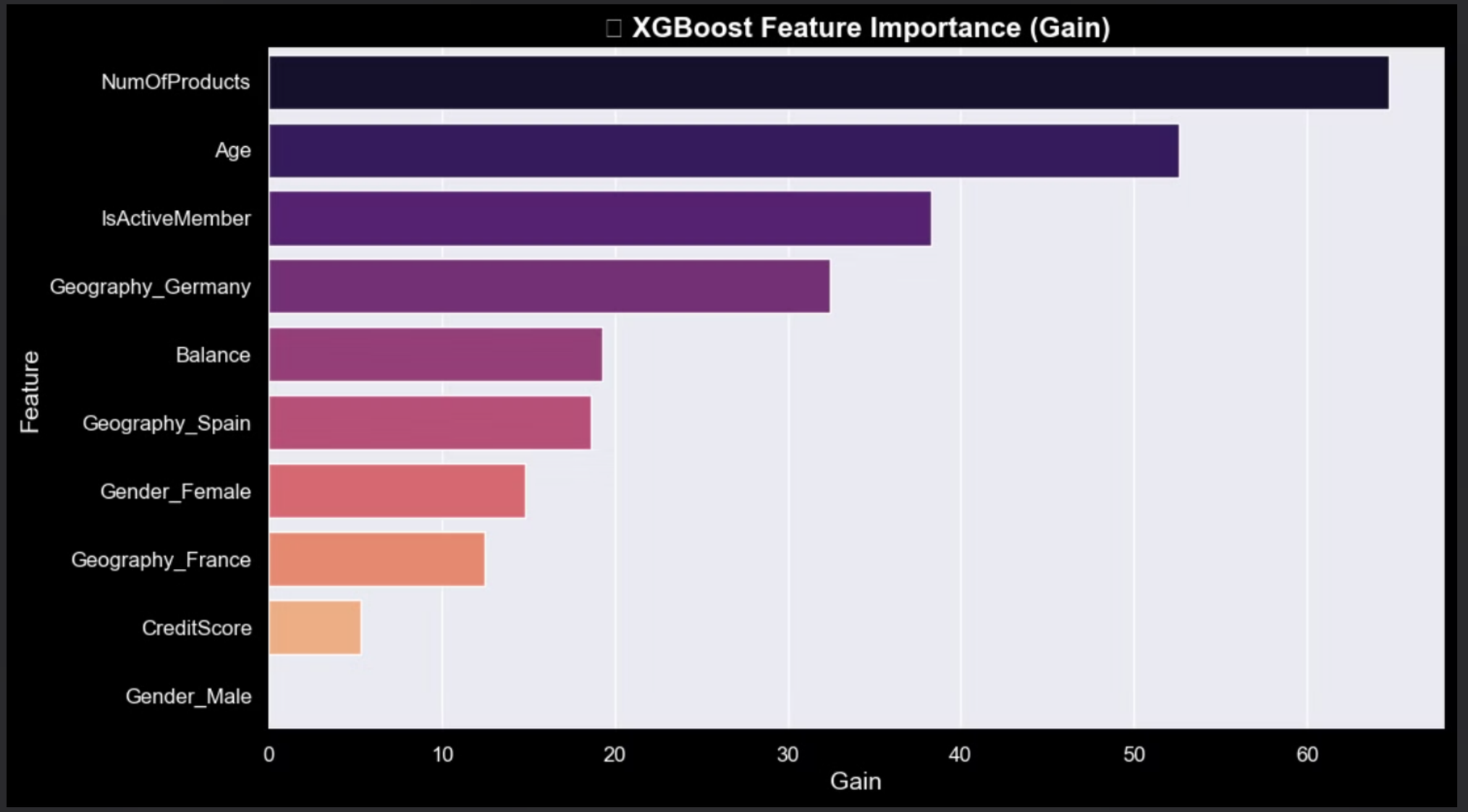
Machine Learning Approach

1. Data preprocessing: Removed outliers using IsolationForest, scaled numeric features with StandardScaler, encoded categorical data via one-hot encoding, and selected the top 10 important features using SelectKBest.

2. Model training: Used an XGBoost Classifier, optimized via Grid Search, applied SMOTE to handle class imbalance, and tuned hyperparameters for best performance.

3. Feature explanation: Used XGBoost's built-in feature importance, permutation feature importance, and partial dependence plots (PDP) to visualize the influence of individual features on predictions.



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Project Contributors

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Final Deliverables

- **Functional Web App**
  Live predictions for churn probability
- **Trained XGBoost Model**
  High accuracy for churn prediction
- **Data-Driven Insights**
  Actionable intelligence for financial institutions
- **Feature Explanations**
  Churn probability and key feature explanations