

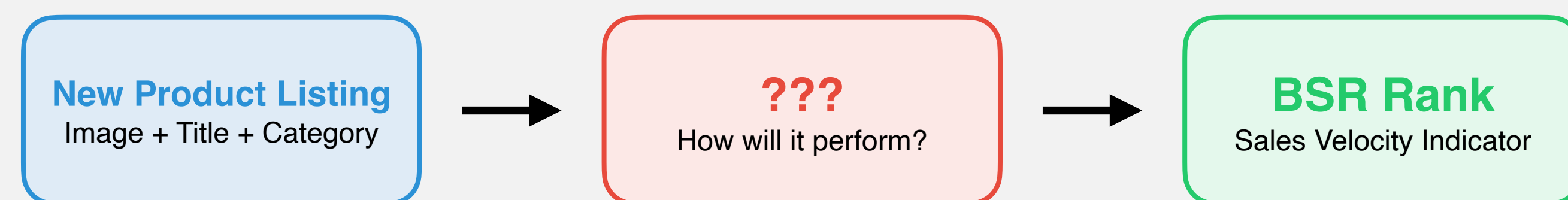
Amazon Best Seller Rank Prediction Using Multimodal Machine Learning

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Instructor/Faculty: Masoud Sadjadi

PROBLEM

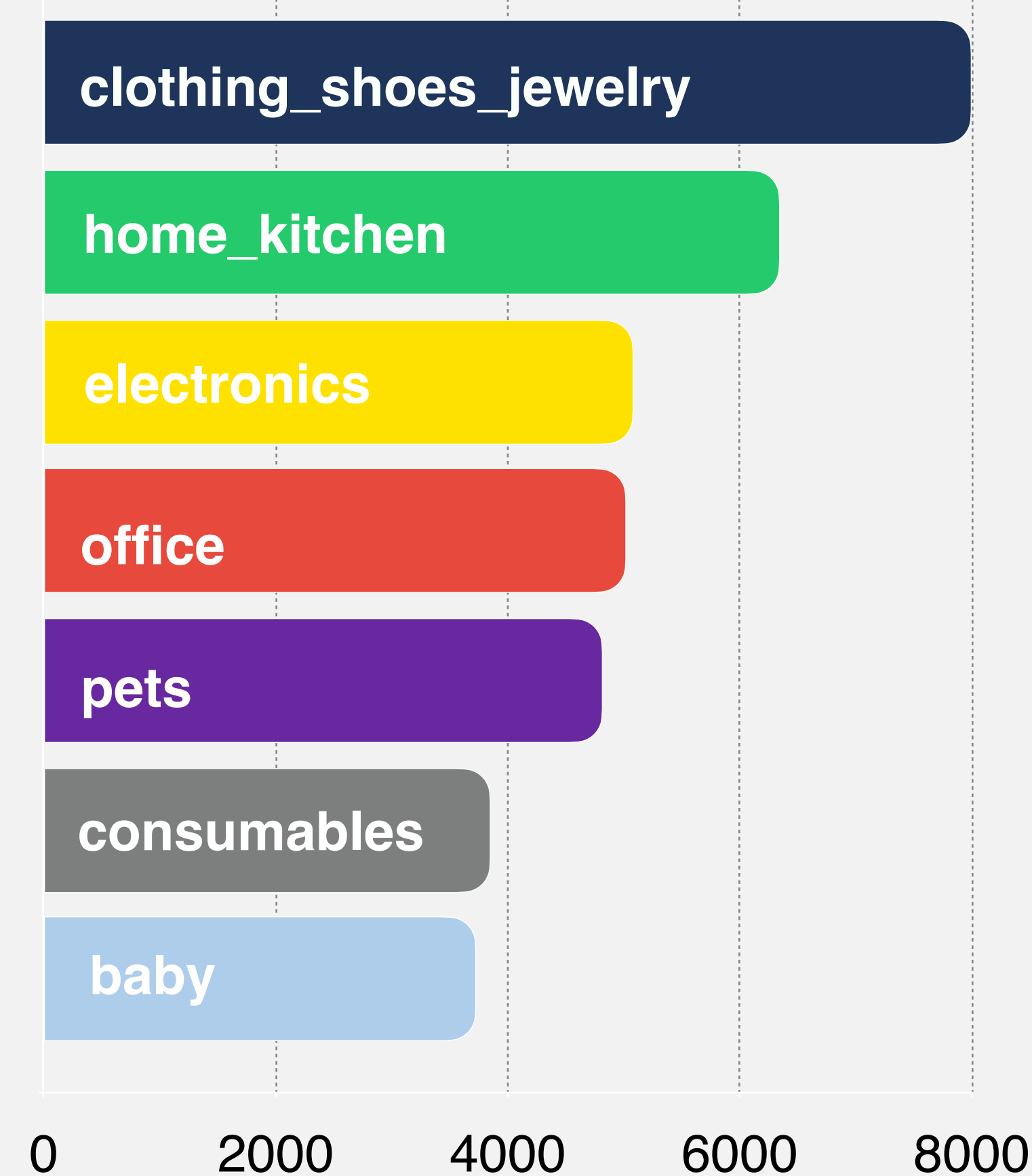
- Sellers can't predict if a product will sell before investing in inventory
- Amazon BSR only appears after sales happen
- Our goal:** Predict BSR from listing content alone



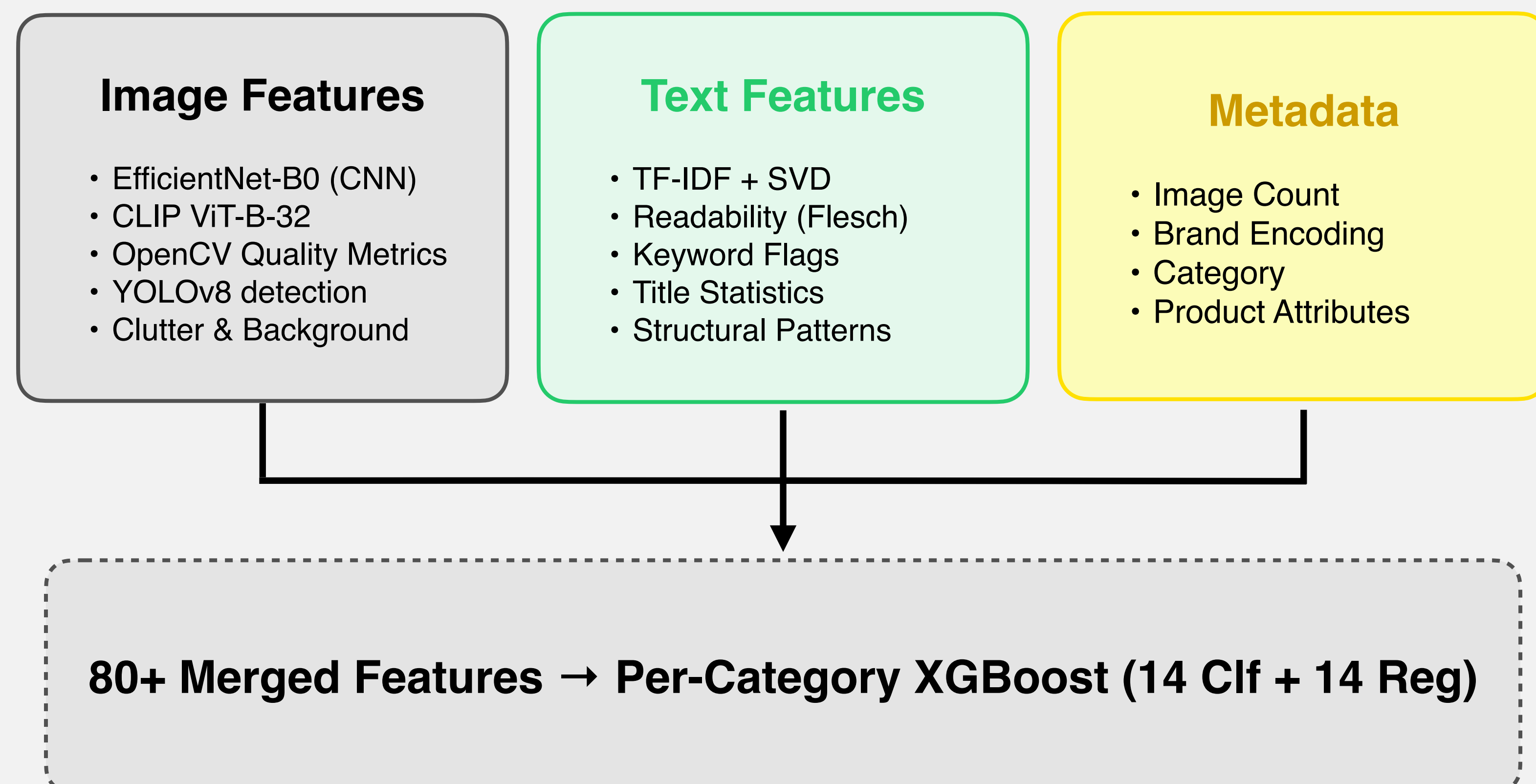
DATA OVERVIEW

Metric	Value
Products Collected	~ 19K ASINs
Product Images	~ 19K Primary Images
Amazon Categories	14
Features Extracted	80+ per product
Data Source	ScrapingDog API
Market	amazon.com (US)

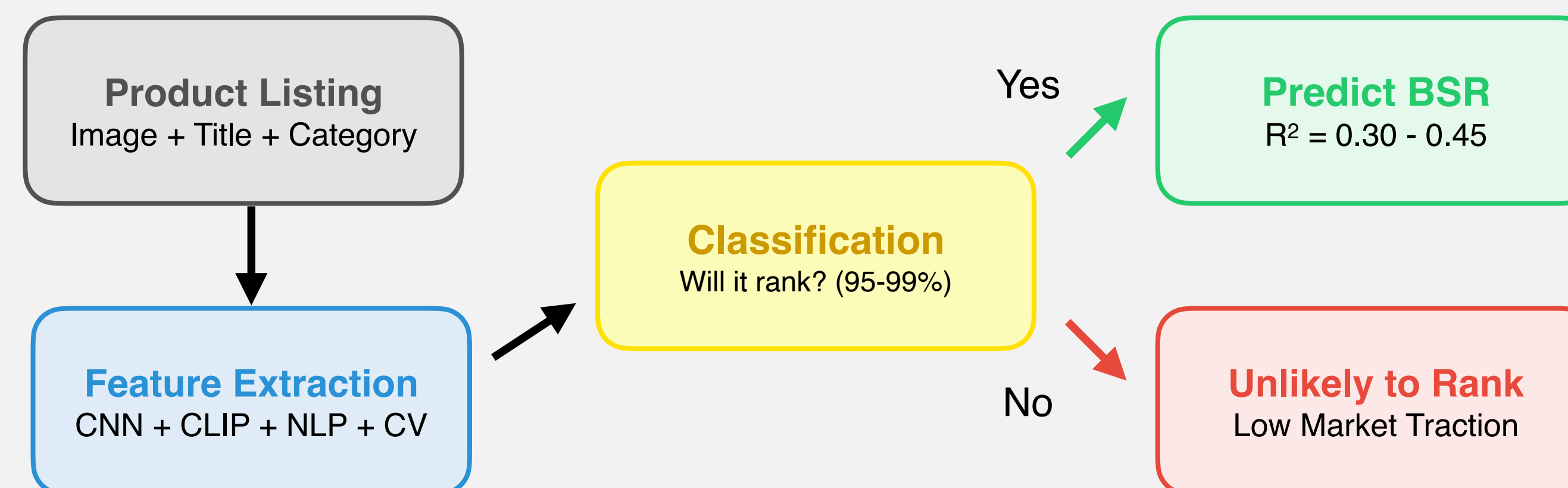
Products by Category (Total: 36,879)



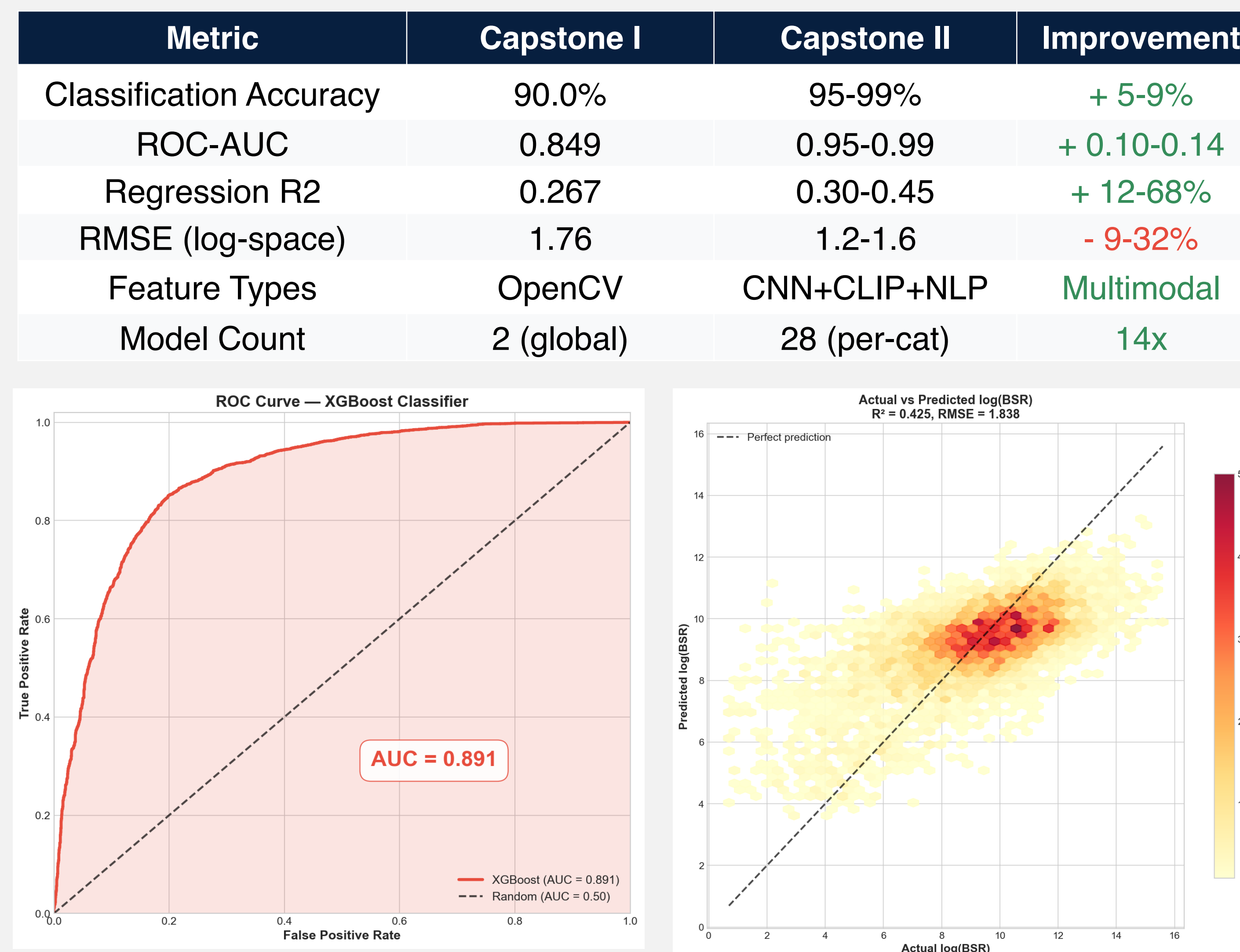
FEATURE ENGINEERING



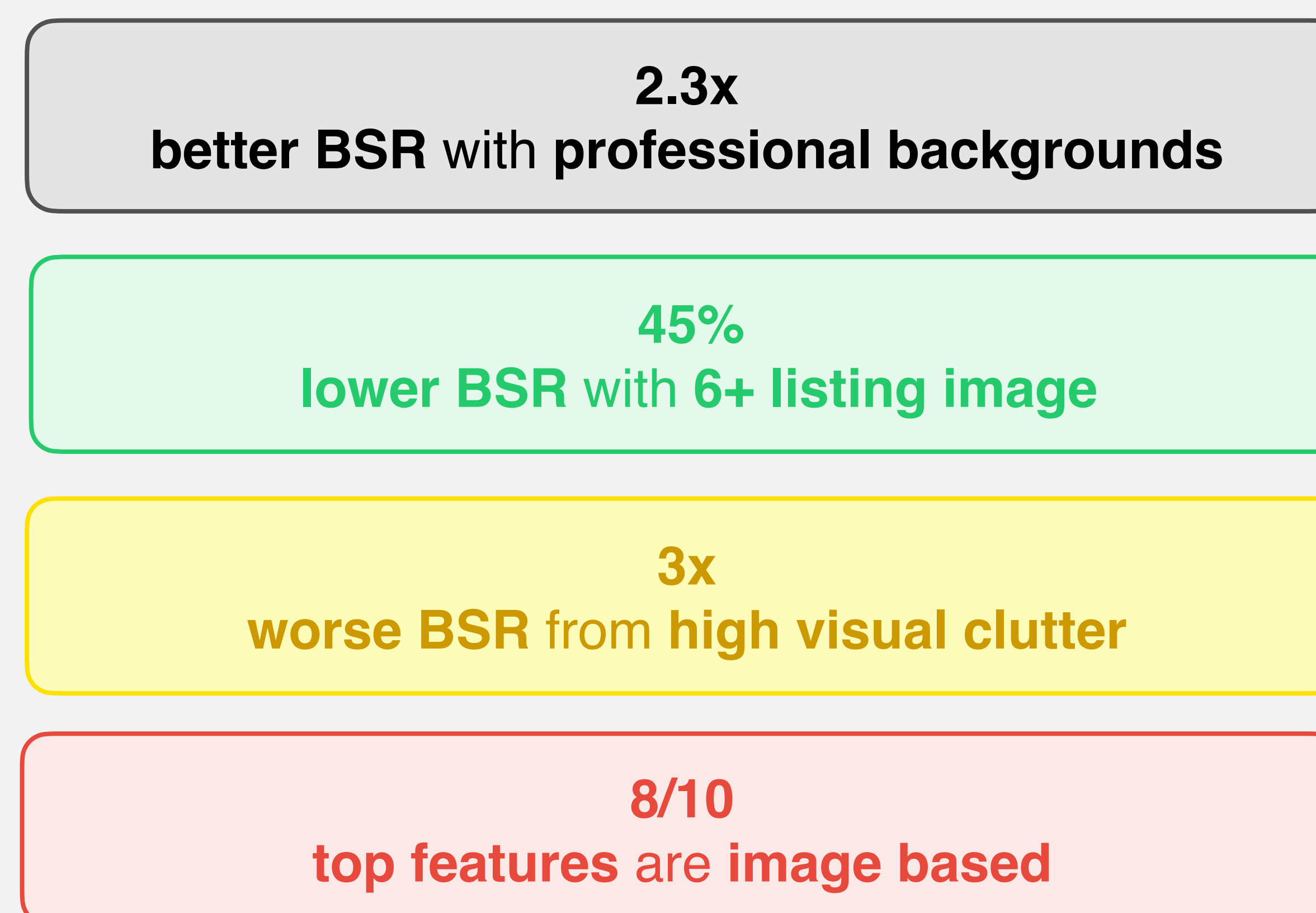
MODEL ARCHITECTURE



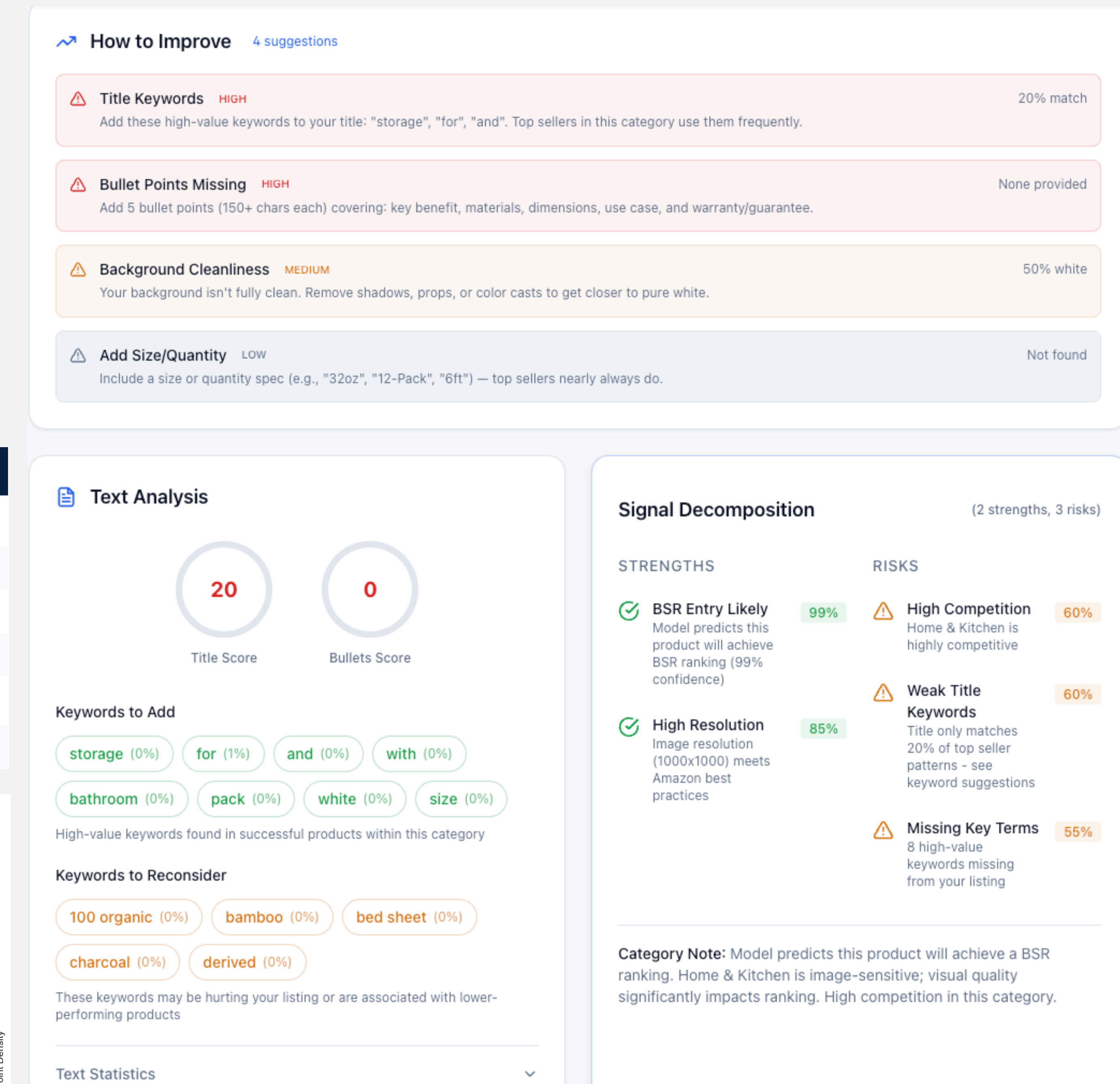
RESULTS



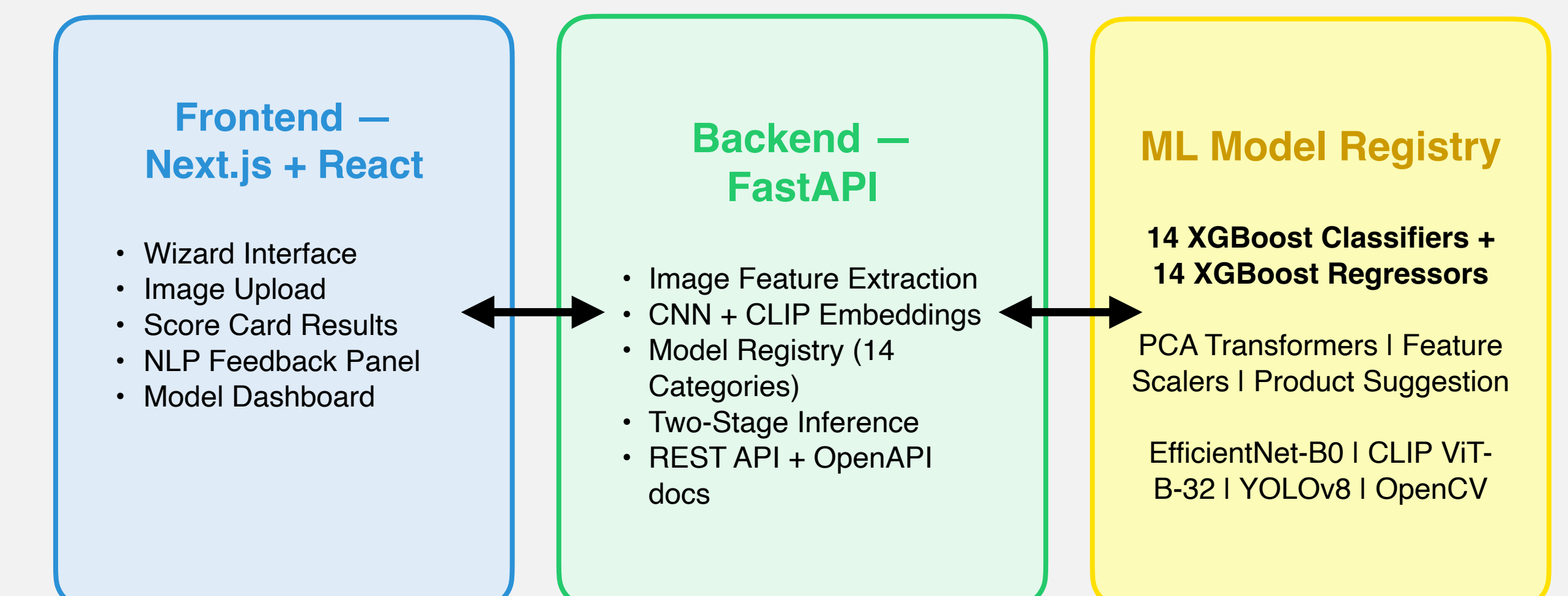
KEY FINDINGS



WEB APPLICATION + TECH STACK



WEB APP ARCHITECTURE



Layer	Technologies
ML Models	XGBoost, scikit-learn
Deep Learning	EfficientNet-B0, CLIP ViT-B-32, YOLOv8
Computer Vision	OpenCV, Ultralytics
NLP	textstat, TF-IDF, SVD
Backend	FastAPI, Python 3.10, PyTorch
Frontend	Next.js, React, TypeScript, Tailwind
Data	pandas, NumPy, Parquet
Environment	Conda, Git, GitHub