

Meet **Investment Banking Binary Decision Classifier (IBBDC)**, a machine learning pipeline that retroactively evaluates whether the terms of highly consequential business transactions proved favorable to involved companies and uses the data to train a specialized, interpretable model which predicts whether a company should accept a certain deal.

IBBDC for Target Company Mergers and Acquisitions: An Abstract Viewpoint

DATA ACQUISITION

Using the London Stock Exchange Group API, obtain data on past M&A deals which were either withdrawn or rejected. Using withdrawn deals, one can assess how the company would have performed if it continued to operate independently



RETROACTIVE DCF VALUATIONS

Using the cash flows after the deal, compute retroactive DCF valuations on each of the target companies at the time of the proposed deal



DATASET LABELING

Compare retroactive DCF valuations with the proposed deal price per share to label deal terms as favorable or unfavorable for the target company

FEATURE ENGINEERING

Construct internally normalized statistics with predictive power concerning the target company and deal terms. Such features include Transaction Value to Cash Flow, Debt to Equity, and Projected Growth Rate



DATASET FILTERING

Filter the dataset to include deals similar to the deal in question



TRAIN THE ML MODEL

An interpretable decision tree model provides clear rationale for decisions

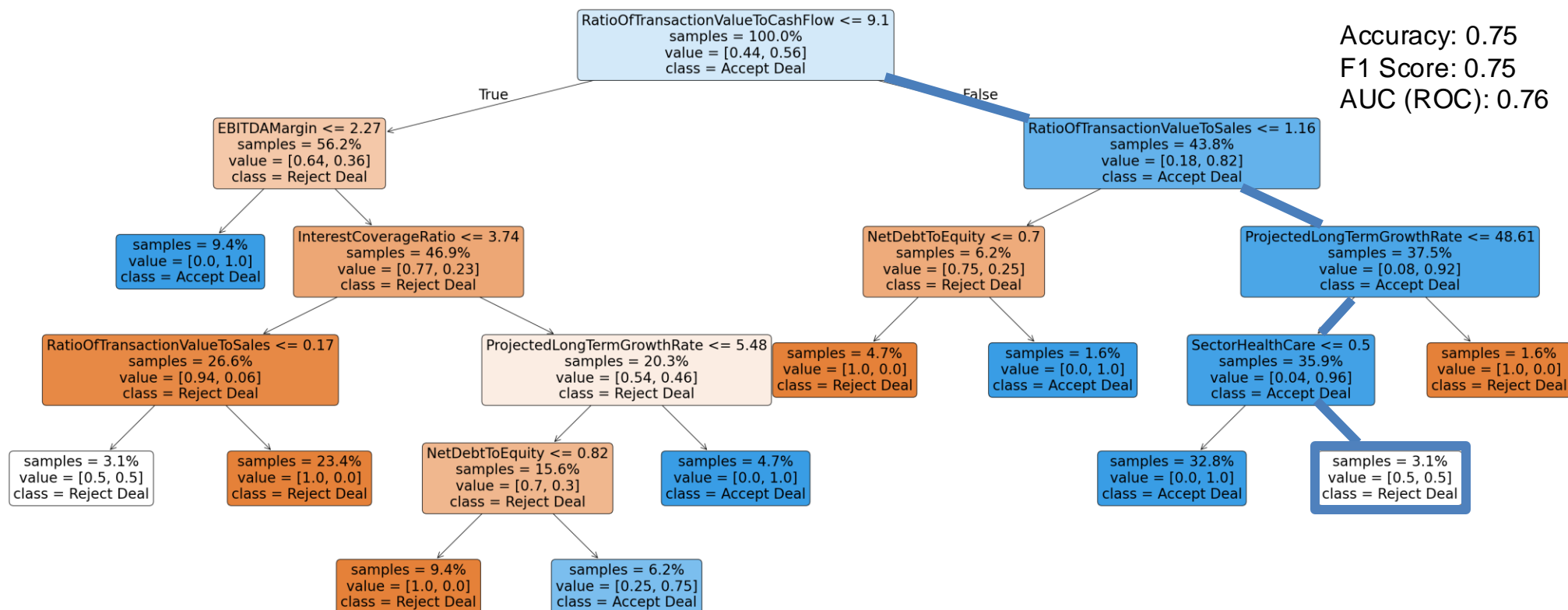


ADVISE ON THE DEAL IN QUESTION

By computing the same features for the deal in question, one can trace the path of the deal in the decision tree. Using this path, one can arrive at an interpretable rationale for why the target company should or should not accept the M&A bid.

Example Decision Tree for Masimo (MASI) Acquisition Recommendation

Accuracy: 0.75
F1 Score: 0.75
AUC (ROC): 0.76



Interpretation: The model first identifies that the Masimo-Becton Dickinson merger's transaction value to cash flow and transaction value to sales ratios exceed its thresholds. It then evaluates Masimo's projected long-term growth rate, which falls below the high threshold. Although the model would typically recommend accepting the deal under these conditions, it makes a final check on Masimo's sector and, since it is in healthcare, **advises against accepting the acquisition bid.**