

# Interpretable Multi-Class Classification for Client Potential Prediction in B2B IT Sales

Presented By

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# Agenda

- Research Problems and Solution
- Research Objectives
- Related Works and Research Gap
- Research Methodology
- Classification Results
- Apply XAI
- Business Implications and Conclusion

# Research Problems and Solution

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## Key Problem

- Sale teams often struggle to prioritize leads and predict which clients will eventually convert.

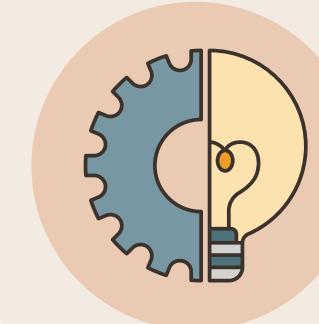


## Key Statistics:

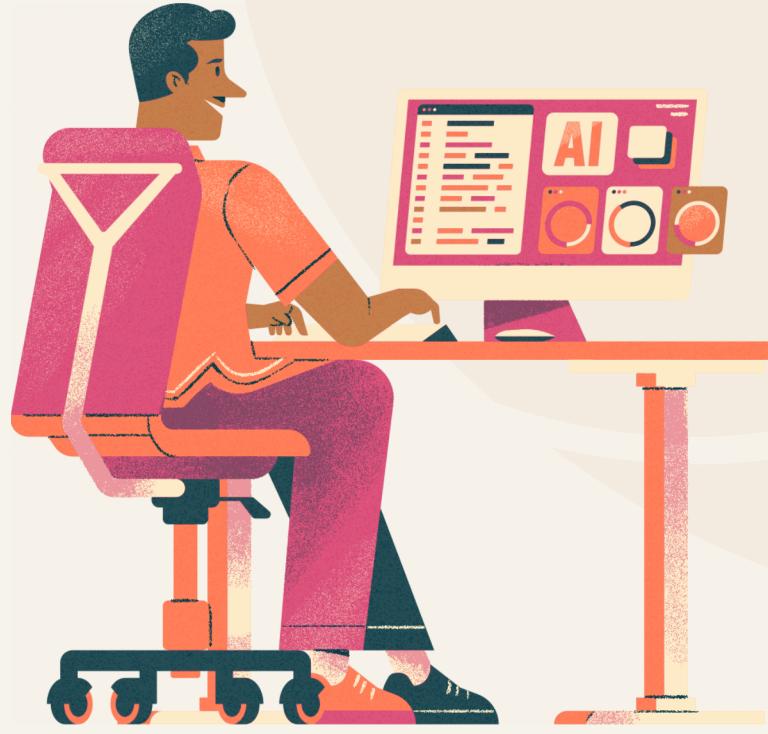
- Only **10%–20%** of leads convert to customers
- Around **79%** of marketing leads never convert because of ineffective lead prioritization

## Solution

- Predict the potential level of each client (High, Medium, Low, No)
- Apply Explainable AI for interpretability



# Research Objectives

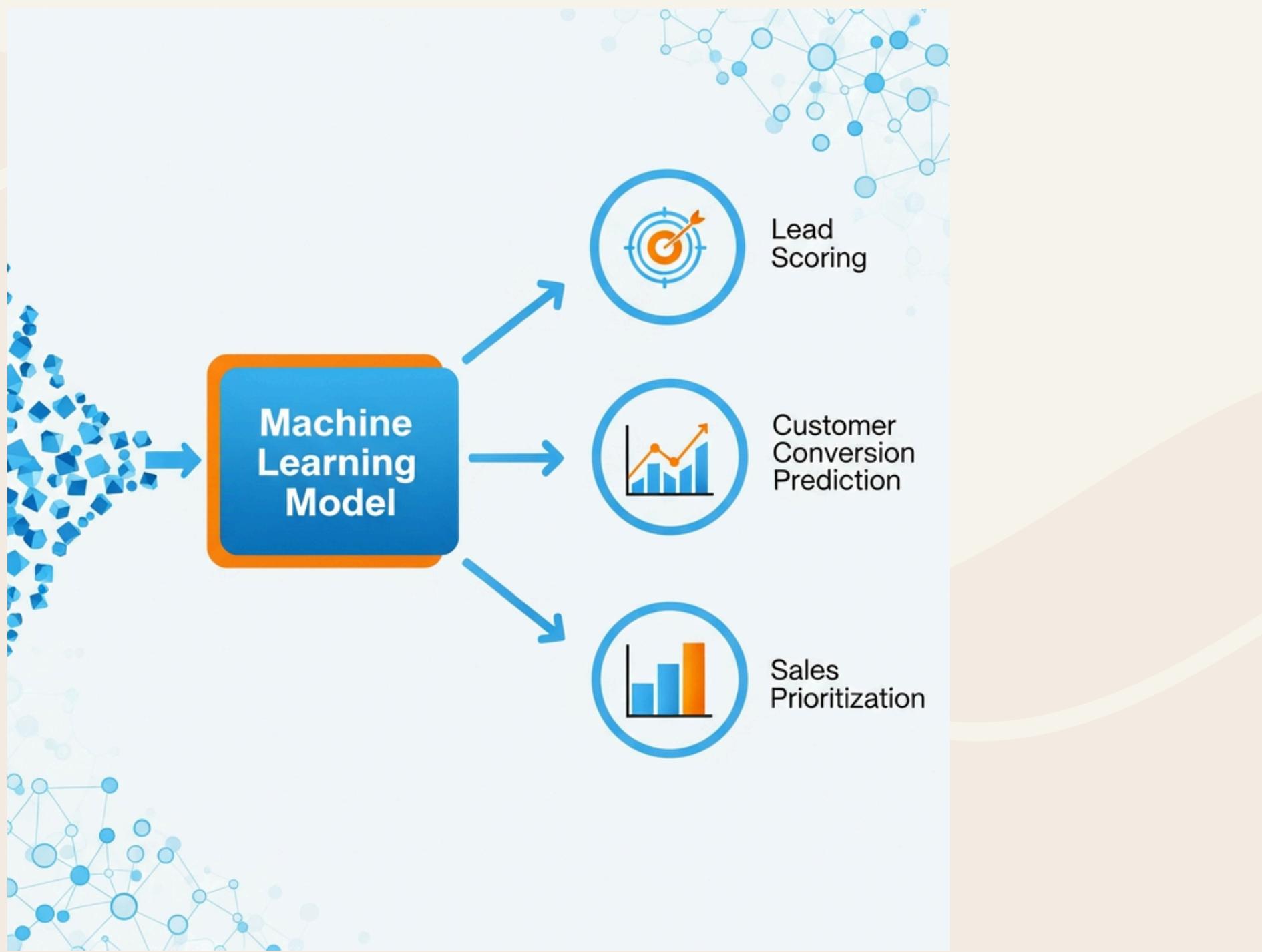


To develop and compare a multi-class classification model for client potential prediction.

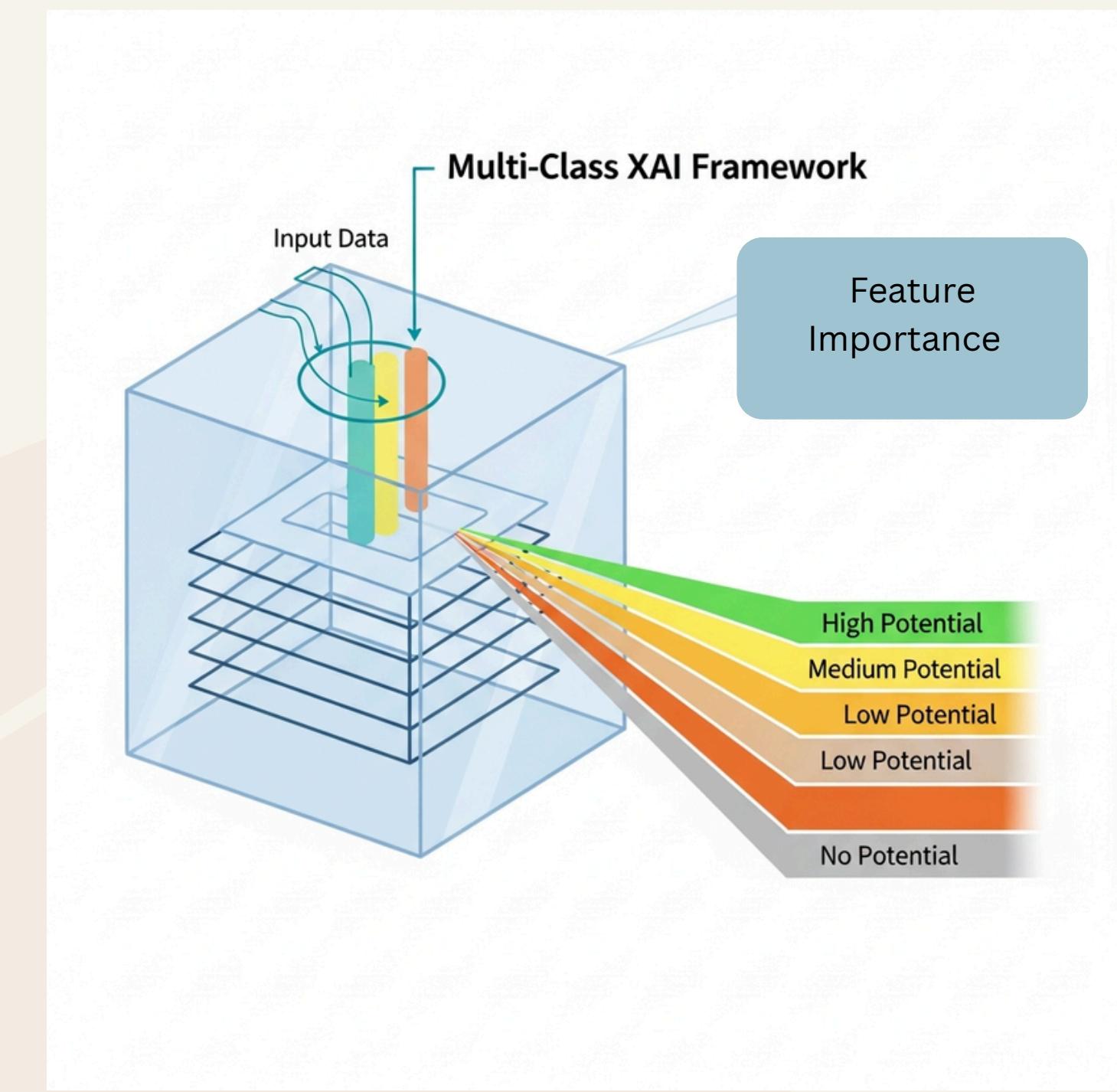


To use explainable AI technique to understand which features influence the predictions.

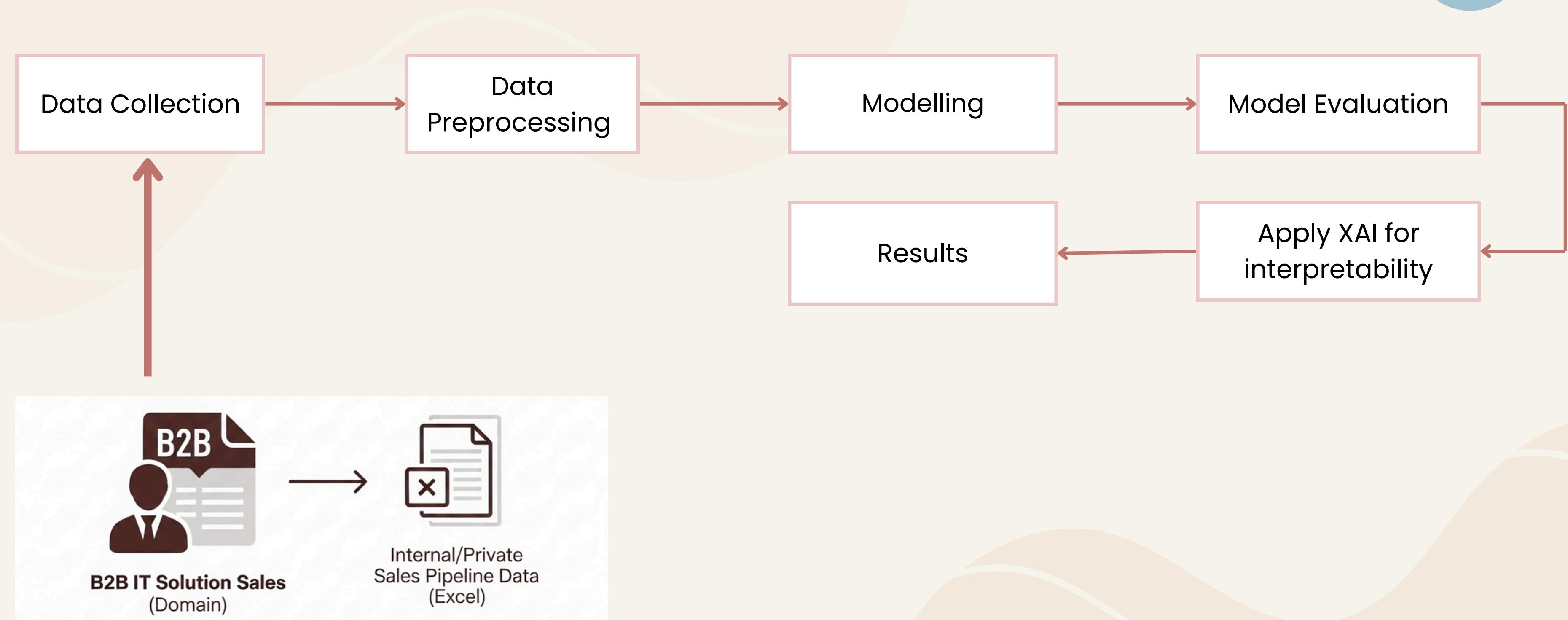
# Related Works



# Research Gap



# Research Methodology



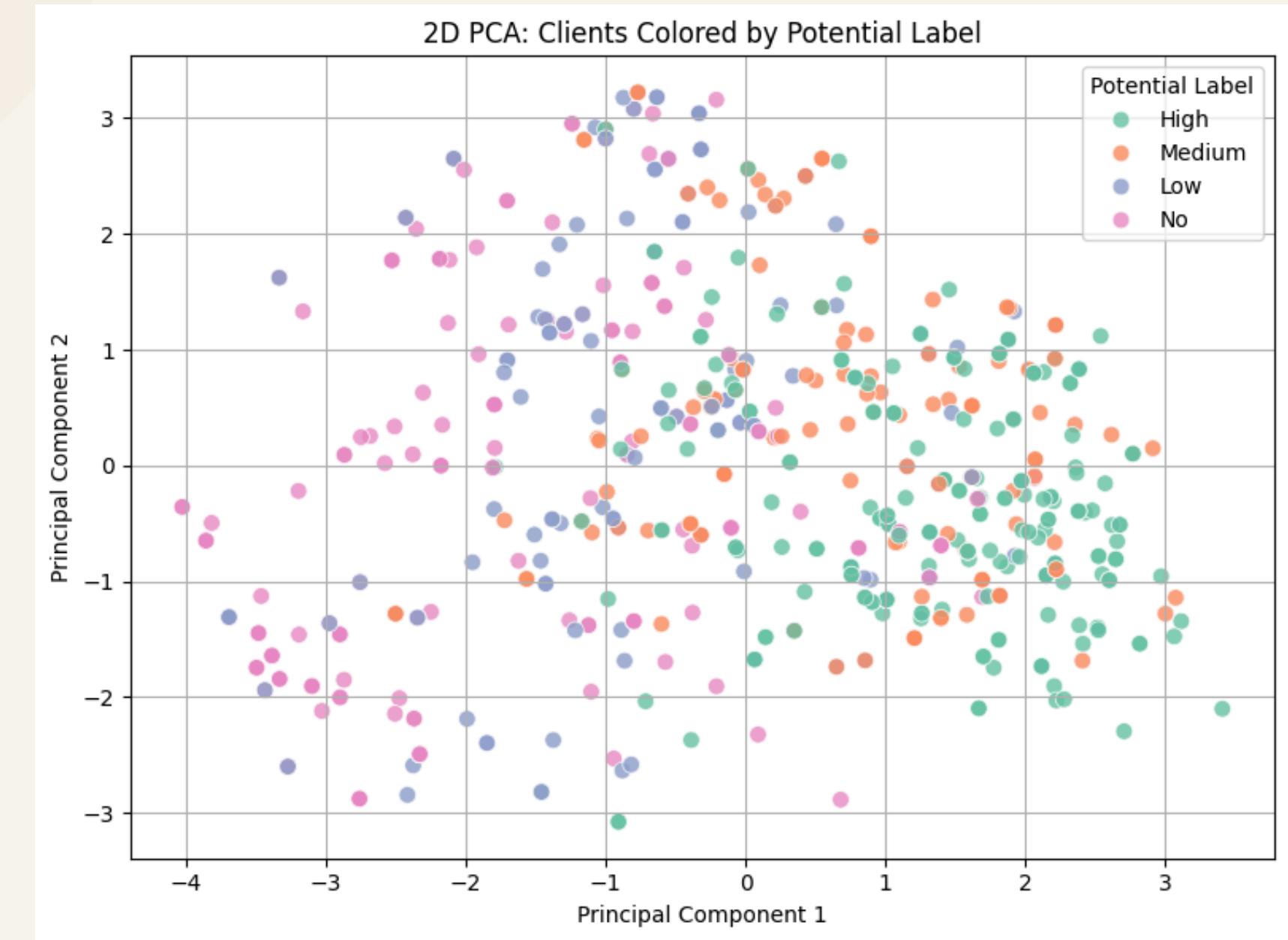
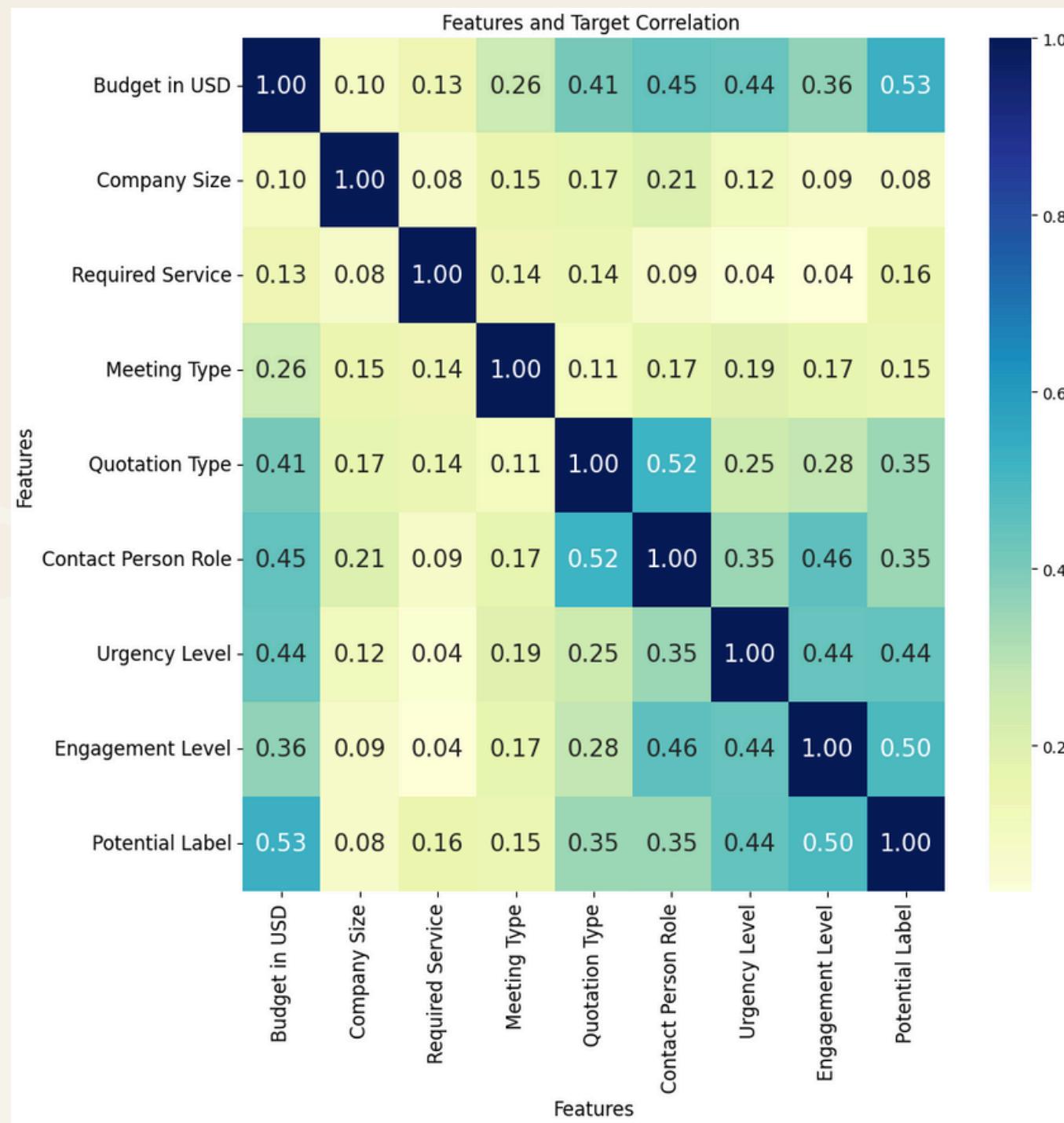
# Data Collection (Dataset Example)

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| Name                | Description   | Example  |
|---------------------|---|--|
| Client ID           | ID of the clients   | C001, C002, ...  |
| Company Size        | The type of the client's company, it is not the ranking of the company. | SME, NGO, Corporate, Other   |
| Required Service    | The type of service the client is requesting                            | Mobile Application, Website, Software, Other IT Services                     |
| Quotation Type      | The type of quotation that clients requested                            | Detailed, Standard, Just Pricing   |
| Meeting Type        | The type of meeting type that clients requested                         | Online Platform, In Person, No Meeting                                       |
| Contact Person Role | The role of the contact person at the client's company.                 | CEO, IT Team, Sale Staff, Business Development Team, Digital Marketing Staff |
| Urgency Level       | The urgency of the project  | High, Medium, Low  |
| Budget in USD       | The client's budget in USD  | 2000, 3000   |
| Engagement Level    | The level of engagement level with clients                              | High, Medium, Low  |
| Potential Label     | <b>The target variable for classification</b>                           | <b>High, Medium, Low and No</b>  |

# Data Preprocessing and EDA Insights

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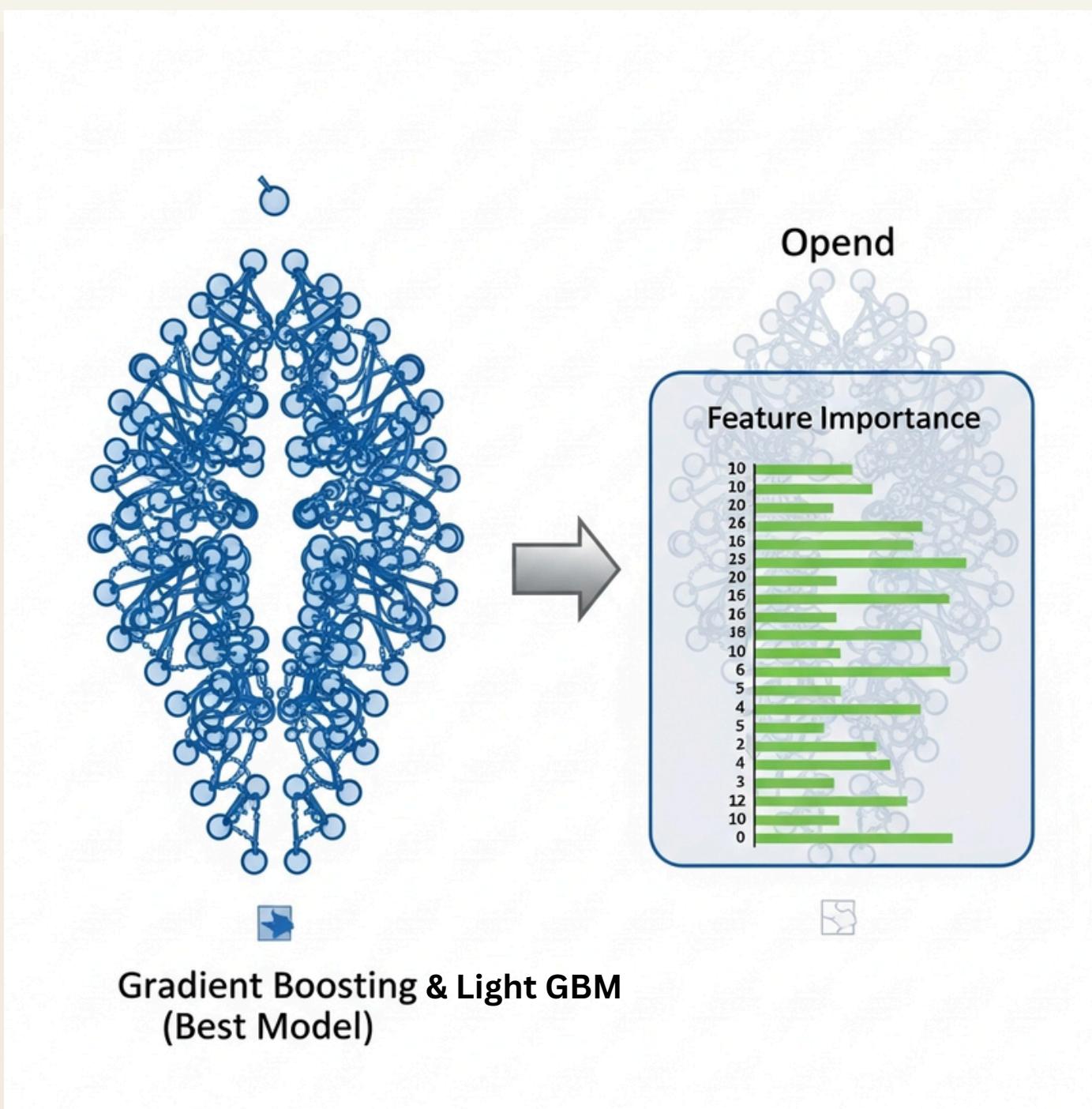
- EDA revealed moderate correlations between Budget (0.53), Engagement Level (0.50), and Urgency Level (0.44) with the target label.

- The PCA visualization showed overlap between High and Medium classes, while Low and No potential clients were more distinctly separated.

# Classification Results

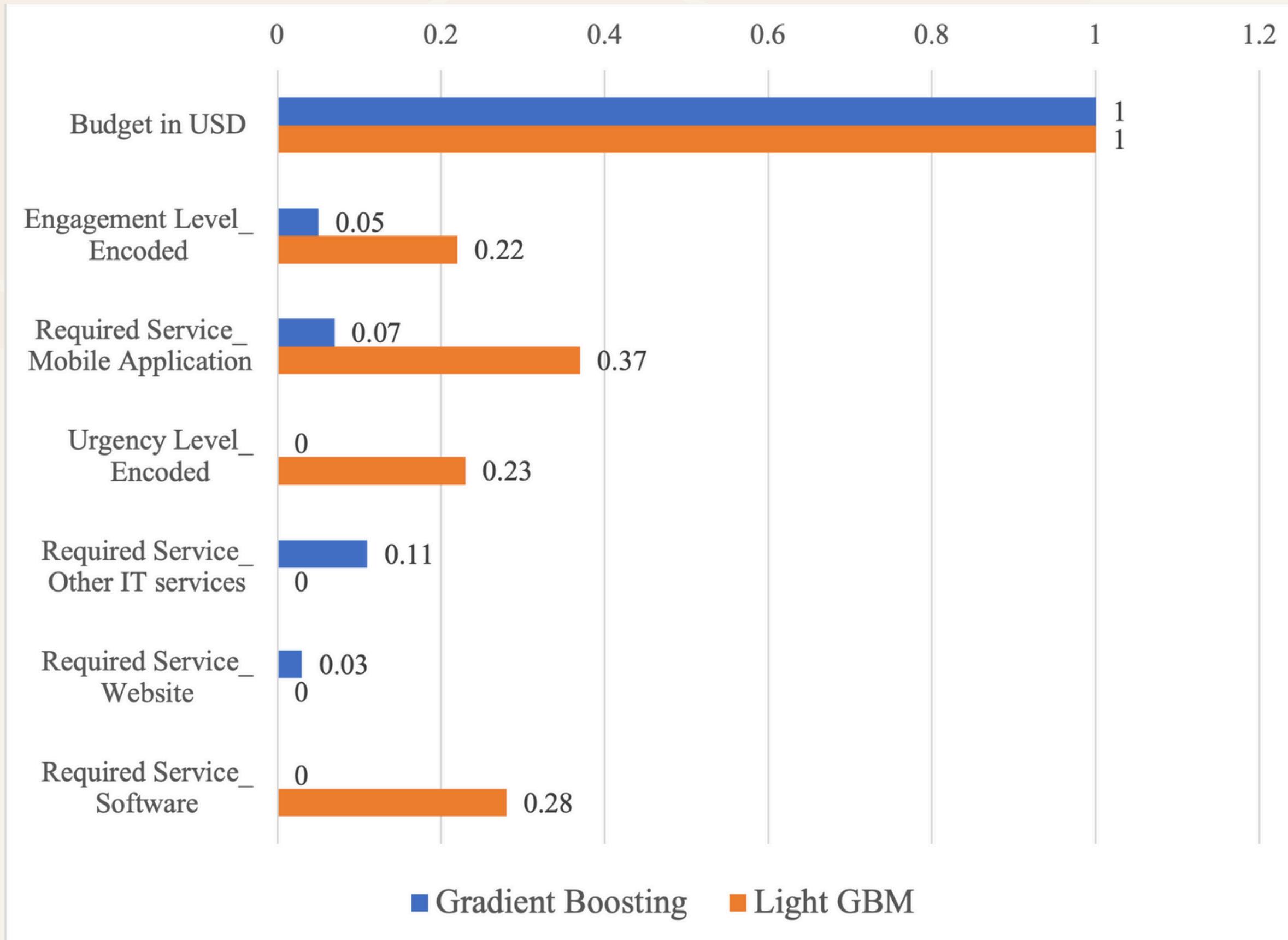
| <b>Model</b>             | <b>Accuracy</b> | <b>Precision</b> | <b>Recall</b> | <b>F1 Score</b> | <b>Standard Deviation</b> |
|--------------------------|-----------------|------------------|---------------|-----------------|---------------------------|
| <b>Gradient Boosting</b> | <b>0.76</b>     | <b>0.763</b>     | <b>0.755</b>  | <b>0.762</b>    | <b>0.049</b>              |
| XGB                      | 0.75            | 0.75             | 0.747         | 0.747           | 0.048                     |
| Light GBM                | 0.761           | 0.751            | 0.733         | 0.76            | 0.055                     |
| LR                       | 0.751           | 0.751            | 0.745         | 0.711           | 0.039                     |
| Decision Tree            | 0.751           | 0.756            | 0.745         | 0.755           | 0.056                     |
| SVM                      | 0.705           | 0.701            | 0.71          | 0.71            | 0.065                     |
| KNN                      | 0.677           | 0.677            | 0.686         | 0.677           | 0.055                     |
| Random Forest            | 0.758           | 0.733            | 0.735         | 0.735           | 0.064                     |
| Naïve Bayes              | 0.627           | 0.516            | 0.538         | 0.519           | 0.047                     |

# Explainable AI (XAI)



- Explainable AI is a set of processes and methods that allow human users to understand and trust the results and output created by machine learning algorithms.

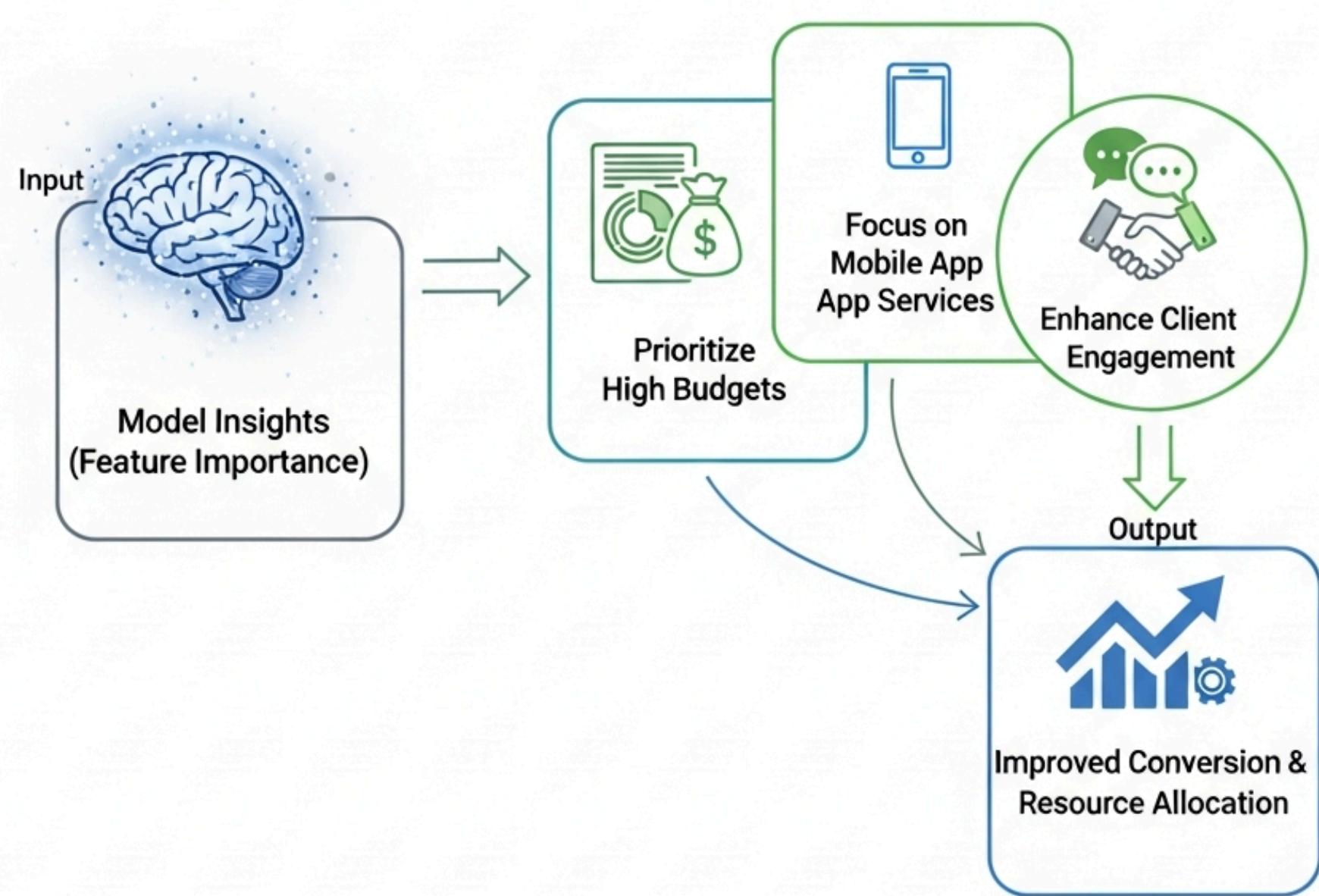
# Apply XAI



- X-axis represents the magnitude of the feature's influence on the model's prediction.
- Y-axis represents the features

# Business Implications

## Conclusion



In conclusion:

- The **Gradient Boosting algorithm** achieved the best accuracy of **76%**.
- Feature Importance provided transparency, revealing that **Budget, Engagement Level, and Required Service\_Mobile Application** were the top predictors.
- The model's accuracy was limited by class overlap in the feature space, as revealed by PCA
- Future work will focus on data increasement collected from multiple companies across regions and exploring other XAI methods.

**Thank you!**