### Backend Technologies

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| **Technology** | **Why It Was Chosen** |
| Python | The undisputed industry standard for AI, data science, and machine learning, with an unparalleled ecosystem of powerful libraries. |
| FastAPI | A modern, high-performance web framework that provides exceptional speed, automatic API documentation, and robust data validation. |
| Socket.IO | Enables real-time, bidirectional communication, which is essential for instant notifications to customers and admins without page reloads. |
| SQLModel | Allows for a clean, type-safe, and Pythonic way to interact with the database, reducing errors and improving code clarity. |

### AI & Data Processing Stack

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| **Technology** | **Why It Was Chosen** |
| Scikit-learn | The go-to library for building reliable machine learning models. We use its RandomForestClassifier with balanced class weights for intelligent, nuanced predictions. |
| Pandas | The essential tool for all data manipulation tasks, from cleaning the initial Kaggle training dataset to preparing real-time application data for the AI model. |
| Pytesseract & OpenCV | A powerful combination for document analysis. OpenCV pre-processes images (cleans noise, improves contrast), and Pytesseract (Google's Tesseract engine) extracts the text with high accuracy. |
| Pdfplumber | A specialized library chosen for its ability to extract structured tables and transactional data from PDF bank statements, which is critical for verifying financial health. |

### Frontend Technologies

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| **Technology** | **Why It Was Chosen** |
| HTML, CSS, Vanilla JS | This universal stack ensures the application is lightweight, incredibly fast, and requires no complex build process. It is easy to maintain and deploy. |
| Web Speech API | A built-in browser feature that provides powerful Text-to-Speech and Speech-to-Text capabilities, making the chatbot accessible to a wider range of users, including those with literacy challenges. |