Product Design

TEAM NUMBER – 2

TEAM NAME – FINEASE

TEAM MEMBERS

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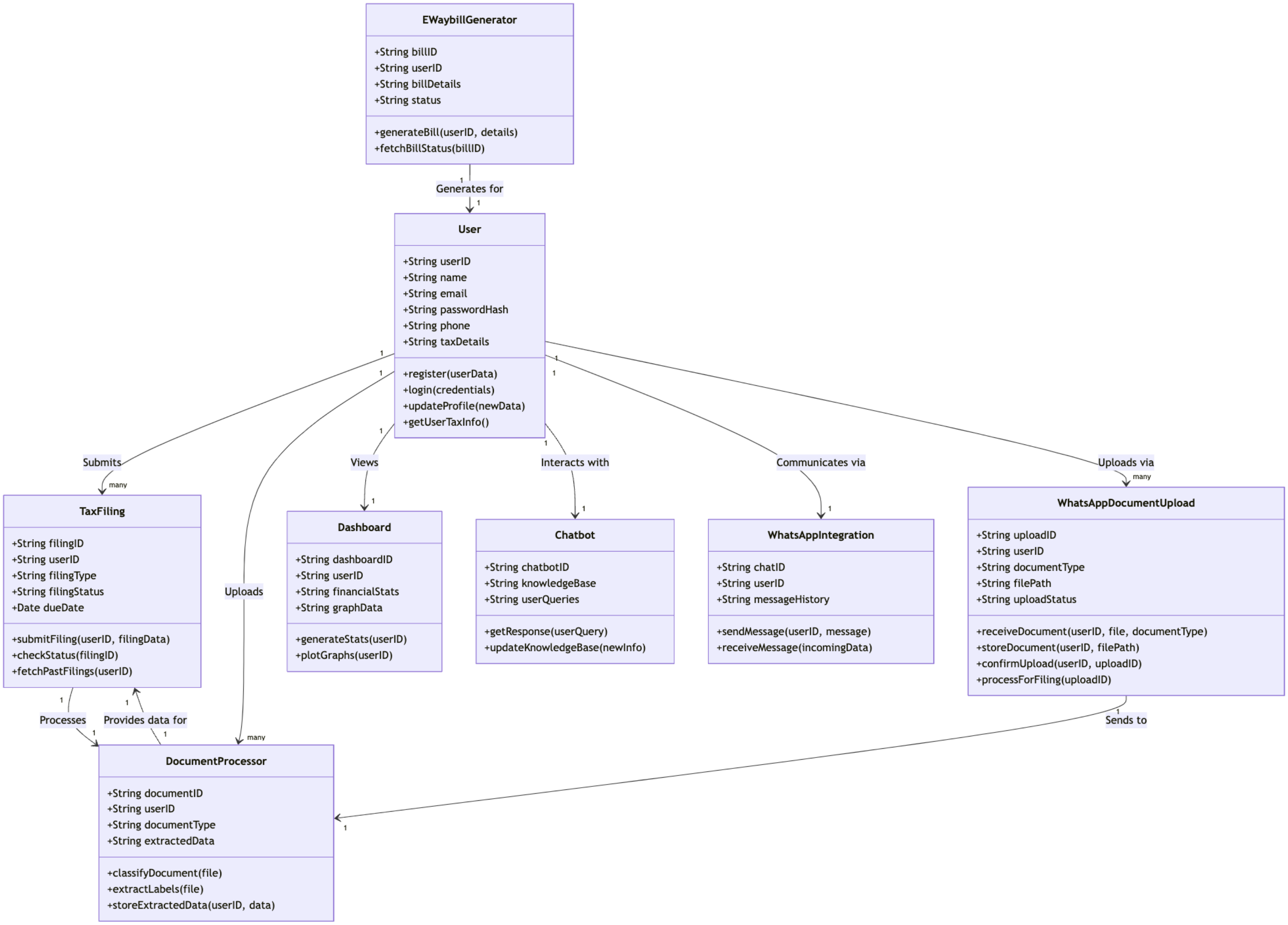
Design Model



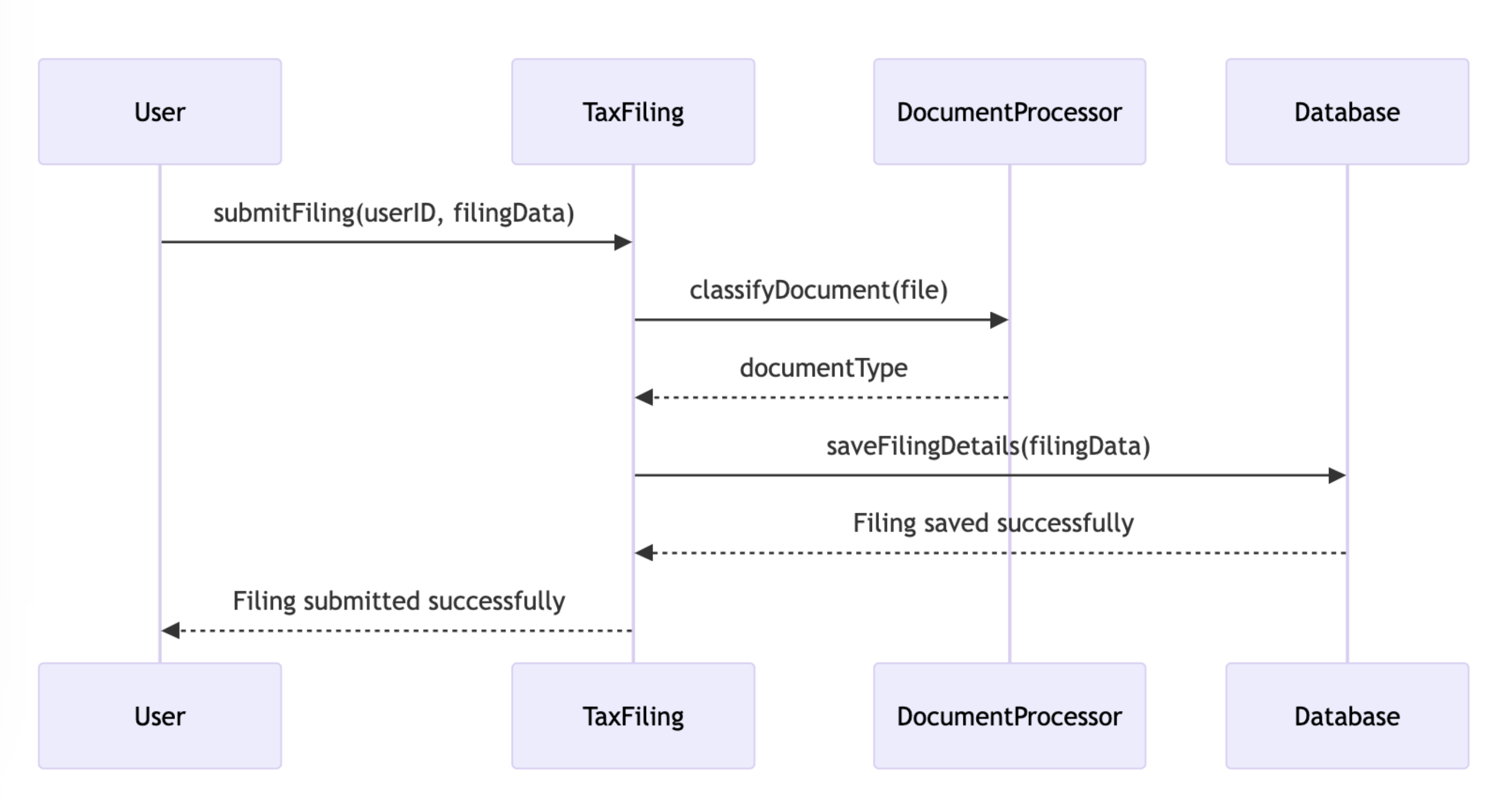
Class No. & Name	Class State (Information Maintained) & Behavior (Methods Implemented)
1. User	**State:** - userID (Unique identifier) - name - email - passwordHash - phone - taxDetails **Behavior:** - register(userData) - login(credentials) - updateProfile(newData) - getUserTaxInfo()

2. TaxFiling	**State:** - filingID - userID - filingType (GST, ITR, PF) - filingStatus - dueDate **Behavior:** - submitFiling(userID, filingData) - checkStatus(filingID) - fetchPastFilings(userID)
3. DocumentProcessor	**State:** - documentID - userID - documentType (GST, PF, ITR) - extractedData **Behavior:** - classifyDocument(file) - extractLabels(file) - storeExtractedData(userID, data)
4. Chatbot	**State:** - chatbotID - knowledgeBase - userQueries **Behavior:** - getResponse(userQuery) - updateKnowledgeBase(newInfo)
5. EWaybillGenerator	**State:** - billID - userID - billDetails - status **Behavior:** - generateBill(userID, details) - fetchBillStatus(billID)
6. WhatsAppIntegration	**State:** - chatID - userID - messageHistory **Behavior:** - sendMessage(userID, message) - receiveMessage(incomingData)

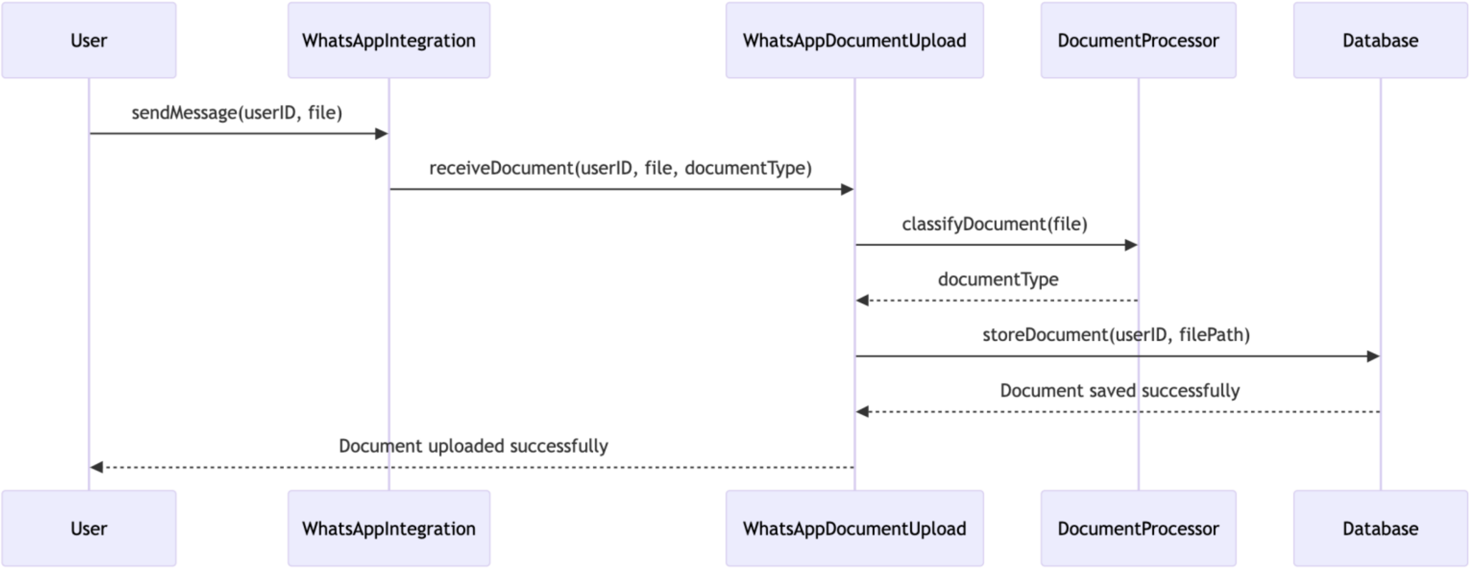
7. WhatsAppDocumentUpload	**State:** - uploadID - userID - documentType (GST, ITR, PF) - filePath - uploadStatus **Behavior:** - receiveDocument(userID, file, documentType) - storeDocument(userID, filePath) - confirmUpload(userID, uploadID) - processForFiling(uploadID)
8. Dashboard	**State:** - dashboardID - userID - financialStats - graphData **Behavior:** - generateStats(userID) - plotGraphs(userID)

Sequence Diagram(s)

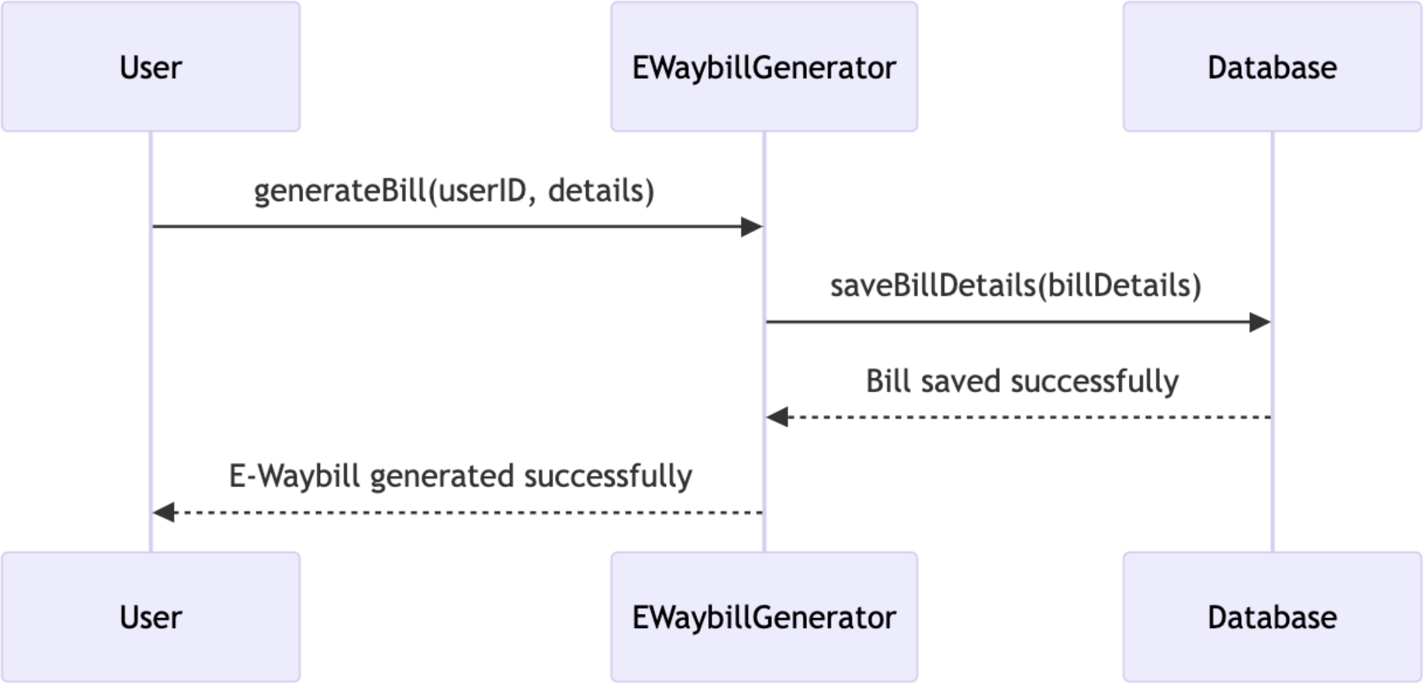
TAX FILING SEQUENCE DIAGRAM


User
TaxFiling
DocumentProcessor
Database
submitFiling(userID, filingData)
classifyDocument(file)
documentType
saveFilingDetails(filingData)
Filing saved successfully
Filing submitted successfully
User
TaxFiling
DocumentProcessor
Database

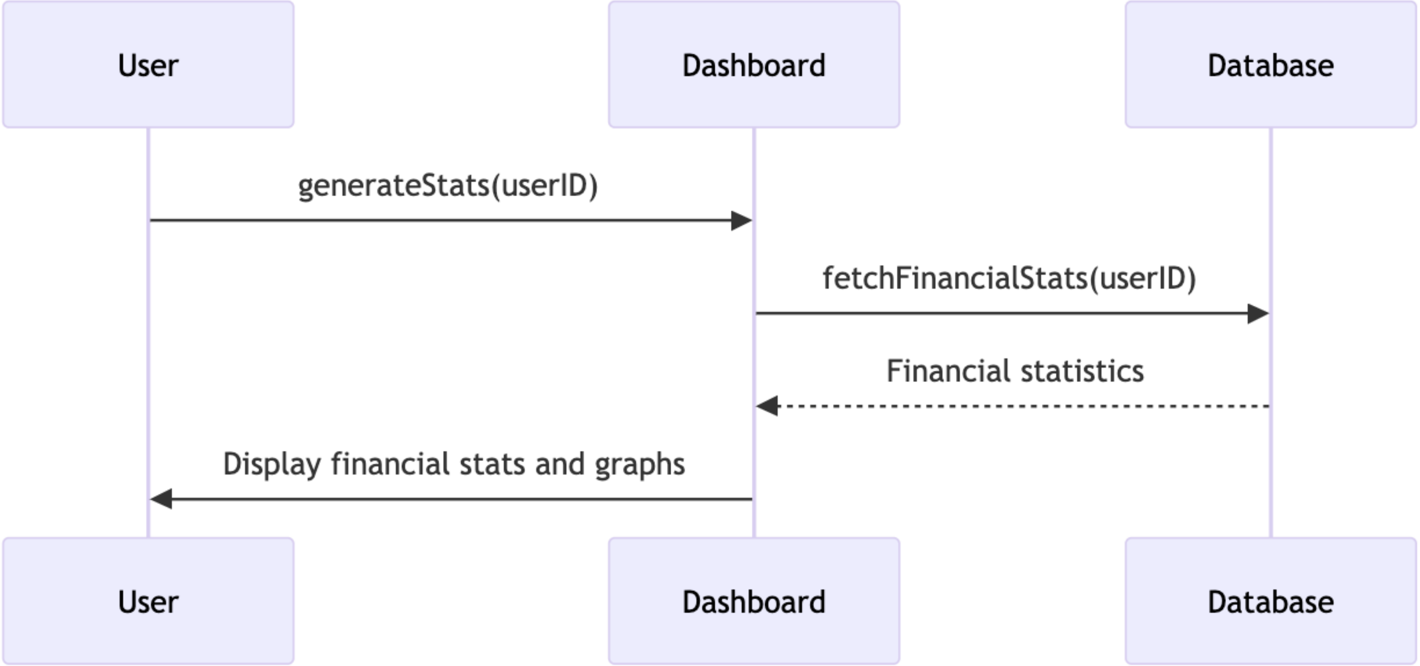
WHATSAPP INTEGRATION SEQUENCE DIAGRAM



E WAYBILL GENERATION SEQUENCE DIAGRAM


User
EWaybillGenerator
Database
generateBill(userID, details)
saveBillDetails(billDetails)
Bill saved successfully
E-Waybill generated successfully
User
EWaybillGenerator
Database

DASHBOARD SEQUENCE DIAGRAM



Design Rationale

Design Issues and Rationale

1. User Authentication and Registration

Issue:

How should user authentication and registration be implemented to ensure security and scalability?

Alternatives Considered:

1. **Basic Email/Password Authentication**:
   a. Simple to implement.
   b. Vulnerable to security risks like brute force attacks.
2. **OAuth-Based Authentication (e.g., Google, Facebook)**:
   a. Enhanced security and user convenience.
   b. Adds dependency on third-party services.
3. **Two-Factor Authentication (2FA)**:
   a. Provides an additional layer of security.
   b. May complicate the user experience.

Chosen Solution:

- **Basic Email/Password Authentication with Password Hashing**:
  - Implemented password hashing (e.g., bcrypt) to secure user credentials.
  - Chosen for its simplicity and ease of implementation, given the project's scope and timeline.

Rationale:

- The project prioritizes a quick and straightforward implementation.
- Password hashing ensures sufficient security for user data.
- OAuth and 2FA were rejected due to added complexity and third-party dependencies.

2. Document Processing and Classification

Issue:

How should the system classify and extract data from uploaded documents?

Alternatives Considered:

1. **Rule-Based Classification**:
   a. Uses predefined rules to classify documents.
   b. Limited flexibility and scalability.
2. **Machine Learning-Based Classification (e.g., NanoNets API)**:
   a. Highly accurate and scalable.
   b. Requires integration with external APIs.
3. **Manual Classification by Users**:
   a. Users manually select document types.
   b. Prone to human error and inefficiency.

Chosen Solution:

- **Machine Learning-Based Classification (NanoNets API)**:
  - Integrated NanoNets API for automated document classification and data extraction.
  - Provides high accuracy and scalability.

Rationale:

- Rule-based classification was rejected due to its inflexibility.
- Manual classification was rejected due to inefficiency and error-prone nature.

- NanoNets API was chosen for its accuracy and ability to handle large volumes of documents.

3. WhatsApp Integration for Document Upload

Issue:

How should the system handle document uploads via WhatsApp?

Alternatives Considered:

1. **Direct File Upload via WhatsApp API**:
   a. Users upload files directly through WhatsApp.
   b. Requires robust file handling and validation.
2. **Email-Based Upload with WhatsApp Notifications**:
   a. Users upload files via email and receive notifications on WhatsApp.
   b. Adds an extra step for users.
3. **Cloud Storage Link Sharing**:
   a. Users share links to files stored in cloud storage (e.g., Google Drive).
   b. Requires users to have cloud storage accounts.

Chosen Solution:

- **Direct File Upload via WhatsApp API**:
  - Integrated Twilio API for WhatsApp to allow direct file uploads.
  - Implemented file validation and processing logic.

Rationale:

- Email-based upload and cloud storage link sharing were rejected due to added complexity for users.
- Direct file upload via WhatsApp was chosen for its simplicity and seamless user experience.

4. Dashboard Design and Data Visualization

Issue:

How should the dashboard display financial statistics and graphs?

Alternatives Considered:

1. **Static Dashboard with Predefined Graphs**:
   a. Displays fixed graphs and statistics.
   b. Limited flexibility for users.
2. **Interactive Dashboard with Customizable Views**:
   a. Allows users to customize graphs and statistics.
   b. Requires more development effort.
3. **Third-Party Dashboard Tools (e.g., Tableau, Power BI)**:
   a. Provides advanced visualization features.
   b. Adds dependency on external tools.

Chosen Solution:

- **Interactive Dashboard with Customizable Views**:
  - Built using a frontend framework (e.g., React) and charting library (e.g., Chart.js).
  - Allows users to customize views and filter data.

Rationale:

- Static dashboards were rejected due to limited user flexibility.
- Third-party tools were rejected due to added cost and dependency.
- An interactive dashboard was chosen for its balance of flexibility and development effort.

5. E-Waybill Generation

Issue:

How should the system handle e-waybill generation?

Alternatives Considered:

1. **Manual E-Waybill Generation**:
   a. Users manually enter details to generate e-waybills.
   b. Prone to errors and time-consuming.
2. **Automated E-Waybill Generation with Prefilled Data**:
   a. Automatically fills data from user profiles and past filings.
   b. Requires integration with tax filing data.
3. **Third-Party E-Waybill Services**:
   a. Uses external services for e-waybill generation.
   b. Adds dependency and cost.

Chosen Solution:

- **Manual E-Waybill Generation**:
  - Users manually enter details to generate e-waybills.
  - Implemented a user-friendly form for data entry.

Rationale:

- Automated generation was rejected due to the complexity of integrating with tax filing data.
- Third-party services were rejected due to added cost and dependency.
- Manual generation was chosen for its simplicity and alignment with the project's scope and timeline.

Summary of Trade-Offs

Feature	Chosen Solution	Rejected Alternatives	Reason for Choice
User Authentication	Email/Password with Hashing	OAuth, 2FA	Simplicity and security
Document Processing	NanoNets API	Rule-Based, Manual Classification	Accuracy and scalability
WhatsApp Document Upload	Direct File Upload via WhatsApp API	Email-Based, Cloud Storage Links	Seamless user experience

Dashboard Design	Interactive Dashboard	Static Dashboard, Third-Party Tools	Flexibility and customization
E-Waybill Generation	Manual Generation	Automated Generation, Third-Party Services	Simplicity and alignment with scope