Business Requirements Document (BRD)

1. Project Overview

1.1 Project Name

Group Expense Management & Bill Split App

1.2 Purpose

The purpose of this application is to help groups of people (friends, roommates, travel groups) easily track shared expenses, split bills fairly, and understand spending patterns using AI-powered insights. The app will be mobile-first and usable on Android phones.

1.3 Target Users

- Friends managing daily expenses
- Travel groups splitting trip costs
- Flatmates sharing rent, groceries, utilities
- Small informal groups (non-business)

1.4 Goals

- Simplify group expense tracking
- Reduce confusion and conflicts around money
- Provide intelligent insights into spending habits
- Be easy to use, fast, and free to deploy

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2. Scope

2.1 In-Scope

- Group creation and management
- Expense entry and bill splitting
- Balance calculation and settlements
- AI-based expense categorization and insights
- Mobile app support (Android)
- Free-tier cloud deployment

2.2 Out of Scope

- Payments integration (UPI, cards)
- Business or enterprise accounting
- Tax calculation or compliance
- iOS App Store publishing

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3. Functional Requirements

3.1 User Authentication

- Users should be able to sign up and log in using:
- Email & password
- Google authentication
- Users must stay logged in across sessions

3.2 User Profile

- View basic profile details
- Edit display name
- View groups user belongs to

3.3 Group Management

- Create a group (name, optional description)
- Add members to a group
- Remove members (admin only)
- View all groups user is part of

3.4 Expense Management

- Add an expense with:
- Amount
- Description
- Paid by (user)
- Date
- Split expense:
- Equally among all members
- Custom split among selected members

3.5 Balance Calculation

- Automatically calculate:
- Who owes whom
- Net balance per user in a group
- Show simplified settlement suggestions

3.6 Expense History

- View list of all expenses in a group
- Filter by date or user

3.7 Settlement Tracking

- Mark expenses as settled
- View settled vs pending balances

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4. AI Features (Functional Requirements)

4.1 Smart Expense Categorization

- Automatically assign categories such as:
- Food
- Travel
- Rent
- Entertainment
- Based on expense description

4.2 Natural Language Expense Input

- User can type text like:
- "Paid 1200 for dinner split between 4"
- System parses input and creates expense automatically

4.3 Spending Insights

- Show insights such as:
- Top spending category
- Comparison with group average
- Weekly / monthly trends

4.4 Expense Prediction

- Predict next month’s total spending
- Based on historical data

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5. Non-Functional Requirements

5.1 Performance

- API response time < 2 seconds
- App should work smoothly on mid-range Android phones

5.2 Security

- Secure authentication using tokens
- Role-based access to groups
- No unauthorized data access

5.3 Scalability

- Support multiple groups per user
- Designed to scale horizontally using containers

5.4 Availability

- Backend uptime dependent on free-tier services
- App should handle backend downtime gracefully

5.5 Usability

- Simple UI
- Minimal steps to add expenses
- Clear balance visualization

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6. Technical Requirements

6.1 Frontend

- Ionic Framework with Angular
- Mobile-first design
- Android support using Capacitor

6.2 Backend

- Spring Boot REST APIs
- JWT or Firebase token-based security

6.3 Database

- PostgreSQL (free cloud tier)
- OR Firebase Firestore

6.4 AI & ML

- Rule-based + lightweight ML models
- Free AI inference APIs (HuggingFace)

6.5 DevOps

- Dockerized backend
- Kubernetes manifests for deployment
- CI/CD optional

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7. Deployment Requirements

- Backend deployed on free cloud platform (Render / Railway)
- Frontend hosted using Firebase Hosting
- Database using free-tier managed service
- Android APK generated for manual distribution

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8. Assumptions & Constraints

Assumptions

- Users have internet access
- Limited concurrent users

Constraints

- Free-tier cloud limitations
- No paid AI APIs

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9. Success Criteria

- Users can create groups and add expenses without errors
- Accurate balance calculation
- AI features provide meaningful insights
- App usable by real users on mobile devices

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10. Future Enhancements

- UPI payment integration
- iOS support
- Expense export (CSV/PDF)
- Notifications and reminders