**AI-Driven Personal Finance Assistant**

**System Architecture Document**

**1. Platform Overview**

| **Layer** | **Component** | **Description** |
| --- | --- | --- |
| Client Side (Frontend) | Mobile Application | React Native app for Android/iOS with user-facing features |
| Server Side (Backend) | API Server | Handles business logic, data processing, and AI operations |
| Database Layer | Relational DB + NoSQL | Stores user data, transactions, budgets, goals, and insights |
| AI Processing Layer | Machine Learning Engine | Powers transaction categorization and financial insights |
| Admin Panel | Web Portal | For system administrators to manage users and monitor system |
| Communication Layer | Push Notifications, Email | Delivers alerts, reminders, and insights to users |
| Authentication & Security | JWT, Encryption | Manages secure login, data protection, and bank integration |
| Integration Layer | Banking APIs | Connects with banking systems for account data |

**2. Programming Languages & Frameworks**

| **Purpose** | **Language/Framework** |
| --- | --- |
| Mobile App | React Native |
| Frontend Components | JavaScript, React |
| Backend API | Node.js (Express) |
| AI/ML Components | Python (TensorFlow/Py Torch) |
| Database | MySQL (relational) + MongoDB (for AI data) |
| API Documentation | Open API/Swagger |

**3. Tools & Technologies**

| **Category** | **Tools/Technologies** |
| --- | --- |
| Version Control | Git, GitHub |
| CI/CD | GitHub Actions |
| Cloud & Hosting | AWS (EC2, Lambda) |
| Authentication | OAuth 2.0, JWT, Biometric integration |
| Notification Services | Firebase Cloud Messaging (FCM), SendGrid |
| Bank Integration | Plaid API, Open Banking standards |
| Data Backup | AWS S3, automated daily backups |
| Monitoring | Prometheus, Grafana, New Relic |
| Security Testing | OWASP ZAP, Burp Suite |

**4. Hardware Requirements**

| **Component** | **Minimum Specification** | **Recommended Specification** |
| --- | --- | --- |
| Backend Server | 4 vCPU, 8GB RAM, 100GB SSD | 8 vCPU, 16-32GB RAM, 250GB+ SSD |
| AI/ML Server | 8 vCPU, 16GB RAM, GPU support | 16+ vCPU, 32GB+ RAM, dedicated GPU |
| Database Server | 4 vCPU, 16GB RAM, 200GB SSD | 8 vCPU, 32GB RAM, 500GB+ SSD |
| Client Devices | Android 8.0+, iOS 13+, 2GB RAM | Latest OS version, 4GB+ RAM |

**5. Software Requirements**

| **Category** | **Software** |
| --- | --- |
| OS (Server) | Ubuntu Server 20.04+ |
| Backend Framework | Node.js 18+ with Express |
| Database | MySQL 8.0+, MongoDB 5.0+ |
| AI Platform | TensorFlow 2.x / PyTorch 1.x |
| Mobile | Android 8.0+, iOS 13+ |
| API Communication | RESTful, JSON |
| Security | HTTPS, TLS 1.3, Data encryption at rest |