# Low-Level Design (LLD) Document

## iNeuron

## 1. Introduction

Funku Online Store is an AI-powered e-commerce platform that integrates a recommendation system, bargaining system, and chatbot to enhance the user shopping experience. The system is built with Flask for the backend, React.js for the frontend, and Firebase Firestore for real-time chat storage.

## 2. System Architecture

• Frontend: React.js  
• Backend: Flask (REST API)  
• Database: Firebase Firestore (NoSQL)  
• Hosting: Localhost (development), Firebase Hosting (optional)  
• AI Models: NLP-based chatbot, recommendation system

## 3. Module Breakdown

### 3.1 Frontend (React.js)

• Components:  
 - ProductList.js: Displays recommended products.  
 - Chatbot.js: Handles AI chatbot interactions.  
 - BargainSystem.js: Allows users to negotiate prices.  
 - FirebaseConfig.js: Connects frontend to Firebase Firestore.  
  
• APIs Consumed:  
 - /chat?message=your\_message (handles chatbot queries)  
 - /recommendations?user\_id=123 (fetches personalized product recommendations)

### 3.2 Backend (Flask API)

• Endpoints:  
 - GET /chat?message=your\_message: Processes user messages and responds with AI-generated replies.  
 - GET /recommendations?user\_id=123: Fetches product recommendations based on user preferences.  
  
• Key Services:  
 - Chatbot Service: Uses NLP models to generate responses.  
 - Recommendation Engine: Suggests products using collaborative filtering and content-based filtering.

### 3.3 Database (Firebase Firestore)

• Collections:  
 - chats: Stores user chat history.  
 - users: Stores user preferences for recommendations.  
 - products: Stores product details.

## 4. Data Flow

1. User visits the frontend.  
2. User interacts with chatbot or product recommendations.  
3. Frontend sends API requests to the backend.  
4. Flask processes the request and queries Firebase Firestore.  
5. AI models generate chatbot responses or recommendations.  
6. Backend returns the response to the frontend.  
7. Frontend updates the UI accordingly.

## 5. Technologies Used

• Frontend: React.js, Bootstrap, React-Toastify  
• Backend: Flask, Flask-CORS, Flask-RESTful  
• Database: Firebase Firestore  
• AI Models: NLP-based chatbot, recommendation algorithms

## 6. Future Enhancements

• Deploy backend on Google Cloud Run or AWS Lambda.  
• Upgrade chatbot AI to GPT-4 for better user interaction.  
• Implement Firebase Authentication for user login.

## Contributors

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iNeuron Certified Project