# Architecture Design Document

## iNeuron

## 1. Introduction

This document outlines the architecture design for the Funku Online Store, an AI-powered e-commerce platform integrating AI-driven recommendations, a bargaining system, and a chatbot. The architecture ensures a scalable, efficient, and maintainable system.

## 2. System Architecture Overview

The Funku Online Store follows a \*\*client-server architecture\*\*, with a React.js frontend communicating with a Flask backend. The backend processes requests, interacts with Firebase Firestore, and integrates AI models for recommendations and chatbot functionalities.

## 3. Architecture Diagram

[Insert system architecture diagram here]

## 4. Components Breakdown

### 4.1 Frontend (React.js)

• \*\*User Interface Components:\*\* Product listings, chatbot, and shopping cart.  
• \*\*API Integration:\*\* Communicates with Flask backend via RESTful APIs.  
• \*\*State Management:\*\* React Context API for handling global states.

### 4.2 Backend (Flask)

• \*\*RESTful APIs:\*\* Handles requests for product recommendations, chatbot responses, and transactions.  
• \*\*AI Modules:\*\* Includes an NLP chatbot and recommendation algorithms.  
• \*\*Security:\*\* Implements authentication and data validation.

### 4.3 Database (Firebase Firestore)

• \*\*Data Storage:\*\* Stores user data, product information, chat history, and transactions.  
• \*\*Real-Time Updates:\*\* Ensures seamless data synchronization.

## 5. Data Flow

1. User interacts with the frontend (React.js).  
2. The frontend sends API requests to the Flask backend.  
3. The backend processes the requests and interacts with Firebase Firestore.  
4. AI models analyze user data and generate responses.  
5. The backend sends the processed response to the frontend.  
6. The frontend updates the UI accordingly.

## 6. Technologies Used

• \*\*Frontend:\*\* React.js, Bootstrap  
• \*\*Backend:\*\* Flask, Flask-CORS, Flask-RESTful  
• \*\*Database:\*\* Firebase Firestore  
• \*\*AI Models:\*\* NLP-based chatbot, recommendation system  
• \*\*Deployment:\*\* Localhost (development), Firebase Hosting (optional)

## 7. Future Enhancements

• Deploy the backend on Google Cloud Run or AWS Lambda.  
• Improve chatbot AI using GPT-4.  
• Implement Firebase Authentication for secure user login.

## 8. Contributors

[Your Name] (https://github.com/Dhach123)

iNeuron Certified Project