Project Report: ShopAssist AI

1. Objectives

The primary objective of the ShopAssist AI project is to build a laptop recommendation chatbot that can interact with users, understand their requirements, and recommend the most suitable laptops based on their needs and preferences. The chatbot aims to simplify the online shopping experience by providing personalized assistance, reducing confusion caused by the vast array of available choices.

2. Design and Architecture

The ShopAssist AI system is designed in three stages to ensure effective interaction, product matching, and recommendation delivery:

| STAGE 1 (INTENT CLARITY AND INTENT CONFIRMATION) Communicate with the user & understand their intent.	STAGE 2 (PRODUCT EXTRACTION AND PRODUCT MAPPING) Extract relevant products to the user	STAGE 3 (PRODUCT RECOMMENDATION) Communicate the recommendations to the user

- Stage 1: Understanding User Requirement

The chatbot proactively interacts with users to gather all necessary details about their laptop requirements. The conversation continues until sufficient information is collected.

- Stage 2: Product Mapping & Extraction

Product details from the dataset are processed and matched against the extracted user requirements. Only top 3 suitable products are selected for recommendation.

- Stage 3: Product Recommendation:

- The chatbot presents the shortlisted laptops to the user, providing clear and relevant explanations to help them make an informed decision.

CHATBOT SYSTEM DESIGN
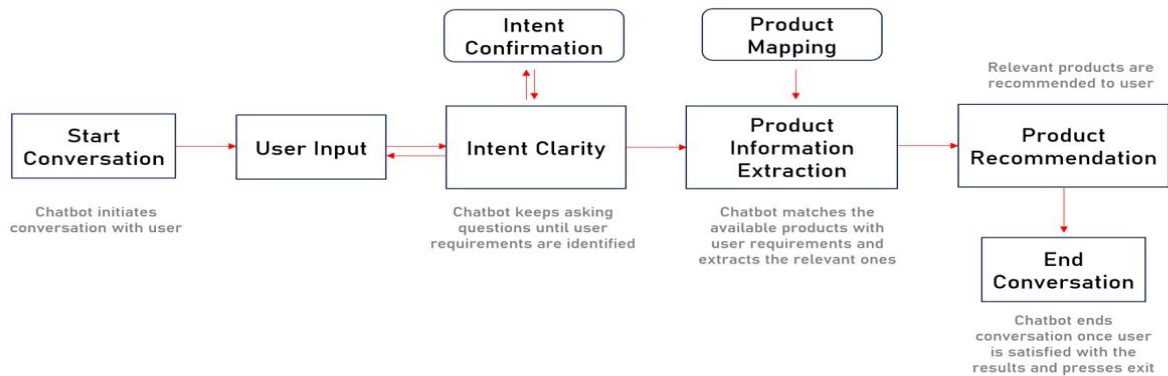
3. Implementation

The implementation involves combining Large Language Models (LLMs) with rule-based functions to parse user queries, extract structured requirements, and map them to the product dataset. The chatbot focuses on the 'Description' field of laptops to assess compatibility with user needs. The project is implemented as a web-based interactive chatbot using Jupyter Notebook for prototyping and testing.

4. Challenges

1. Ensuring accurate interpretation of user requirements, which may often be vague or incomplete.
2. Mapping user requirements precisely to dataset specifications to avoid irrelevant recommendations.
3. Maintaining conversational flow to ensure users provide all necessary information without losing engagement.
4. Handling limitations of dataset quality and coverage.
5. Balancing between free-form LLM responses and structured rule-based filtering.

5. Lessons Learned

1. A hybrid approach (LLMs + rule-based filtering) provides better accuracy than relying on a single method.
2. Clear system design with modular stages ensures scalability and maintainability.
3. Continuous user interaction is essential to capture detailed requirements.
4. Function calling APIs can significantly streamline requirement extraction and improve reliability.
5. Documentation and stepwise development improve team collaboration and project clarity.

6. Conclusion

ShopAssist AI successfully demonstrates how conversational AI can enhance online shopping experiences. By integrating natural language understanding with structured product filtering, it delivers personalized, accurate, and user-centric laptop recommendations. The project lays the foundation for future enhancements, such as integrating real-time product databases, multi-modal inputs, and advanced personalization techniques.