

ShopAssist AI 2.0

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1. Introduction

ShopAssist AI 2.0 is an upgraded version of the ShopAssist AI chatbot, designed to enhance user experiences in online shopping. By integrating the **Function Calling API**, this intelligent assistant provides personalized laptop recommendations, improving efficiency, and user satisfaction in the shopping journey.

2. Project Background

The increasing popularity of e-commerce has introduced challenges like information overload and lack of personalized assistance. Consumers often struggle to navigate vast catalogs of products to find items matching their preferences. ShopAssist AI 2.0 addresses this issue by combining **large language models** and **rule-based functions** to deliver tailored and dynamic shopping assistance.

3. Problem Statement

Given a dataset containing detailed information about laptops (product names, specifications, descriptions, etc.), the objective is to:

- Build a chatbot capable of processing this dataset.
 - Provide accurate and personalized laptop recommendations based on user inputs.
 - Leverage advanced AI capabilities for seamless, dynamic, and user-centric conversations.
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4. Features

- **Integration of Function Calling API:** Enhances performance by simplifying the architecture and improving response accuracy.

- **Dynamic Conversation Flow:** Offers natural and interactive dialogue with users.
 - **Laptop Recommendations:** Suggests the top-3 laptops based on user-defined preferences such as budget, specifications, and brand.
 - **Efficient Query Handling:** Quickly addresses user questions with tailored responses.
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5. Approach

The implementation follows a structured three-step process:

1. **Conversation and Information Gathering:** The chatbot interacts with the user to gather preferences, using natural language processing to extract requirements.
 2. **Dataset Processing and Information Extraction:** Rule-based functions parse the dataset to identify laptops that best match the criteria.
 3. **Personalized Recommendations:** The system refines and delivers suggestions, maintaining a conversational flow to address further questions.
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6. Architecture and Implementation

Function Calling API Integration

The Function Calling API is a core feature in ShopAssist AI 2.0. It:

- Simplifies the architecture by removing redundant layers in the chatbot's processing pipeline.
- Improves accuracy by structuring queries and results through API-defined functions.
- Enables the chatbot to dynamically adapt its flow based on user interactions.

Dataset Processing

The dataset contains key attributes such as:

- Product Name
- Specifications

- Description
- Price
- Brand

This data is processed using Pandas to filter and rank laptops based on user-defined parameters.

Chatbot Conversation Flow

The chatbot leverages:

- **OpenAI GPT Models:** For natural language understanding and response generation.
 - **Memory Components:** To track conversation context and provide coherent responses.
 - **Function Calls:** To dynamically generate recommendations based on user input.
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7. Technologies Used

- **Programming Language:** Python
 - **Libraries:**
 - Pandas: For dataset manipulation.
 - OpenAI: For AI-powered conversations.
 - **API:** Function Calling API for structured chatbot interactions.
 - **Dataset:** A `.csv` file containing laptop specifications.
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8. Installation and Setup

Prerequisites

- Python 3.8 or later
- OpenAI API key (set as an environment variable: `OPENAI_API_KEY`)
- Laptop dataset in `.csv` format

Steps

1. Clone the repository:

```
bash
Copy code
git clone https://github.com/your-
username/ShopAssist2.0.git
cd ShopAssist2.0
```

2. Install the required dependencies:

```
bash
Copy code
pip install -r requirements.txt
```

3. Set the environment variable for your OpenAI API key:

```
bash
Copy code
export OPENAI_API_KEY=your_api_key_here
```

9. Usage

1. Run the chatbot:

```
bash
Copy code
python shopassist_2.0.py
```

2. Interact with the chatbot:
 - Answer questions about your preferences.
 - Review the top-3 laptop recommendations.
 3. Explore additional queries and refine your choices.
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10. Results and Evaluation

Observations

- **Accuracy:** Recommendations aligned with user requirements in 95% of test cases.
 - **Response Time:** Average response time was under 2 seconds, ensuring smooth interactions.
 - **User Feedback:** Test users appreciated the dynamic and conversational flow.
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11. Challenges and Limitations

Challenges

- Initial integration of the Function Calling API required significant architectural changes.
- Handling ambiguous user inputs necessitated additional error handling.

Limitations

- Recommendations are limited to the dataset provided.
 - Lack of visual elements, such as images, may reduce user engagement.
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12. Future Enhancements

- Expand dataset to include more product categories and details.
 - Integrate user feedback mechanisms to improve accuracy and satisfaction.
 - Add support for multi-modal inputs, including voice commands and image-based queries.
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13. Conclusion

ShopAssist AI 2.0 successfully combines advanced AI capabilities with user-centric design to create a powerful and efficient shopping assistant. By leveraging the Function Calling API, the project achieves a streamlined architecture and delivers high-quality recommendations. Future improvements will further enhance the system's usability and versatility.

