**Title: Halawa AI Salesbot — A Real-Time Intelligent Assistant for E-commerce**

**Abstract**

This project presents the development of *Halawa AI Salesbot*, an AI-powered sales assistant built to enhance customer engagement in the e-commerce domain. Leveraging real-time product data and transformer-based language models, the chatbot provides informative and persuasive responses to customer queries about Halawa Wax products. It integrates a sentence embedding model and vector search to deliver contextually relevant answers. The system aims to bridge the gap between traditional static product descriptions and dynamic, conversational product support.

**Problem Statement and Research Gap**

In traditional e-commerce platforms, customers often rely on static descriptions, FAQs, or human support agents to learn about products. This creates friction in user experience, especially when immediate, detailed, or personalized assistance is needed. While chatbots exist, many are rule-based, lack contextual awareness, and do not utilize real-time product knowledge effectively.

**Research Gap**:

* Existing salesbots often fail to integrate real-time product data with conversational AI.
* Most implementations lack semantic search capabilities for identifying relevant product data from large corpora.
* Integration with advanced language models (like transformer-based architectures) for persuasive and domain-aware sales conversations is limited in open-source or lightweight implementations.

This project addresses these limitations by:

1. Employing **semantic product search** using SentenceTransformer and FAISS for contextual understanding.
2. Integrating **LLM-based response generation** (using OpenRouter's API and Mistral model).
3. Using **real-time product datasets** that reflect current inventory or promotional changes.

**Methodology**

**Dataset**

The dataset (halawa\_docs.csv) contains structured information on Halawa Wax products, including:

* Product Name
* Description
* Features
* Benefits

This real-time dataset serves as the knowledge base for generating tailored responses.

**Approach**

1. **Preprocessing and Indexing**:
   * The dataset is indexed using **FAISS** (Facebook AI Similarity Search), which enables efficient similarity search based on vector embeddings.
   * Sentence embeddings are computed using SentenceTransformer with the 'all-MiniLM-L6-v2' model for both the query and document vectors.
2. **Query Handling**:
   * User input is semantically encoded and compared against the vector index to retrieve the most relevant product entry.
   * The top product match is used as the context for generating the sales response.
3. **Response Generation**:
   * OpenRouter’s API is used to query a Mistral-based LLM (mistral-small-3.1-24b-instruct) with a structured prompt containing:
     + The user query
     + Retrieved product’s name, description, features, and benefits
   * The model is instructed to behave as a “persuasive e-commerce assistant” to generate tailored, convincing replies.
4. **UI Implementation**:
   * A Streamlit interface enables real-time interaction with users.
   * Custom styling and a responsive chat UI are implemented for usability and aesthetic appeal.

**Analysis of Implemented Salesbot**

**Strengths**:

* Real-time, dynamic product assistance.
* Hybrid pipeline using semantic search and generative LLMs.
* Domain-specific prompt engineering improves response relevance and persuasiveness.
* Lightweight deployment using Streamlit allows easy integration into websites or kiosks.

**Limitations**:

* Single product match (top\_k=1) may limit recommendation diversity.
* Dependency on API access (OpenRouter) may introduce latency or quota constraints.
* No explicit handling of user preferences, cart integration, or order tracking.

**Comparative Evaluation with Existing Works**

| **Feature** | **Traditional Chatbots** | **Transformer-Based Assistants** | **Halawa AI Salesbot** |
| --- | --- | --- | --- |
| Query Understanding | Keyword-based | Contextual Embeddings | Contextual Embeddings |
| Data Source | Static Rules | Sometimes dynamic | Real-time Dataset |
| Response Style | Predefined | Generative | Generative, Persuasive |
| Search Mechanism | None or basic | Optional | FAISS Semantic Search |
| Personalization | Low | Moderate | Moderate (contextual tailoring) |

While large commercial systems like those of Amazon and Shopify offer more comprehensive pipelines (with integrated order management, user profiling, etc.), *Halawa AI Salesbot* offers a scalable, modular prototype for domain-specific product assistance using free or open-source tools and APIs.

**Conclusion**

This project successfully demonstrates a sales chatbot that integrates semantic search, real-time product data, and transformer-based generation. It fills a notable research gap in accessible, intelligent e-commerce bots by combining lightweight infrastructure with powerful NLP tools. Future work could extend the bot to handle multilingual input, customer profiling, and end-to-end sales support.