

Conversational AI Project

A solution for customer communication

Structure:

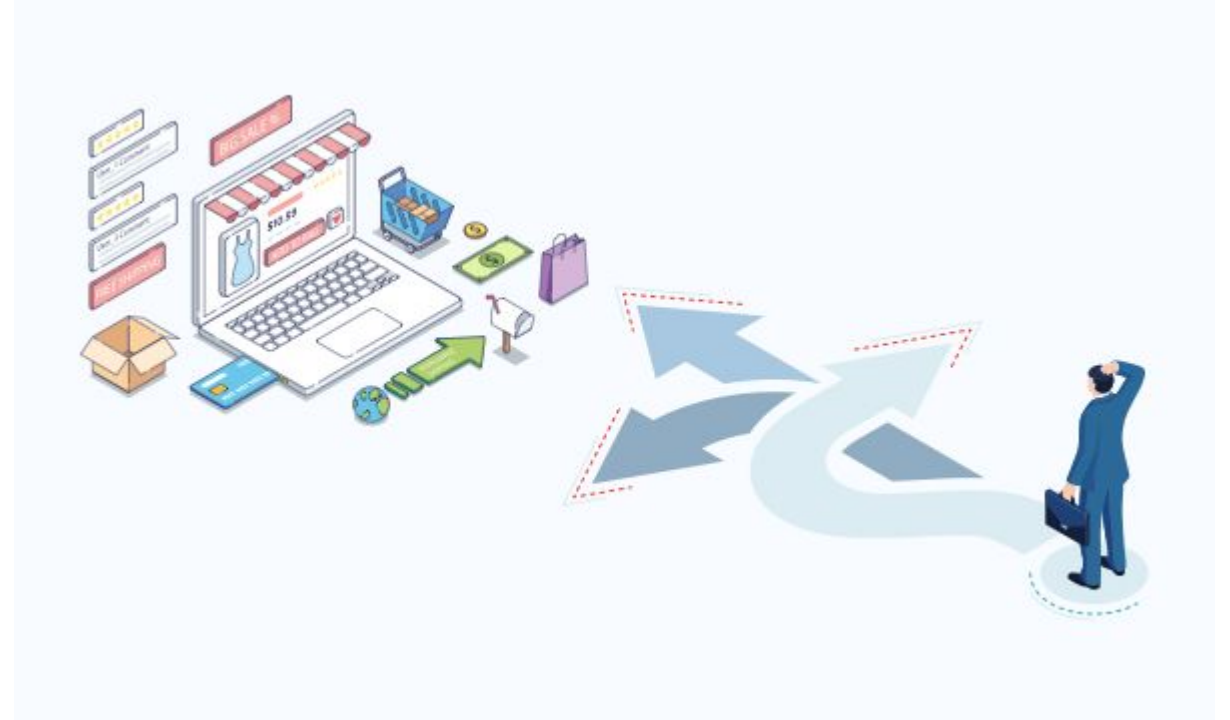
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2. Problem Statement



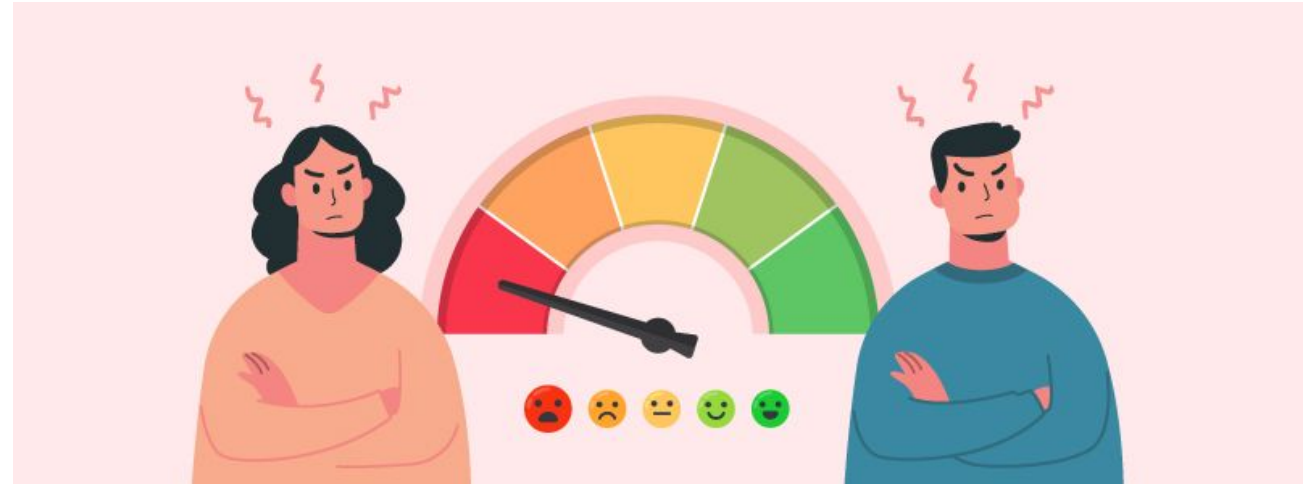
2.1 Challenges

- Lacks the ability to engage in dynamic and context-aware conversations with users, resulting in static and non-adaptive interactions
- Difficulties in finding personalized recommendations tailored to preferences and style
- Users face challenges in manually navigating through extensive product catalogs or conducting time-consuming searches, hindering a seamless and efficient product discovery process



2.2 Pain Points

- Limited personalization in the current product recommendation system may result in customers missing out on products aligned with their unique tastes.
- The absence of a personalized product consultant leads to a generic shopping experience, potentially leading to decreased customer satisfaction.



2.3 Competitors problem

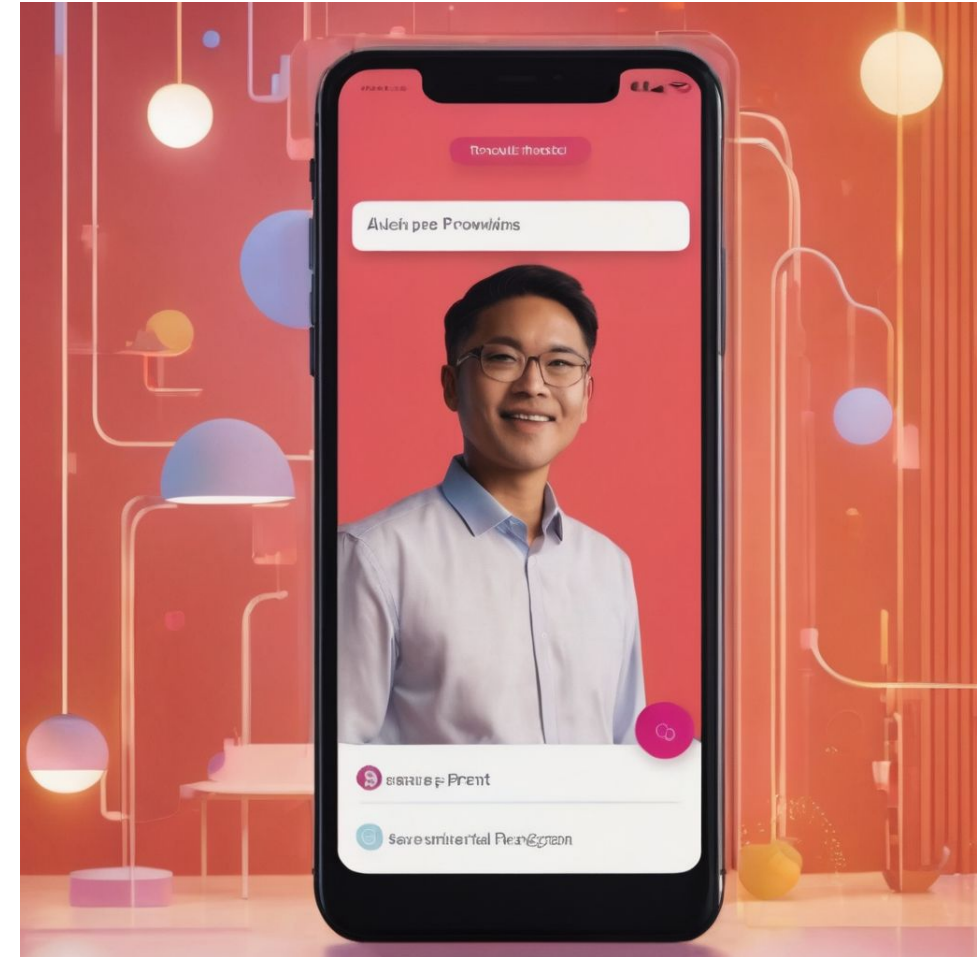
Current landscape: Competitors in the athletic apparel market may employ AI-driven chatbots or recommendation systems for product assistance

Positioning of competitors: Some competitors may focus on user experience through streamlined interface, while others may leverage AI for personalized recommendations



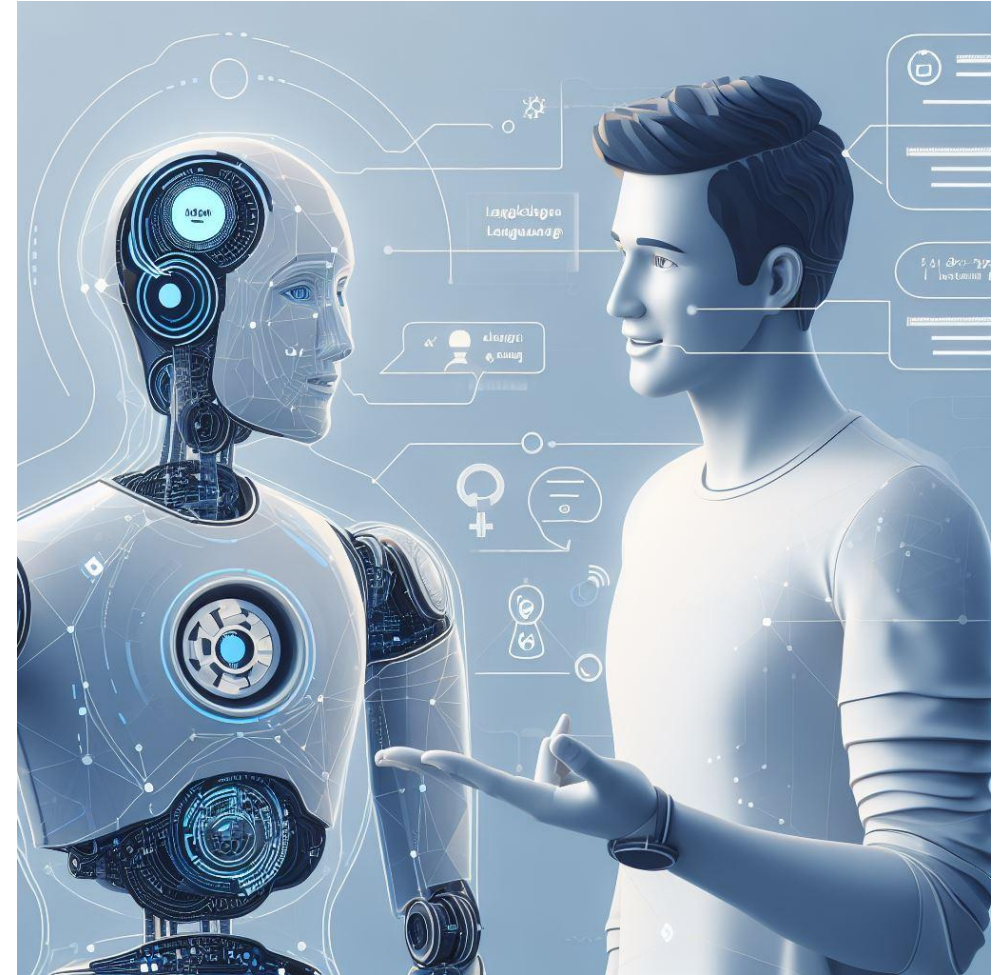
3. Solution Overview

The LangChain-powered AI product consultant chatbot is a cutting-edge solution that utilizes advanced natural language processing and machine learning technologies. This chatbot is designed to understand user interactions and preferences, providing highly personalized product recommendations.



3.1 Strategic models

- LangChain's language model gives the chatbot the ability to understand user inputs and respond in a way that closely resembles human conversation. This means the chatbot can comprehend and generate responses in a natural, human-like manner.
- Interactions with the chatbot feel more intuitive and conversational, creating a user experience that is both engaging and user-friendly.



3.2 Innovation

The solution leverages LangChain's powerful language capabilities, allowing the chatbot to understand nuanced user inputs and provide tailored recommendations, enhancing the overall user experience



Methodology

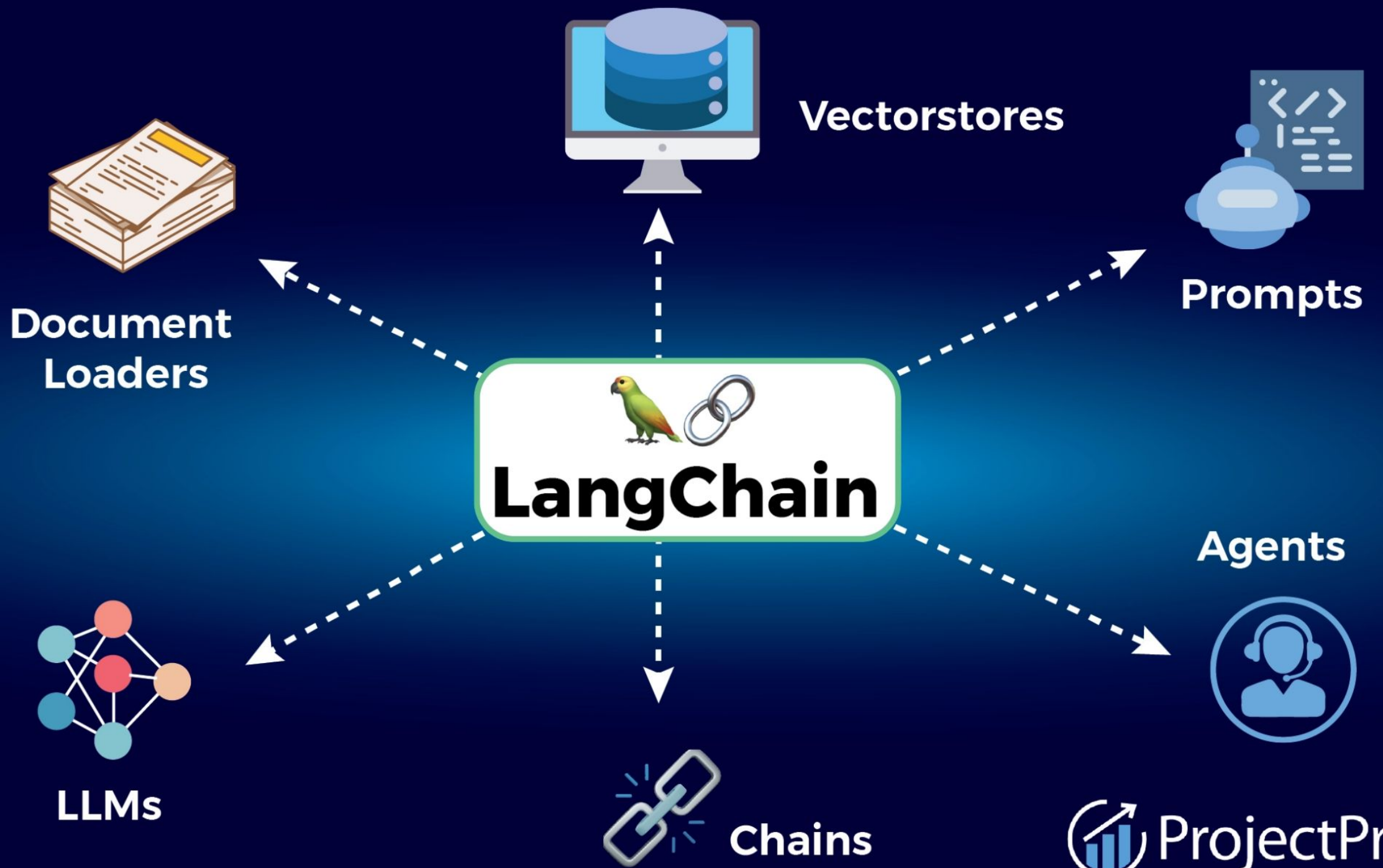
- Use pretrained LangChain model

Advantages:

- State-of-the-art NLP capabilities
- Knowledgeable based on massive data
- Adaptable via fine-tuning
- Scalable capacity with 175B+ parameters

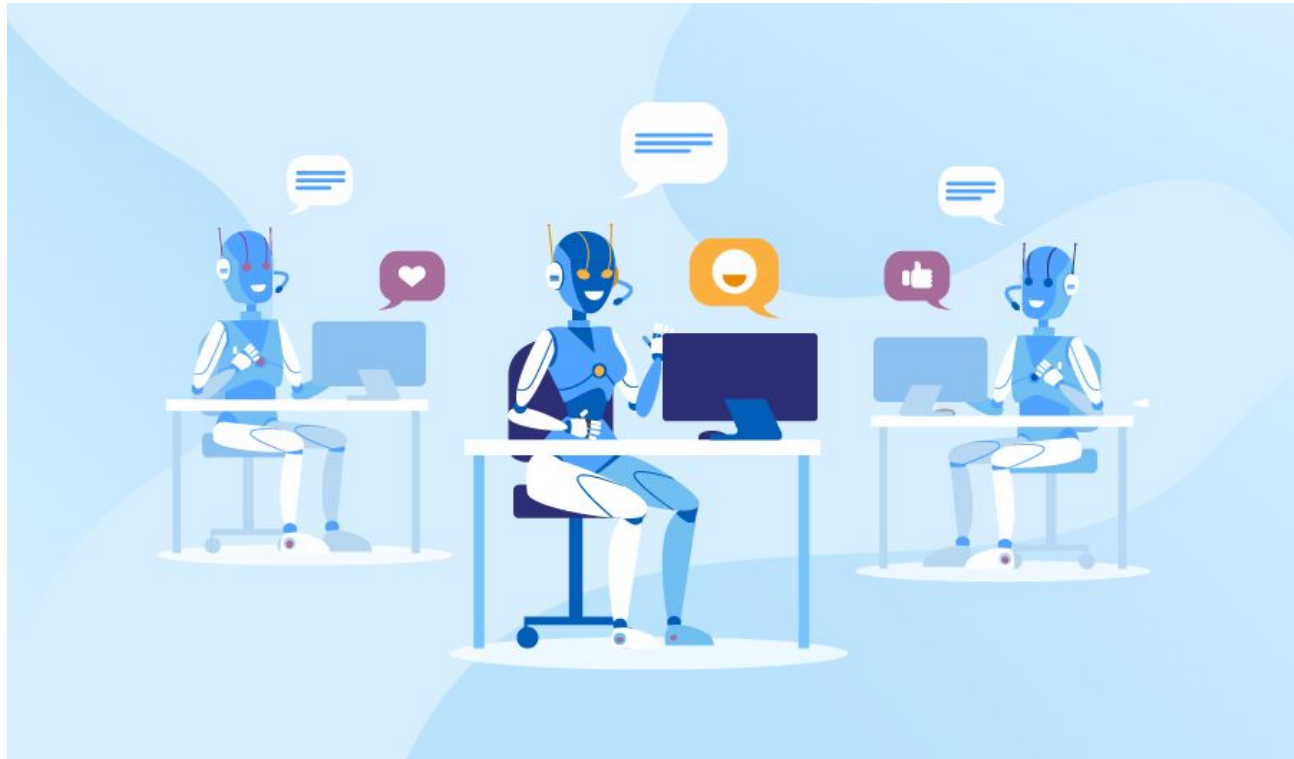
Disadvantages:

- Expensive computational cost
- Risk of harmful biases
- Opaque reasoning
- Difficult to customize fully
- Limited reasoning capabilities



Methodology

- Train on small custom dataset for MVP domain



Methodology

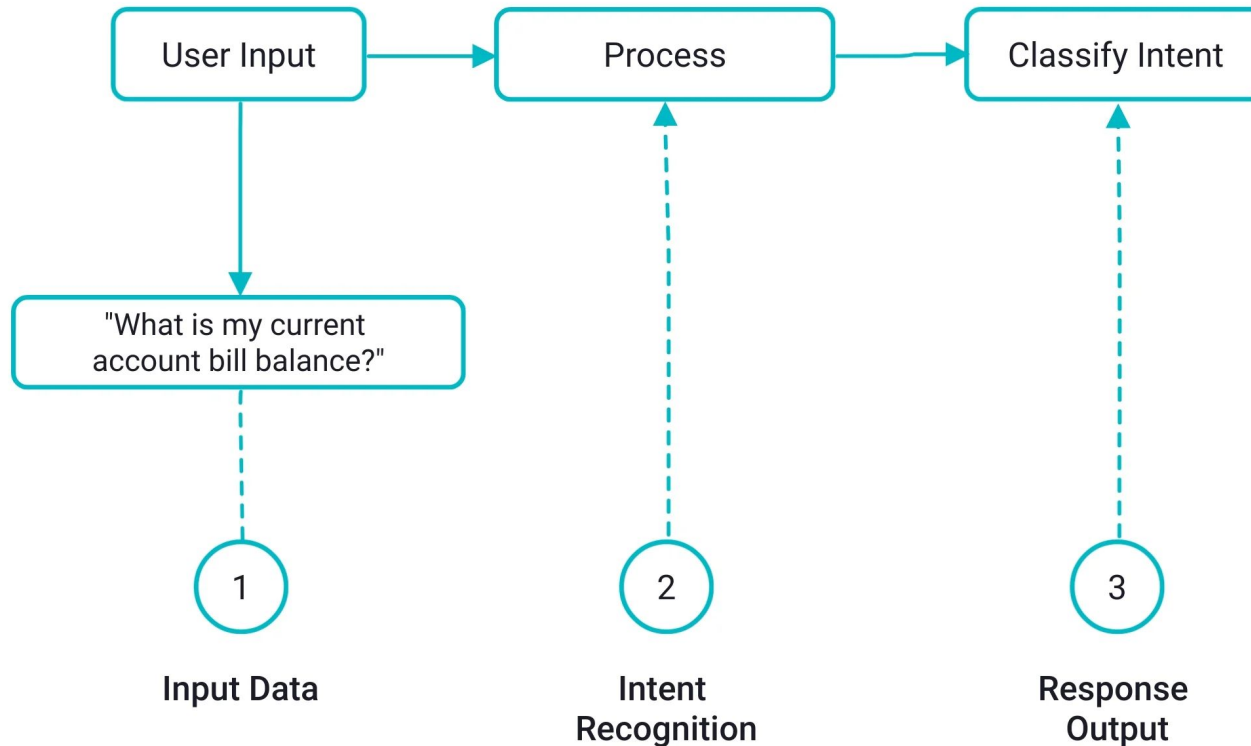
- Focus on key tasks: intent classification, entity extraction, response generation

Key benefits of LangChain's architecture:

- Parameter efficient sharing of encodings across tasks
- Jointly trained extractor and generator heads
- Scalable model capacity for complex reasoning
- Self-supervised pre training enables generalization

Intent classification:

- LangChain models leverage a classifier head trained on intent labels to predict probabilities over possible intent classes for an input text.



Entity Extraction:

- The models utilize token-level representations from the transformer encoder to identify entity spans using labeled entity BIO tagging schemes.

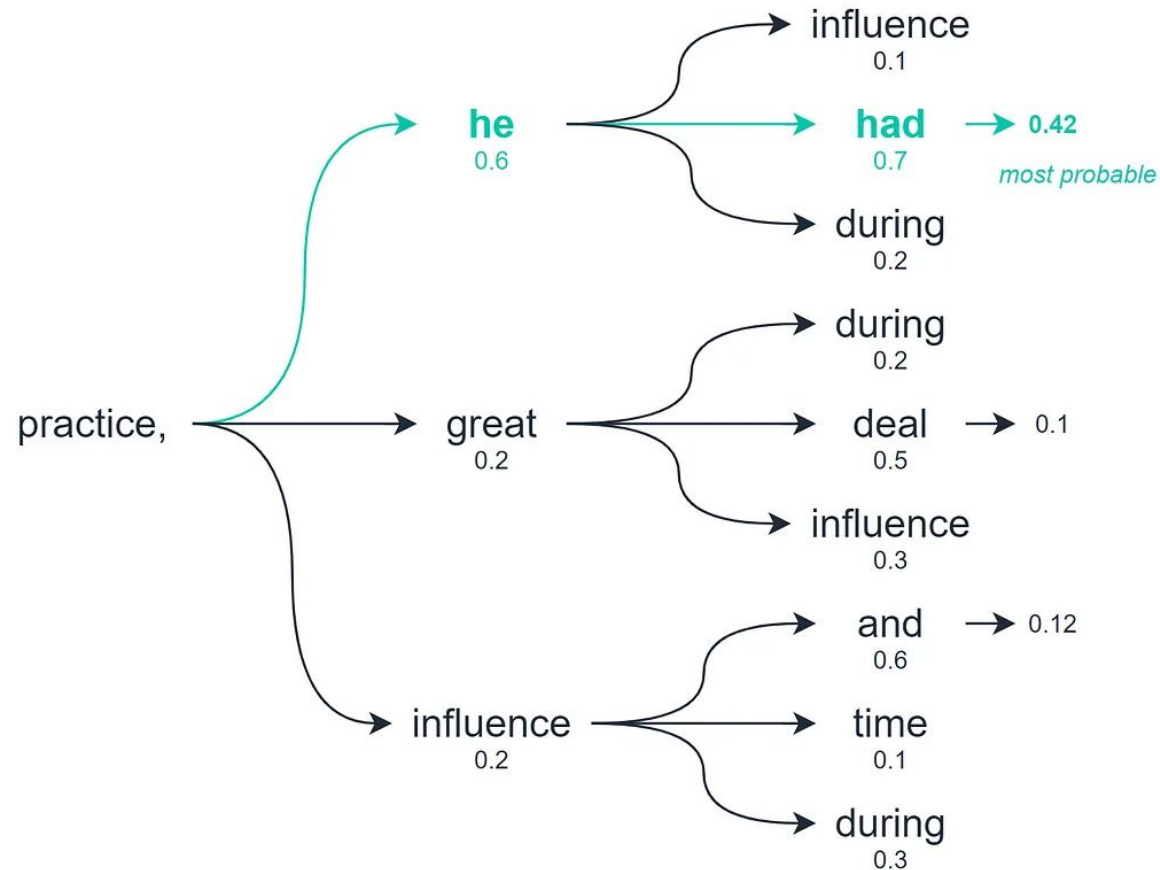
The screenshot displays a Named Entity Recognition (NER) interface. At the top, a legend bar identifies six entity types with their corresponding labels: Person (p, blue), Loc (l, yellow), Org (o, black), Event (e, green), Date (d, red), and Other (z, purple). Below the legend, a text snippet is shown with several entities highlighted in colored boxes, each followed by a small 'x' icon. The entities and their labels are: 'Barack Hussein Obama II' (Person, blue), 'August 4, 1961' (Date, red), 'American' (Other, purple), 'the United States' (Loc, yellow), 'January 20, 2009' (Date, red), 'January 20, 2017' (Date, red), 'Democratic Party' (Org, black), 'African American' (Other, purple), 'United States Senator' (Other, purple), 'Illinois' (Loc, yellow), and 'Illinois State Senate' (Org, black).

Person p Loc l Org o Event e Date d Other z

Barack Hussein Obama II x (born August 4, 1961 x) is an American x attorney and politician who served as the 44th President of the United States x from January 20, 2009 x, to January 20, 2017 x. A member of the Democratic Party x, he was the first African American x to serve as president. He was previously a United States Senator x from Illinois x and a member of the Illinois State Senate x.

Response Generation:

- Beam search decoding is used to generate relevant responses by maximizing $p(\text{response}|\text{context}, \text{intent}, \text{entities})$ modeled by the decoder autoregressive language model.



Methodology

- Start with local deployment, cloud optional
- Test locally first - Use high-memory GPUs to evaluate model and resource needs.
- Optimize model - Use distillation, pruning, quantization to compress model size.

Core Functionality

- **Conversational response generation**
 - The ability of the chatbot to understand user input and generate contextually relevant and natural-sounding responses
 - Implementation of Natural Language Processing (NLP) techniques to comprehend user intent, extract entities, and maintain a coherent conversation flow
- **Limited product recommendation**
 - Integration of a product recommendation engine that suggests relevant products based on user queries, preferences, or behavior
 - Development of rules or algorithms for making targeted and meaningful product recommendations to enhance the user experience
- **Streamlit chatbot interface**
 - Creation of a user-friendly interface using Streamlit that facilitates seamless communication between the user and the AI
 - Components such as a chat window, user input field, and space for displaying responses and product

Performance Metrics

- User Engagement focuses on quantifying the level of interaction users

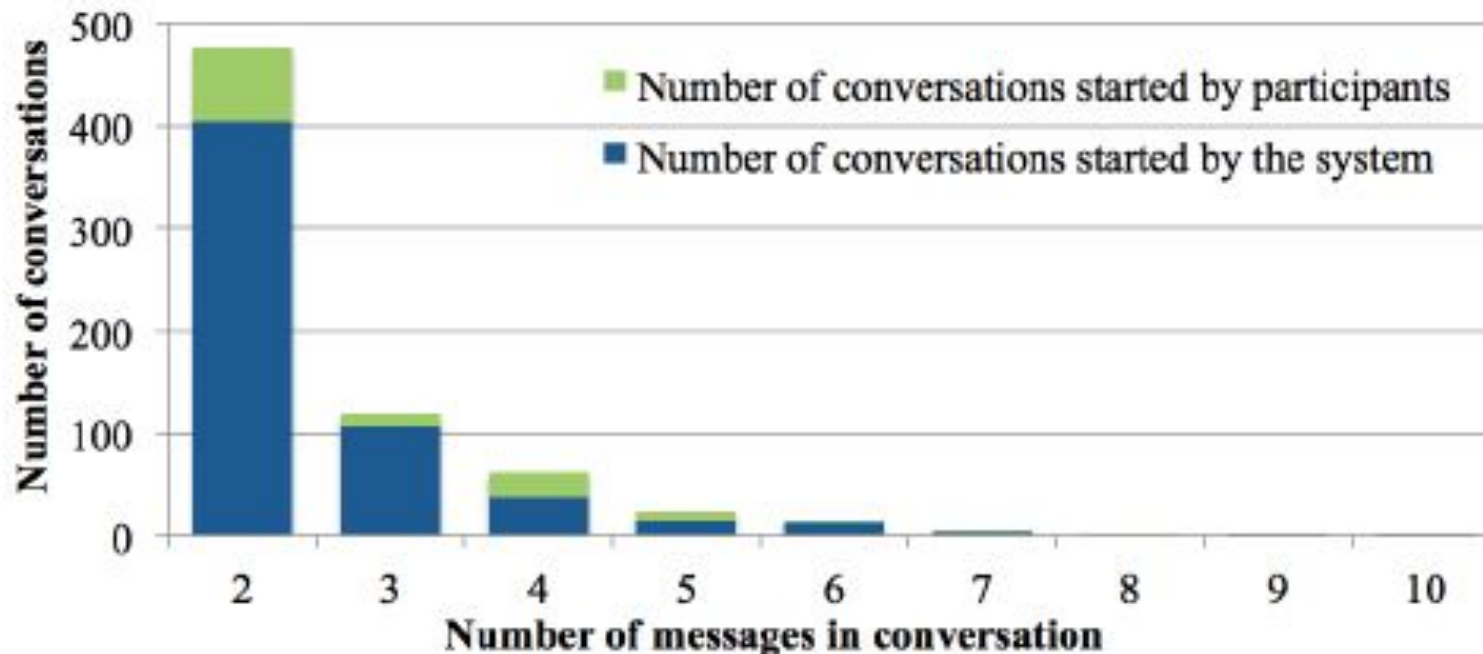


Key User Engagement Metrics

- Number of Conversations or Interactions
- Message Volume
- Session Duration
- Repeat Interactions
- Peak Engagement Times

Metrics 1: Number of Conversations

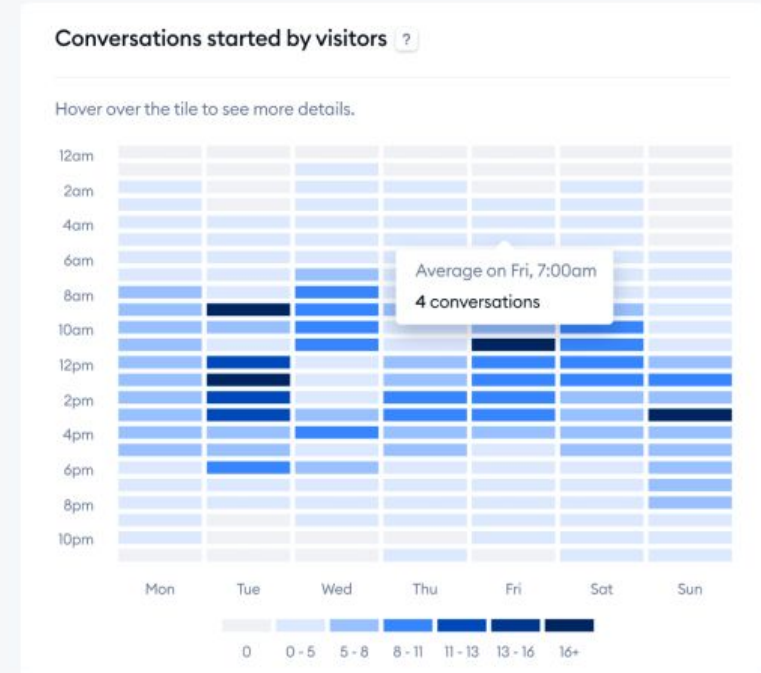
- Track the total number of conversations initiated by users.
- Provides an overview of how many users are actively engaging with the chatbot.



Metrics 2: Message Volume

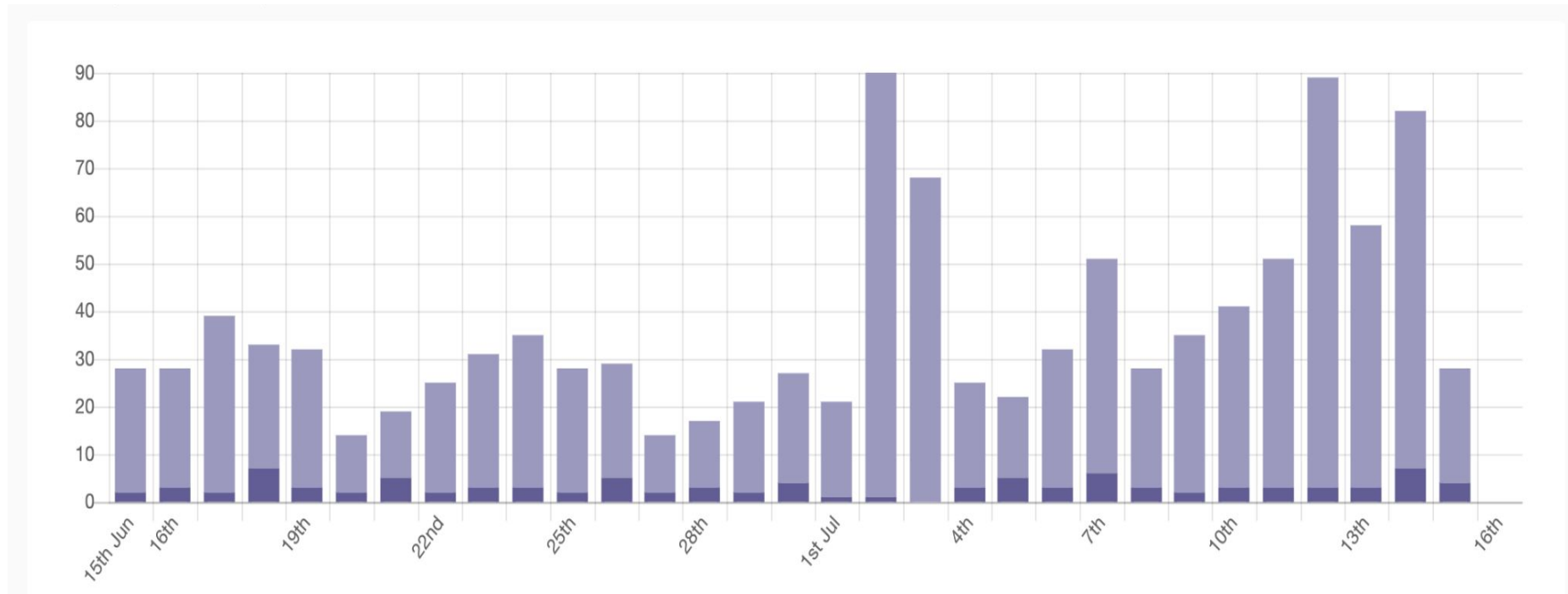
- Monitor the volume of messages exchanged within each conversation.

⇒ The depth and complexity of user interactions.



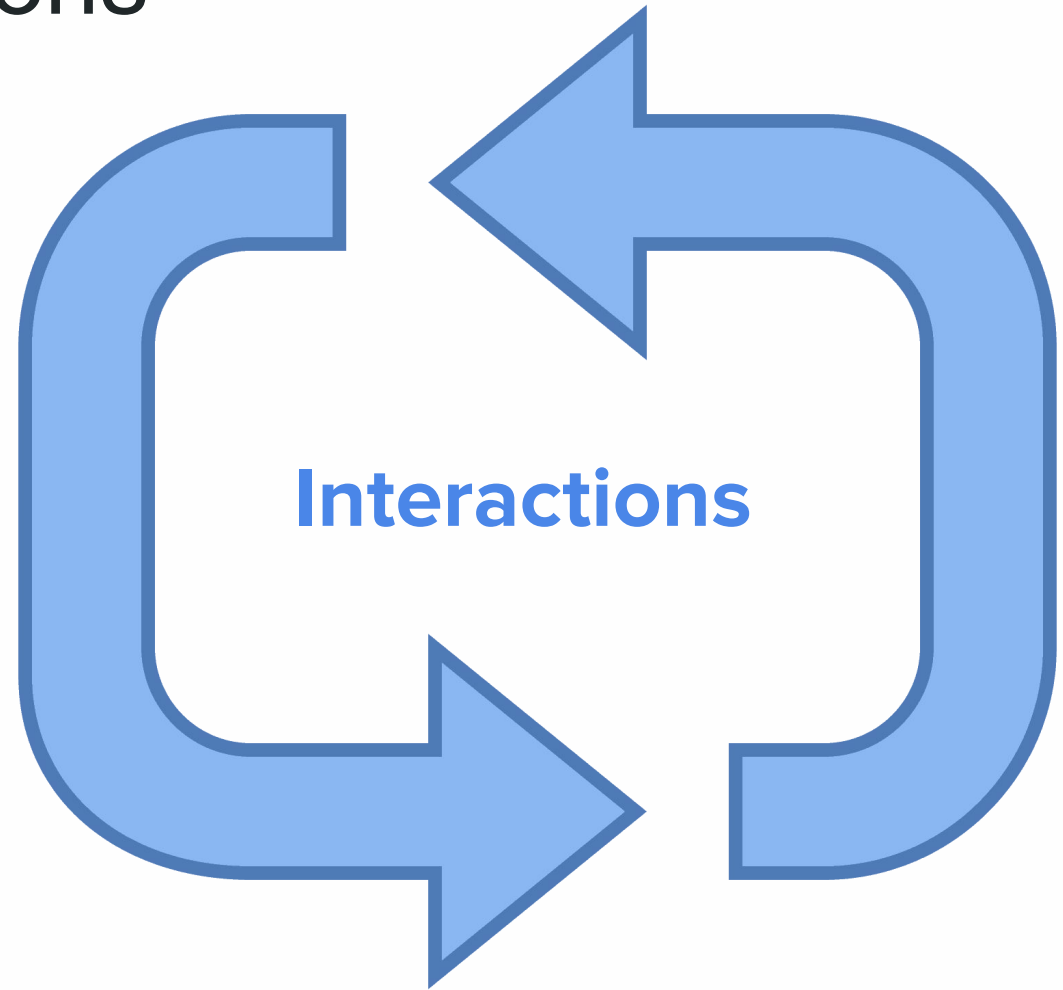
Metrics 3: Session Duration

- Measure the average duration of user sessions with the chatbot.
- This metric helps assess how much time users spend interacting with the chatbot, indicating the depth of engagement.

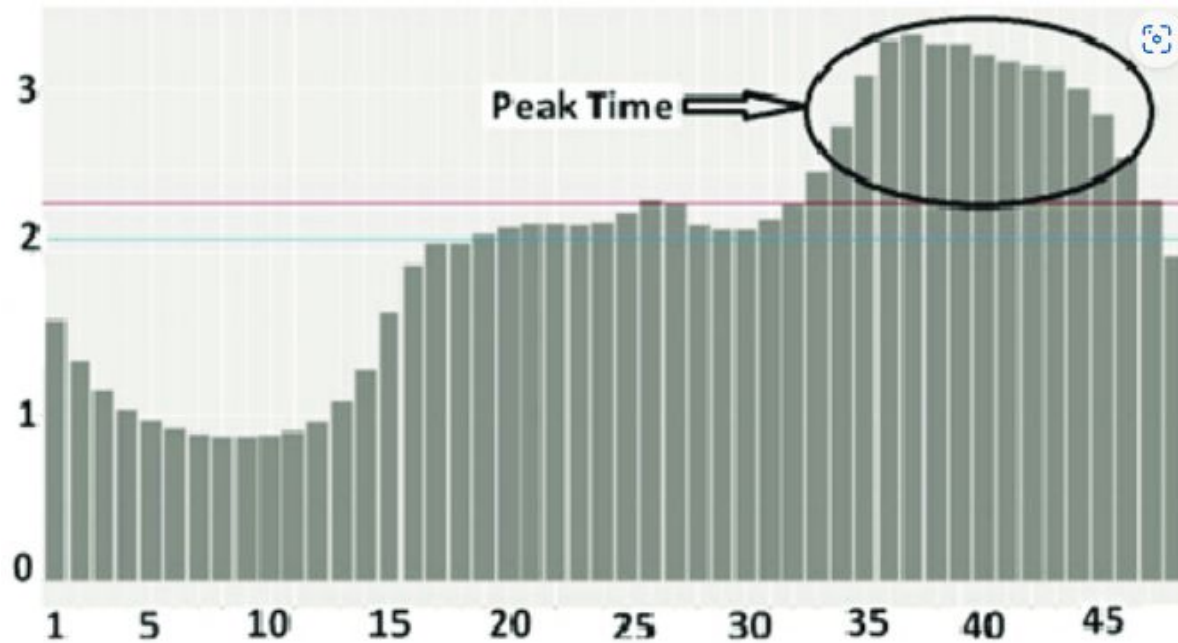


Metrics 4: Repeat Interactions

- Track the percentage of users who initiate multiple interactions with the chatbot over time.
- Repeat interactions indicate sustained user interest and engagement.



Metrics 5: Peak Engagement Times



- Identify peak hours or periods when user engagement is highest.
- This information can be valuable for optimizing chatbot availability and ensuring it aligns with user preferences.

Evaluation Criteria

- Setting Benchmarks
- Comparative Analysis
- User Segmentation



Evaluation Criteria

- Setting Benchmarks:

Establish baseline metrics for user engagement during the initial stages of the MVP.

Chatbot Marketing Benchmarks		
	GENERAL PAGE	HIGH INTENT PAGE
Engagement Rate	2%	3%
Conversion Rate	15%	20%
Meeting Booking Rate	3%	4%

Evaluation Criteria

- Comparative Analysis:

Compare user engagement metrics over different time periods (e.g., weekly or monthly) to identify trends and patterns.



Best Charts to Show Trend Over Time

Evaluation Criteria

- User Segmentation:

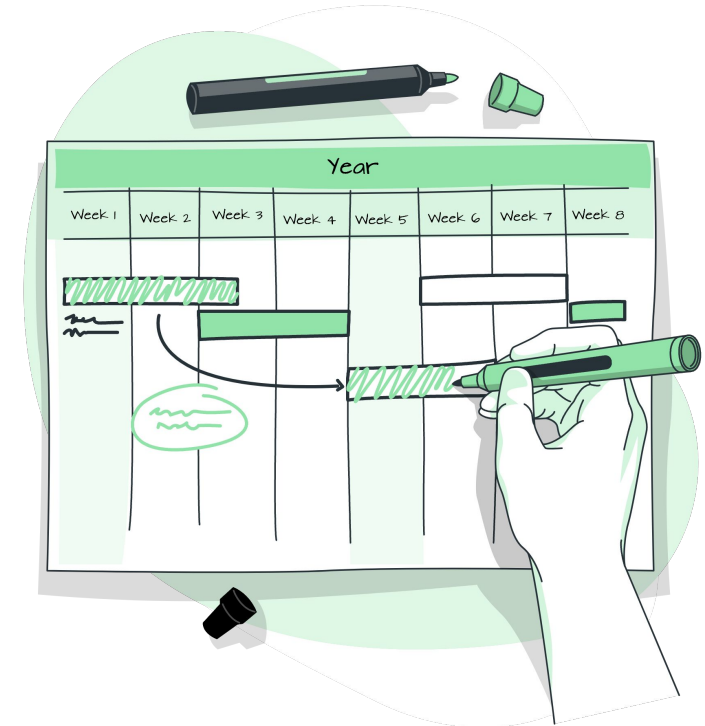
Analyze user engagement metrics based on user segments (e.g., new users vs. returning users) to identify areas for improvement and optimization.



Timeline

November 20 - 26:

- Complete dialog design and conversation flows
- Build core NLP modules for intent recognition and entity extraction
- Integrate NLP modules with Dialogflow



Timeline

November 27 - December 3:

- Expand shoe database and catalog shoe features
- Develop content-based recommendation model
- Implement user attribute extraction

Timeline

December 4 - 10:

- Connect recommendation model outputs to dialog system
- Develop explanation capability for recommendations
- Conduct preliminary testing and debugging

Timeline

December 11 - 15:

- Incorporate user feedback into chatbot improvements
- Optimize conversation responses and flows

Timeline

The major milestones are:

- November 26: Core NLP extraction capabilities
- December 3: Shoe database and recommendation model
- December 10: Integration of dialog and recommendations
- December 15: Testing

Team Structure

- Project Lead
- Model/Data
- Frontend Developer
- Testing across roles

Conclusion

This innovative AI-powered product consultant chatbot is poised to revolutionize the customer experience. Leveraging cutting-edge natural language processing from LangChain, it will engage customers in dynamic, personalized conversations to understand their unique tastes and deliver tailored product recommendations. By focusing on key metrics like user engagement and utilizing agile development practices, we will bring this transformative solution to market. This chatbot has immense potential to increase customer satisfaction, build loyalty, and transform the way people shop - the future of conversational commerce is here!