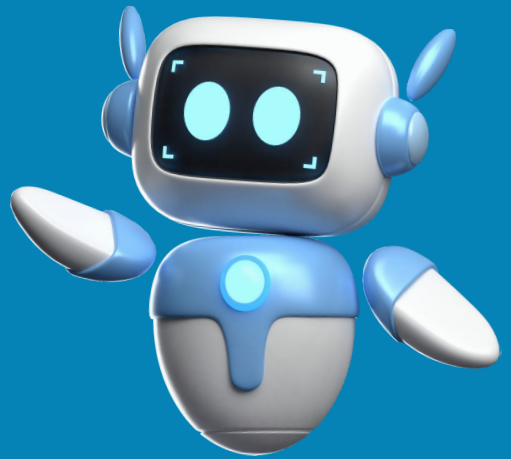
VIETNAM DATATHON 2023

SUSBot Proposal

"Sucessful HCMUS ChatBot"

to Better Understand Customers



sUSessful TEAM

“SUSBot” IS A AI-DRIVEN CHATBOT

“SUSBot” are automated shopping assistants, it usually powered by artificial intelligence (AI) and is designed to enhance the customer experience and drive sales in the retail sector.

SAVE TIME

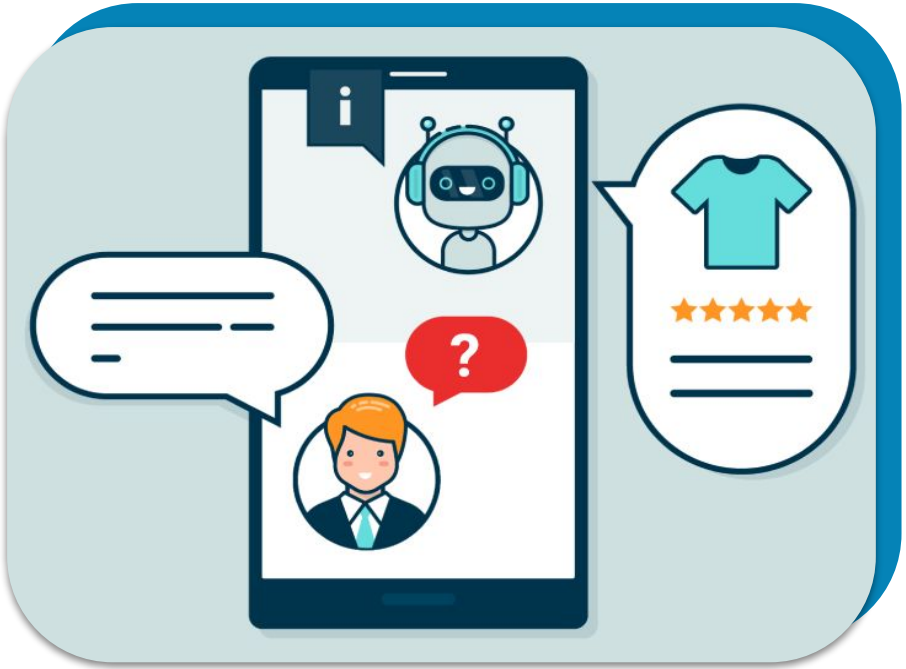
Search, suggest, advise products for customers 24/7 and quickly

USEFUL

Notify promotional campaigns connect other social media platforms.

SAVE MONEY

Customer: discount codes and sale updates. Business: employing fewer resources.



Source: Teplar

VIETNAM DATATHON 2023

ENHANCE CUSTOMER EXPERIENCE

Outfit suggestions based on the intended purpose

Chatbots can recommend suitable outfits based on the occasion or desired style, helping customers make informed choices.

Product consulting

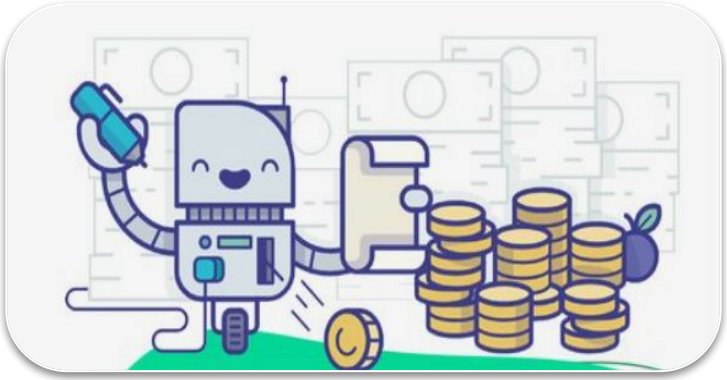
Chatbots assist customers in selecting the right color, size, or other specifications of a product, enhancing their shopping experience.

Information researching

Chatbots can quickly retrieve and provide product details, availability, and other relevant information, saving customers time and effort.

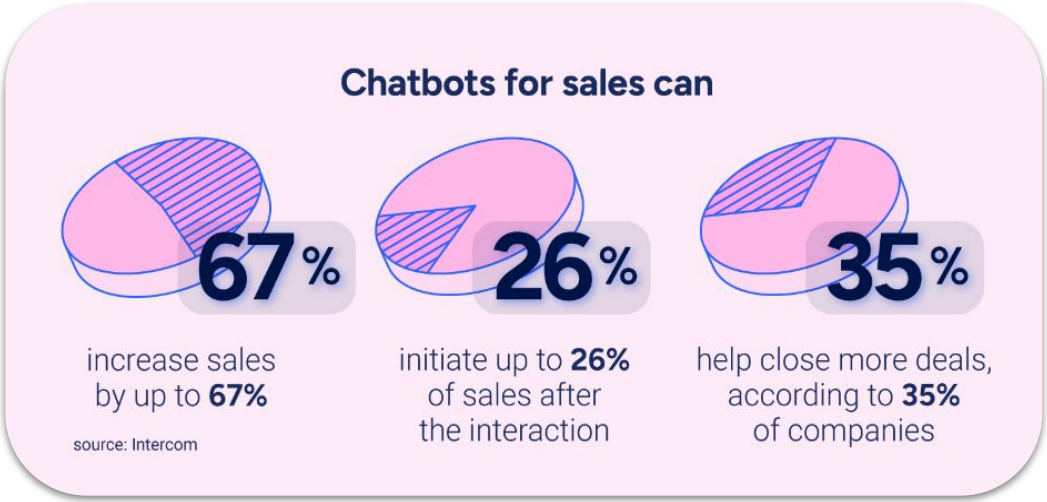
Discount codes and sale updates

Chatbots inform customers about ongoing discounts, promotions, and sale updates, encouraging more purchases.



- Increasing the number of orders
- Reduced cart abandonment
- Resource saving for business

INCREASE SALES

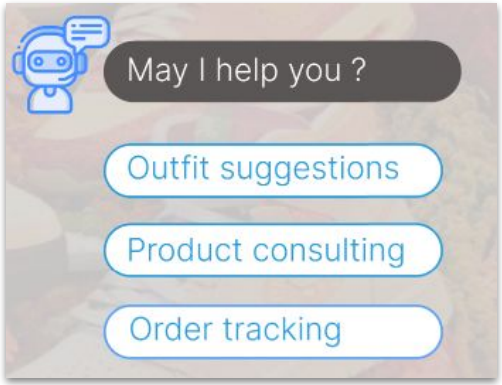


PROBLEM STATEMENT

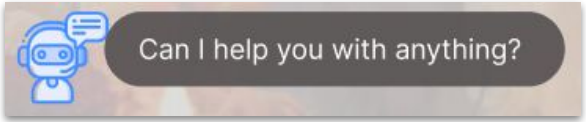
VIETNAM DATATHON 2023

INTERACT WITH CUSTOMERS, HANDLE THEIR REQUESTS

When the user clicks on the chatbot icon displayed on the website, the chatbot will offer a number of options to support and interact with customers.



OFFER SUPPORT



When users want to use it, SUSBot will friendly ask for help with their requested problem

PROVIDE PRODUCT INFORMATION, ASSIST WITH PURCHASES

When users want to search for information, SUSBot will provide brief information and a link to the purchase address

PAIN POINTS OF SUSBOT

VIETNAM DATATHON 2023

Constraints in natural language understanding

SUSBot can still face difficulties in accurately understanding and responding to complex requests or unclear language from customers.

Capability in handling complex issues

In cases dealing with complex problems, SUSbot might not offer effective solutions as expected.

COMPETITOR

VIETNAM DATATHON 2023

HM'S CHATBOT

Strengths: Supports searching, purchasing, and tracking orders.

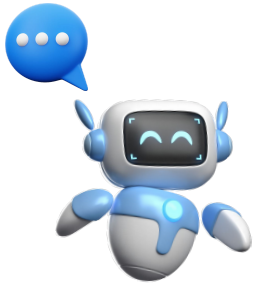
Weaknesses: May encounter difficulty in providing detailed assistance, limit in language capability, only understanding English.

AMAZON'S CHATBOT

Strengths: Provides fashion trend advice, product information, and customer service.

Weaknesses: Limitations in customizing and personalizing the user experience.

SUSBot

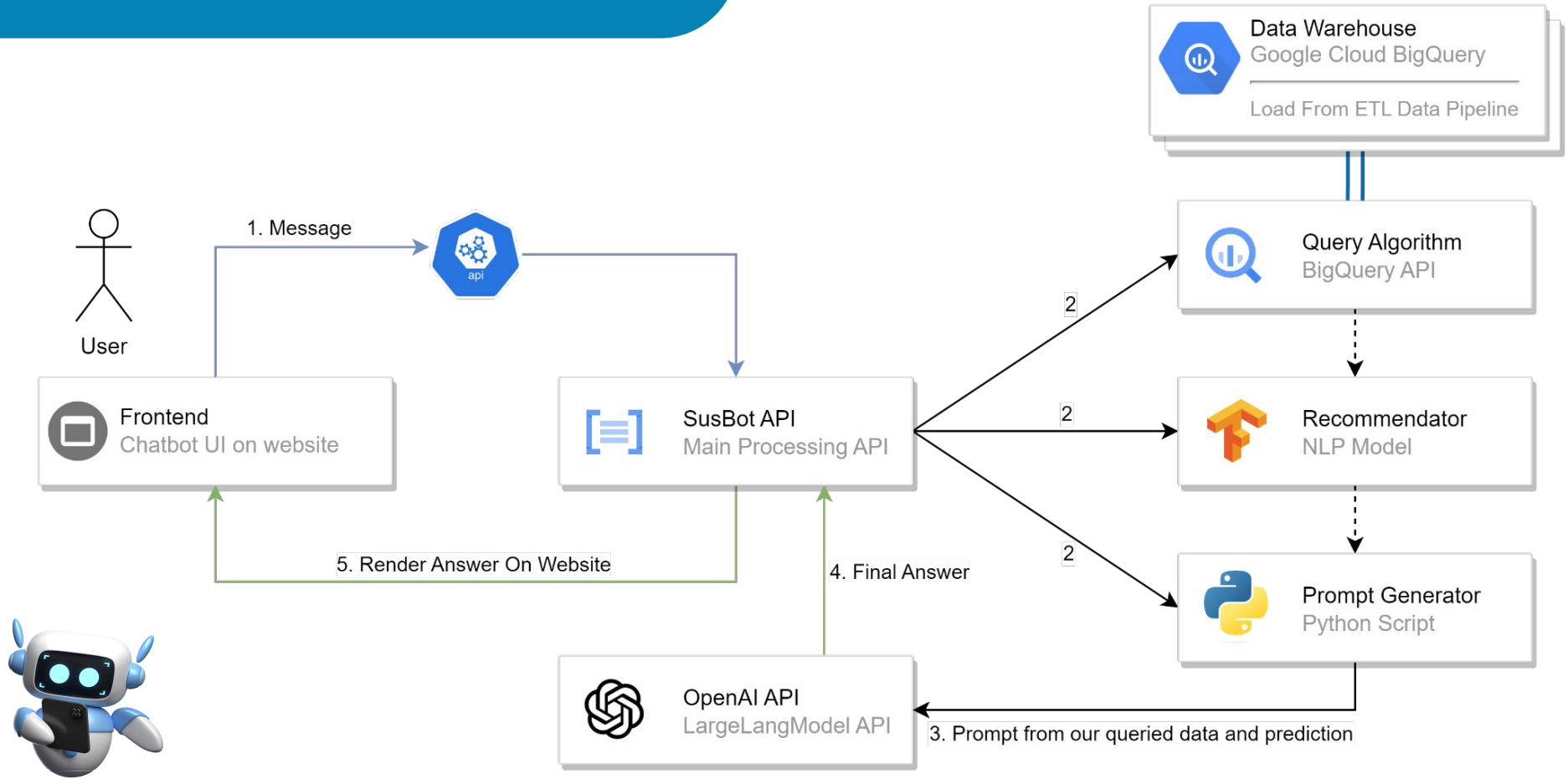


Strengths: Outfit suggestions, information research, understanding text and voice chats; integration: Website integration for promotions, social media (Facebook, Instagram, ...).

Weaknesses: Limitations in language capability and constraints in effectively resolving complex issues.

SOLUTION OVERVIEW

VIETNAM DATATHON 2023

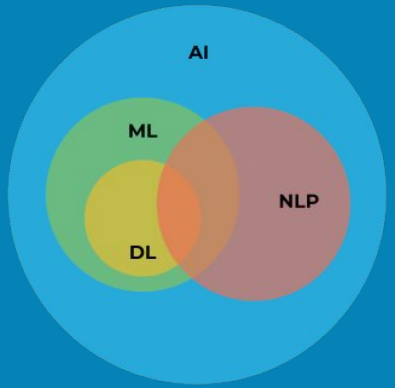


VIETNAM DATATHON 2023

Advanced Technology Integration

Combining NLP and Machine Learning for a Sophisticated Conversational Agent

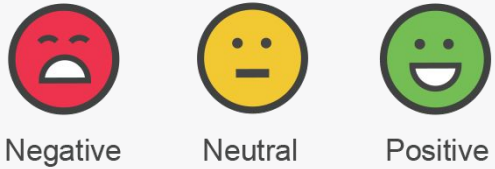
Our SUSBot utilizes advanced technology integration by combining natural language processing (NLP) and machine learning (ML) techniques. This integration enables the creation of a sophisticated conversational agent that can provide exceptional user assistance.



Chat Analysis for Personalized Insights

Understanding Customer Behavior Patterns: Connecting Language Nuances to Product Attributes

With the help of our SUSBot's neural network, chat transcripts are analyzed to learn customer behavior patterns. This analysis connects language nuances to specific product attributes, enabling the chatbot to offer personalized insights tailored to individual shoppers.



Tailored Recommendations

Meeting Individual Shopper Needs: Personalized Adidas or Nike Product Recommendations

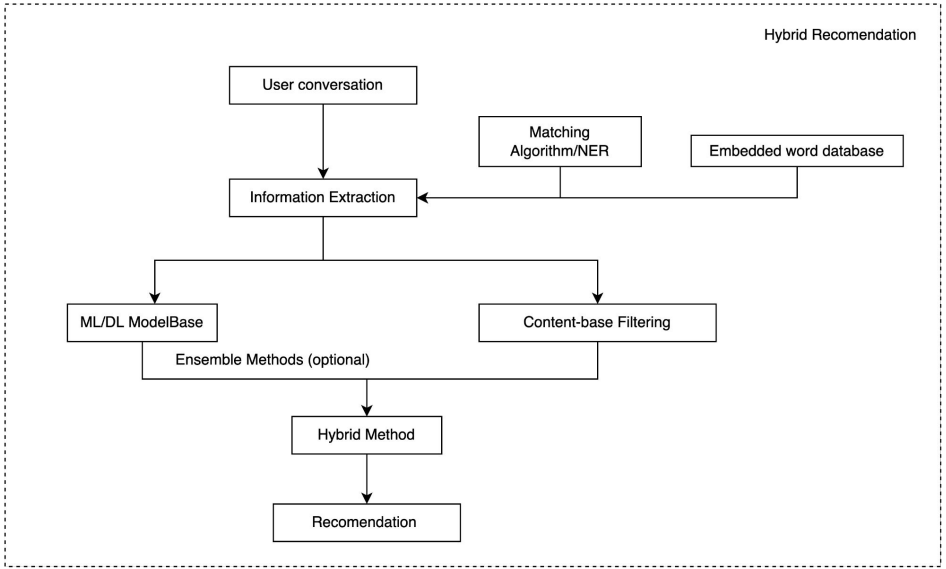
Text: Leveraging the knowledge gained from chat analysis, our SUSBot interprets new conversations to offer tailored recommendations. Whether it's Adidas or Nike products, the chatbot understands individual shopper needs and provides personalized suggestions to enhance their shopping experience.

METHODOLOGIES

Conceptual Design

VIETNAM DATATHON 2023

Recommendation



Extracting and filtering information can be summarized as follow:

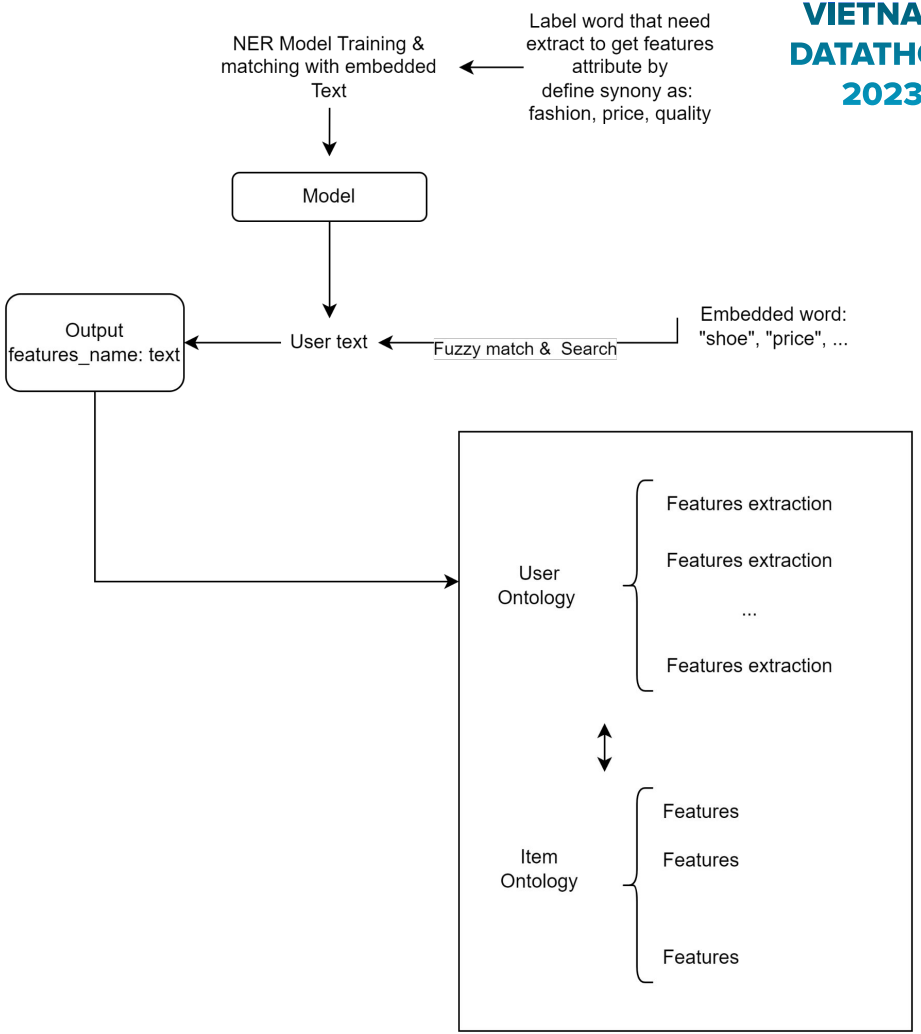
- Processes information extraction
- Post-process the data - apply model-based algorithm filtering and facility to text query matching (hybrid method).

This process can be used to extract many other types of information and user account information (age/gender).

METHODOLOGIES

Conceptual Design

VIETNAM DATATHON 2023



Recommendation

Information Extraction

Features value of this extraction step can define by:

- Word matching with embedded database
- Word recognition of user text (NER model)

METHODOLOGIES

Conceptual Design

VIETNAM DATATHON 2023

Recommendation

Collect data through session:

We define ranking score in content - base like that:

$X\ (item\ serving)\ |\ X_{score}\ define$:

$$O(x)xO(item): h(X, item) = \sum_{i=0}^{n}\sum_{j=0}^{m} g\,(x_i, item\ feature_j) + \sum_{i\prime=0}^{n\prime}\sum_{j\prime=0}^{m\prime} u\,(x_{i\prime}, item\ feature_{j\prime})$$

x is the features value extraction define by NER model or the comparison user text and embedded:

$x|\ x = \text{embedded}: \text{score}\ O(x) \times O(\text{usertext}) = \frac{1}{m}\sum_{i=0}^{m} g\,(x,\ \text{user}_{\text{text}})$ > standard core

g(x,y): denotes the fuzzy comparison between ontologies attributes

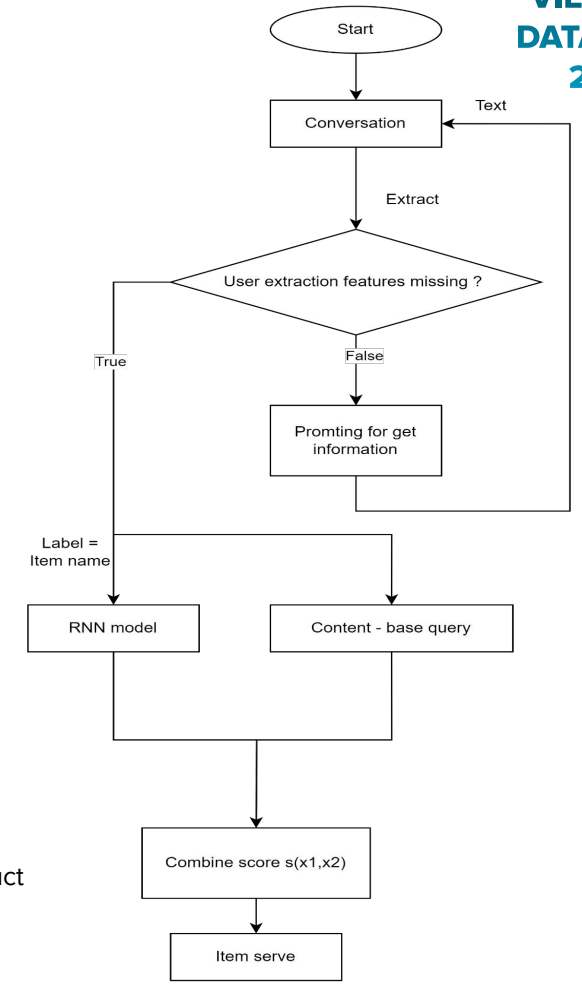
u(x,y): represents the exact comparison between ontologies attributes

n denotes number of embedded word matching of text data features

m denotes number of features/attributes in the comparison of 2 ontologies

n' denotes number of embedded word matching of numerical features

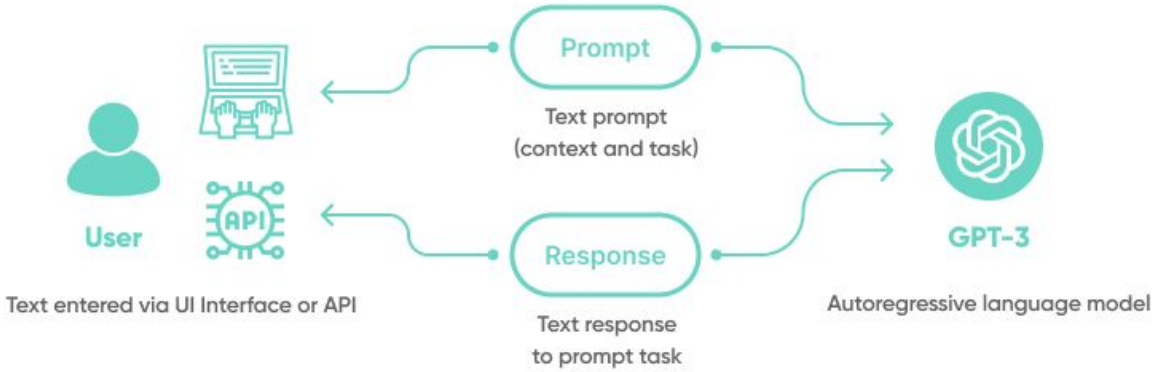
m' denotes number of features/attributes in the comparison of 2 ontologies



In the branch of RNN-based system, we label and train an RNN with the label being the product name. However, user feature extraction is missing for model prediction. The system will use prompting chat to ask the user about the missing feature fields

Prompting conversation

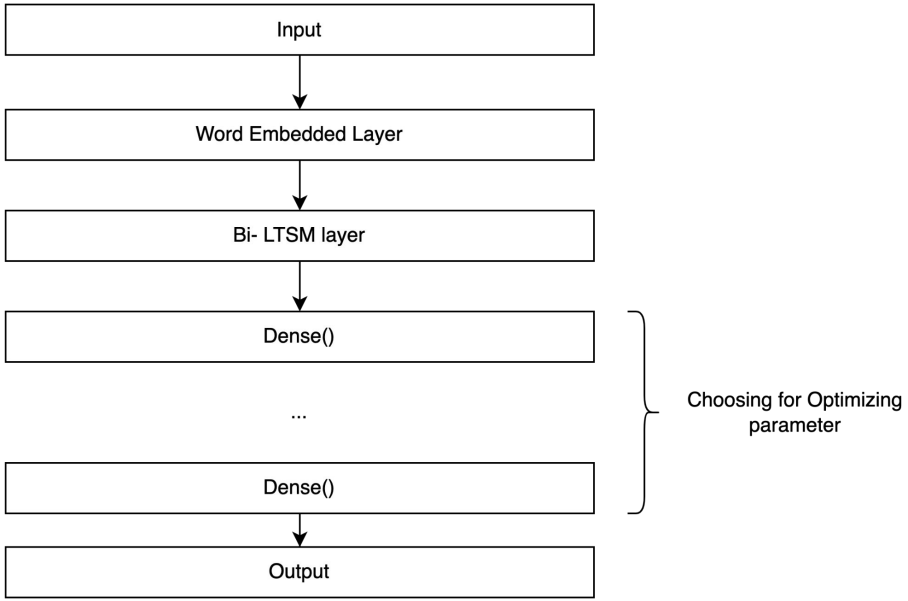
We design some example chat message for user interaction is this step, because we mainly using this chatbot for collect information. Do not use language comprehension tasks or other tasks that need to using LLM model.



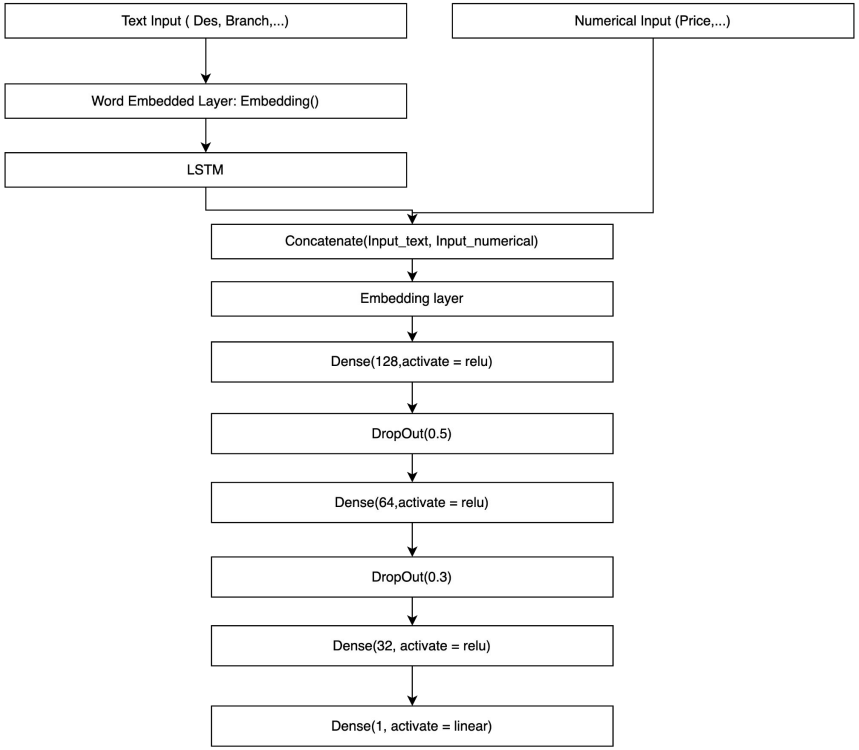
METHODOLOGIES

Conceptual Design

Model (phase 1 - NER)



Model (phase 2 - prediction & recommend)



METHODOLOGIES

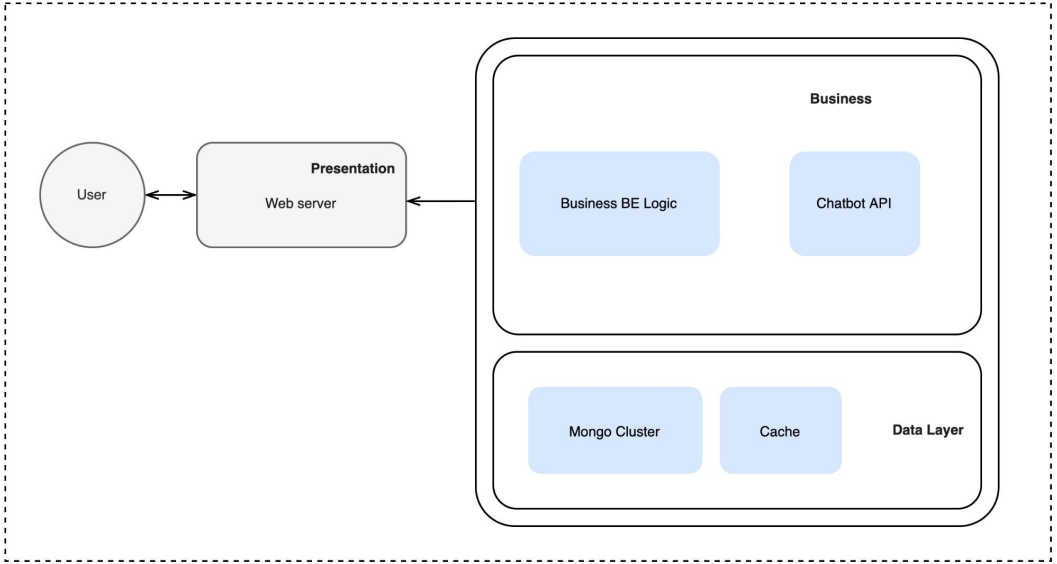
Conceptual Design

VIETNAM DATATHON 2023

Web application

Apply 3-Tier Architecture in our MLOps development:

- Presentation Layer: Web or mobile applications developed using Flask and React.
- Application Layer: Machine learning pipelines and model versioning tools - TensorFlow and MLflow.
- Data Layer: Mongo Cluster or BigQuery utilized as the database for data storage and processing.

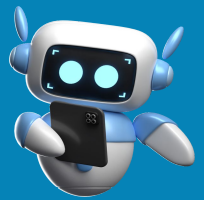


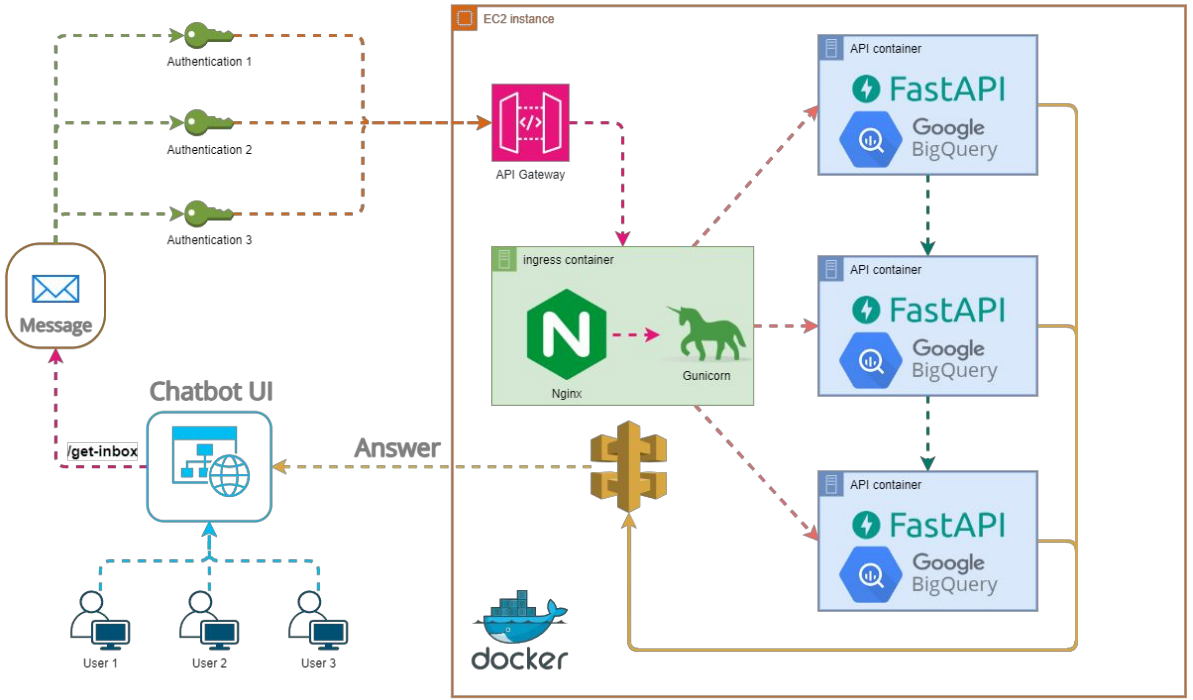
VIETNAM DATATHON 2023

Model Serving as API Architecture

The chatbot's **model serving API**:

- ➔ User input processing: **FastAPI**.
- ➔ API will use **BigQuery API** to interact with data warehouse prepared before.
- ➔ Frontend integration: **ReactJS**.
- ➔ Deployment and scalability: **Docker**.
- ➔ Hosting: **Amazon EC2**.

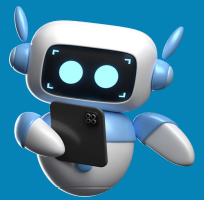


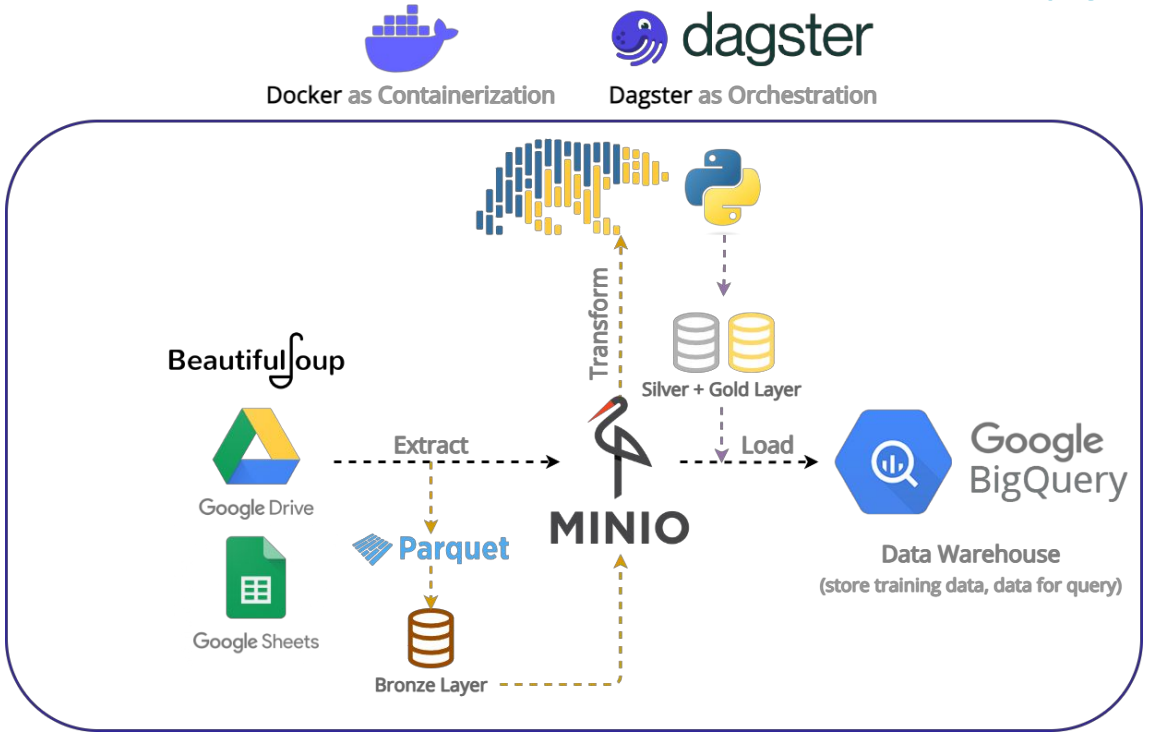


VIETNAM DATATHON 2023

Data Architecture Design

- The chatbot's **ETL pipeline** includes:
- Detecting changes in **Google Drive** and **Google Sheets**, scraping data from Nike and Adidas websites.
- Extracting raw data to **MinIO** (data lake).
- Transforming with **Python Polars**.
- Loading transformed data into **BigQuery** as a warehouse, *training the chatbot with BigQuery data, and querying and filtering data using BigQuery algorithms*.

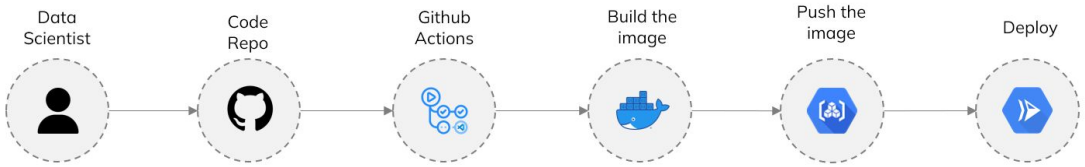


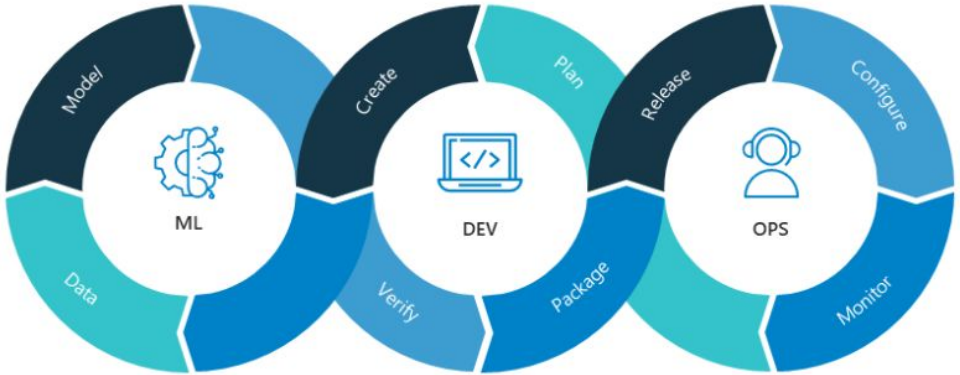


System engineering & CI/CD

MLOps with CI/CD for data scientists uploading models on GitHub:

- ➔ **GitHub Actions:** Automates workflows and CI/CD pipelines.
- ➔ **MLOps:** Combines machine learning and DevOps for streamlined model development and deployment.
- ➔ **CI** automates code integration, **CD** automates rapid model deployment, all facilitated by **GitHub** for collaboration among data scientists.





Nguồn: https://blogs.nvidia.com/blog/what-is-mlops/

CORE FUNCTIONALITY

VIETNAM DATATHON 2023

Outfit Suggestion

SUSbot gives personalized outfit suggestions based on customer preferences, style, and occasion. Users input event details, and SUSbot recommends suitable outfits from the catalog.

Product Consulting

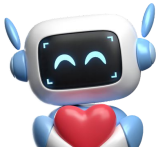
The SUSbot provides detailed catalog information, including product features, specifications, pricing, and availability. Customers can inquire about various details to make informed purchasing decisions.

Product Information

The SUSBot acts as a product info hub, providing details like descriptions, sizes, and styling tips. Customers can ask specific product questions for relevant information to aid their decision-making.

Order Tracking

Customers can check their order status through SUSBbot. By providing order details like number or customer info, the chatbot retrieves real-time progress, including tracking numbers, delivery dates, and updates.



PERFORMANCE METRICS

VIETNAM DATATHON 2023

To measure and evaluate the performance of the SUSBot, the following methods will be applied User engagement:

$$\text{Click – Through Rate (CTR):} \frac{\text{Click rate of item}}{\text{Number of item suggestions}} \times 100\ \%$$

This is the metric within which the system's effectiveness can be built and evaluated. Product clicks are recorded with The total number recommend of this Product from API

TIMELINE & ROADMAP

VIETNAM DATATHON 2023

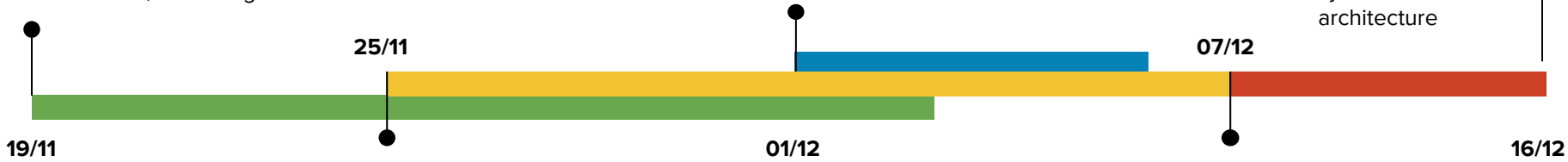
Phase 1: Setup model and Infrastructure (4 weeks, parallel with chatbot logic on phase 2)

- Set up infrastructure (AWS EC2, Google Cloud BigQuery,...)
- Preprocessing data and develop NLP model, and design chatbot UI.

Phase 3: Data Analytics and Refinement (1 weeks)

- Perform data analytics on user queries and improve chatbot responses.
- Gather user feedback, refine chatbot behavior, and optimize data processing pipelines.

Datathon Day: Develop new model based on new data (same format with old data). Apply to prepared system and software architecture



Phase 2: Data Transforming and Chatbot Development (5 weeks)

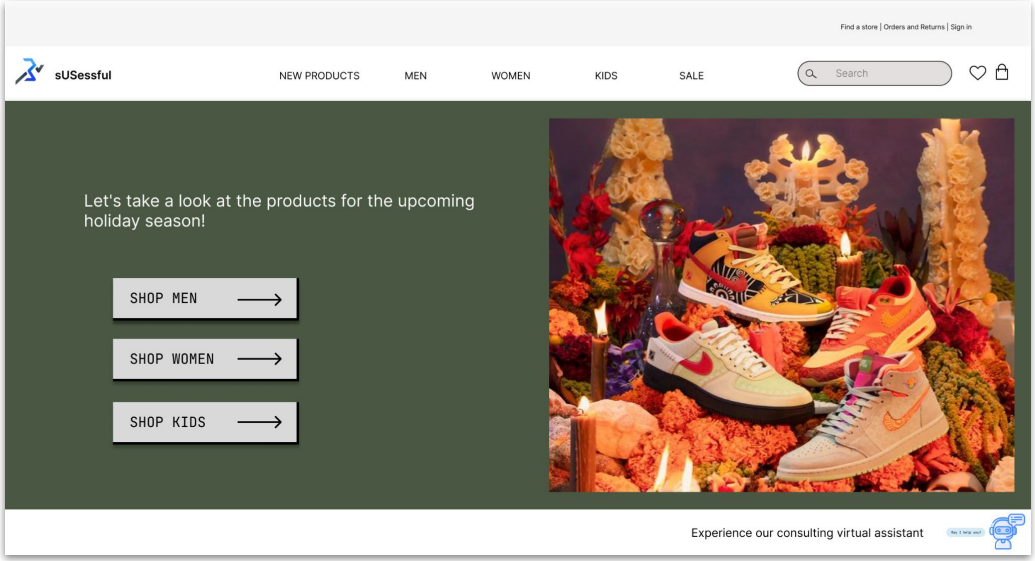
- Implement ETL data transforming pipelines for product information extraction.
- Develop chatbot logic, query algorithm, and integrate NLP model.
- Implement chatbot UI and optimize NLP model for accuracy and performance.

Phase 4: Testing, Deployment, and Documentation (1 week)

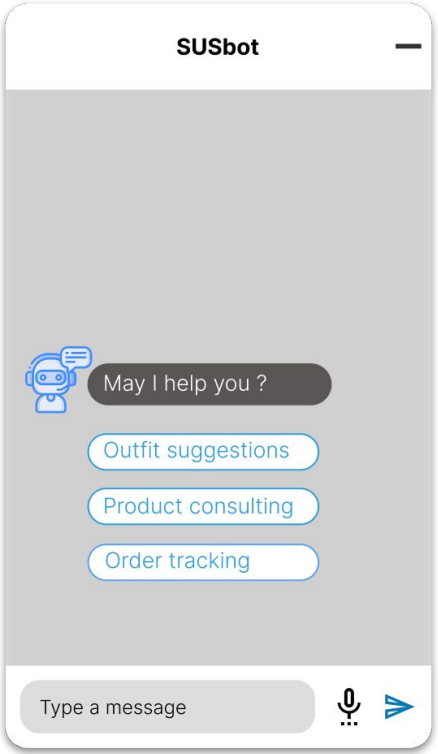
- Conduct comprehensive testing, prepare for deployment, and create documentation.

USER INTERFACE (UI)

VIETNAM DATATHON 2023



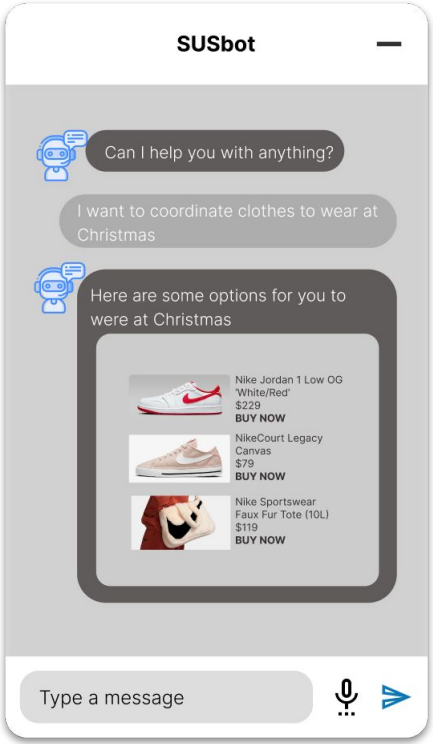
This is a description of the sales website interface. When users enter the website, in the bottom right corner of the screen will be SUSBot.



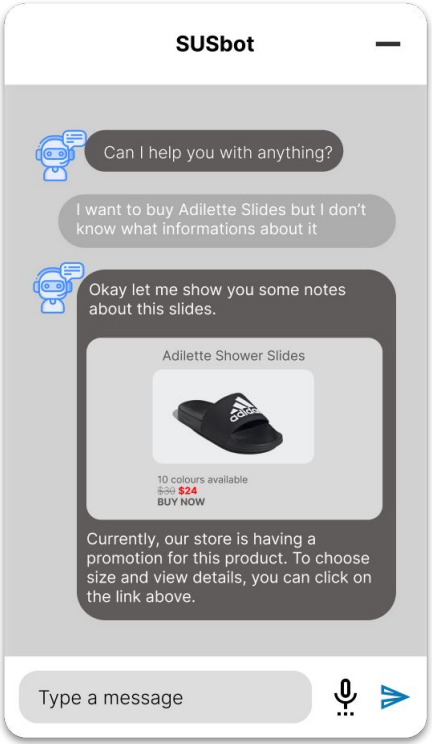
When users click on the chatbot icon, SUSBot will suggest a number of options to help users interact with the chatbot.

VIETNAM DATATHON 2023

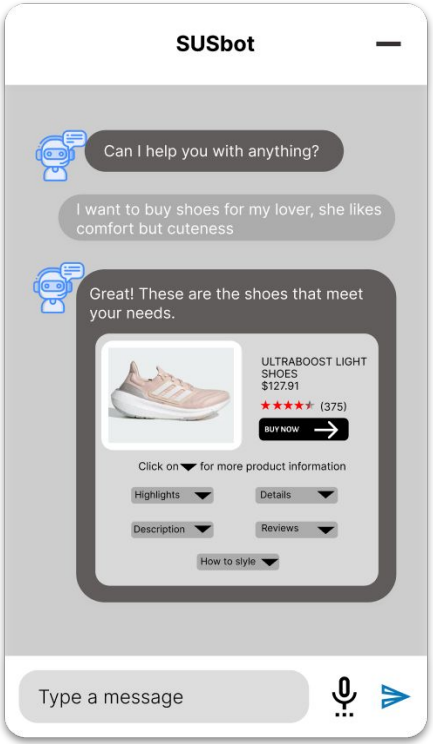
Below is the interface describing some features of SUSBot:



Users want outfit suggestions. SUSBbot will provide a list of suggestions. Users can click on the product link in the 'buy now' section to view information or place an order.

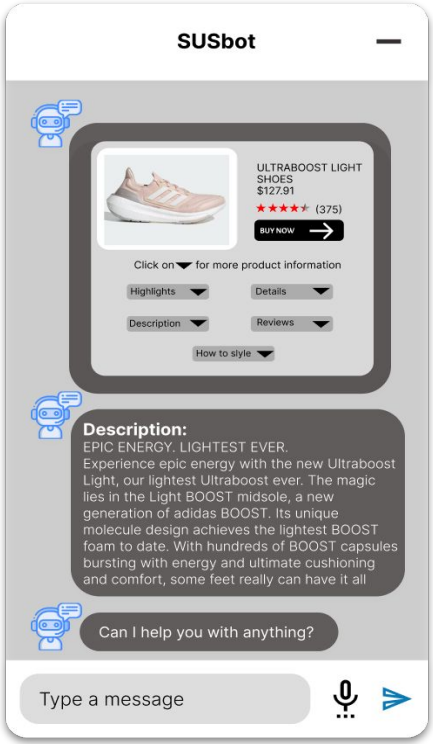


If the user needs quick advice about a previously selected product, the chatbot supports providing product information such as size, color,...



SUSBot supports product suggestions according to user's purpose, from design to intended use.

Below is the interface describing some features of SUSBot (cont)



When the user clicks on the arrow, SUSBot will provide information immediately below. That helps them not have to go to the brand's homepage to search.

Besides, after helping users with content in the chat. SUSBot will once again repeat the original question "How can I help you?".

LIMITATIONS

- ★ Users can only input English. The chatbot is not yet capable of translating into multiple languages.
- ★ In terms of budget: Cache storage, the chatbot is not yet able to synchronize messages, requiring users to re-enter them next time,...

FUTURE ENHANCEMENT

- ★ Besides entering text messages, developing voice recognition.
- ★ Integrating with external apps/devices(social media: Facebook,...), expanding to other sports brands.
- ★ If there is additional data on orders, the chatbot can incorporate an order tracking feature.
- ★ The learning never stops for these AI assistants!

Conclusion

VIETNAM DATATHON 2023

In conclusion, our project has successfully developed SUSBot, an AI-powered automated shopping assistant, integrating advanced technologies for accurate and personalized recommendations. With a robust API, scalable system architecture, and efficient data processing, SUSBot revolutionizes the retail sector by providing an exceptional shopping experience. We are confident that SUSBot will drive sales and enhance customer satisfaction, making it a valuable asset for retailers.