Team 6

In-N-Out Chatbot Application

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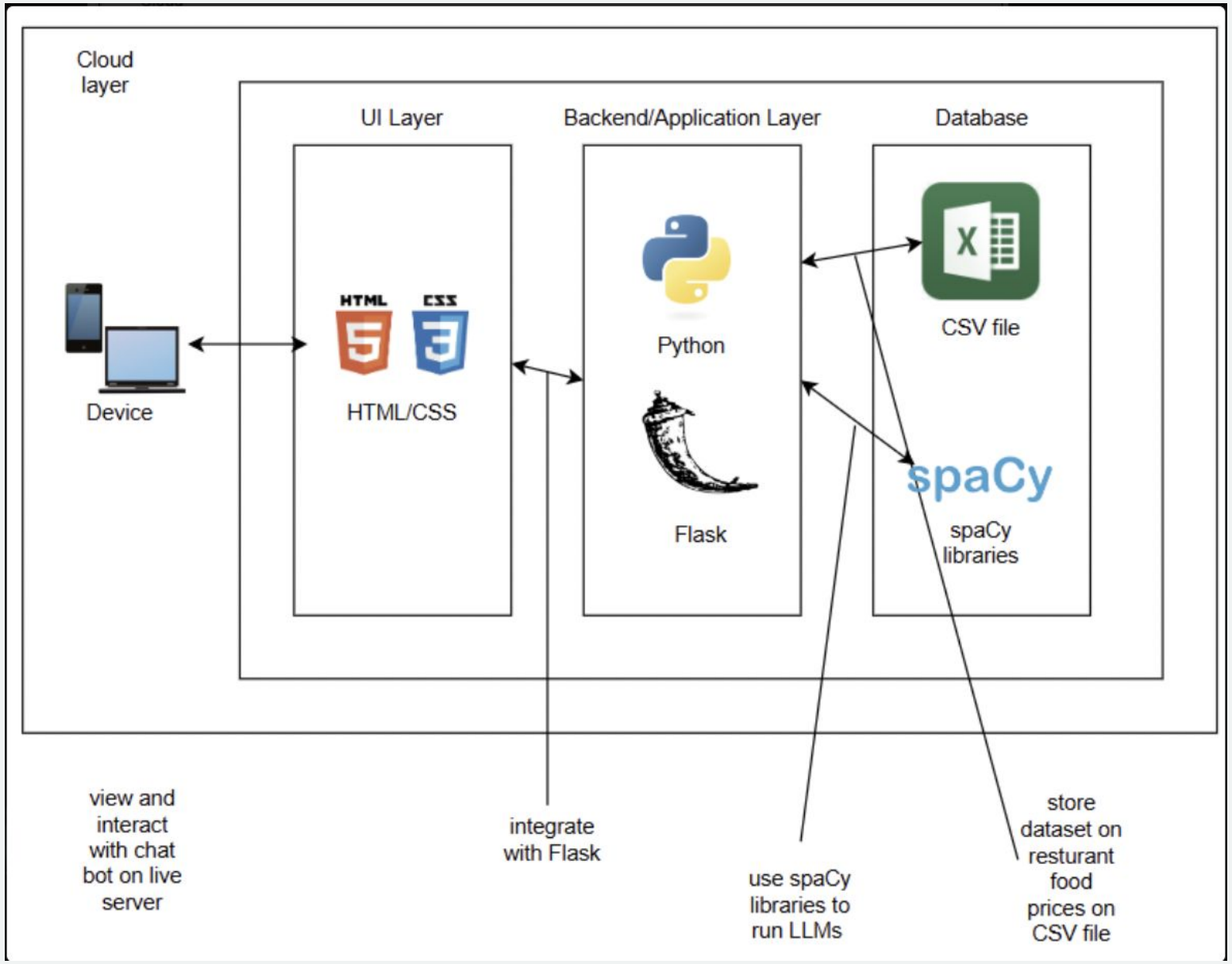
https://innoutchatbox.onrender.com/

Our Project

- Building a Fast Food Service AI Chat Bot
- Our restaurant was In-N-Out
- We needed an interactive user interface where a customer is able to look at a menu and order the food items that they request
- We built a website to do this effectively
- Our approach started off with simplicity
    - *have a menu and customer must directly say what menu items they want*
    - *menu is to always be visible from the beginning*
    - *list of ordered items must always be visible while ordering*
- We would show the accumulated price accordingly and charge the user at the end
- Later, we added features to try to add or remove ingredients from the menu items

Architecture Diagram



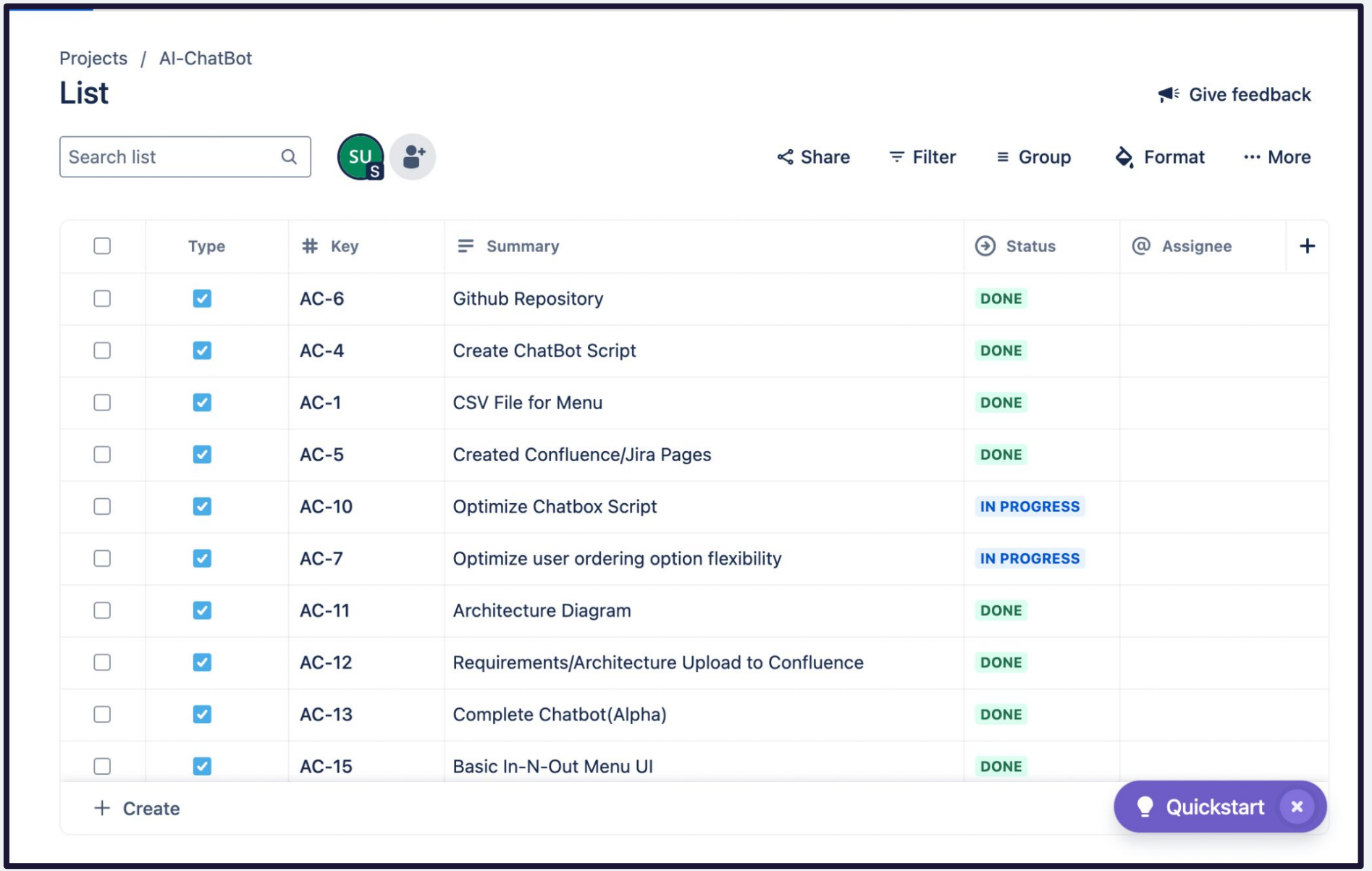
Confluence/JIRA Documentation

2. **Menu Browsing**
   - Display full menu (burgers, fries, drinks, special items).
   - Filter and search options (e.g., by category or dietary preferences).
3. **Order Customization**
   - Customization options for each menu item (e.g., burger styles, toppings).
   - Option to specify special instructions (e.g., "light on sauce").
4. **Order Placement**
   - Add items to the cart.
   - Review and edit cart before finalizing the order.
   - Confirmation of the order summary before checkout.
5. **Location Services**
   - Geolocation to find nearby In-N-Out locations.
   - Display operating hours and contact information for each location.
6. **Order Tracking**
   - Real-time updates on order status (e.g., preparing, ready for pickup).
   - Estimated wait times based on location and order size.
7. **Chatbot Interaction**
   - Natural language processing for understanding user queries.
   - Predefined flows for common tasks (placing an order, FAQs).
   - Option to escalate to human support if needed.

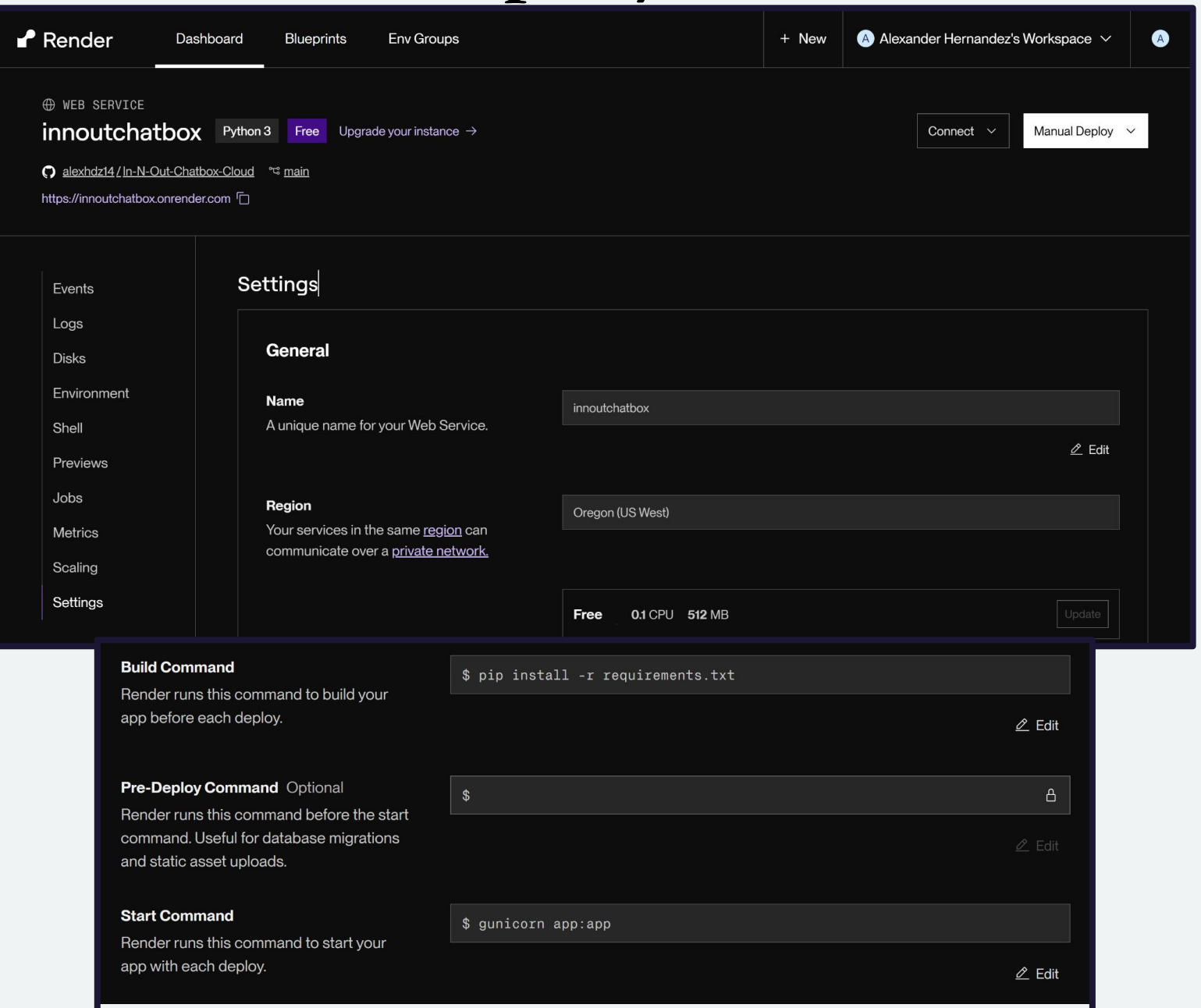
Non-Functional Requirements

1. **Usability**
   - Intuitive user interface and user experience design.
   - Accessibility features for users with disabilities.
2. **Performance**
   - Quick load times for menu and order processing.
   - Scalable infrastructure to handle peak times.
3. **Security**
   - Secure user data storage and transaction processing.
   - Compliance with relevant data protection regulations (e.g., GDPR, CCPA).
4. **Reliability**
   - Robust error handling and recovery options.
   - Regular updates and maintenance for the app.
5. **Compatibility**
   - Support for multiple devices (iOS, Android, tablets).
   - Compatibility with various screen sizes and resolutions.
6. **Analytics**
   - Track user behavior and order trends.
   - Monitor chatbot interactions for continuous improvement.

Confluence/JIRA Documentation



Cloud Deployment



- Explored several hosting options, including Heroku.
- Selected Render despite limitations in the free plan, such as service spin-down during inactivity.
- The free plan provided sufficient memory and CPU resources for our lightweight application.
- Configured the build command to install necessary dependencies from requirements.txt.
- Deployed the Flask application using Gunicorn, ensuring seamless integration with the web server.

AI & NLP Packages Utilized

spaCy

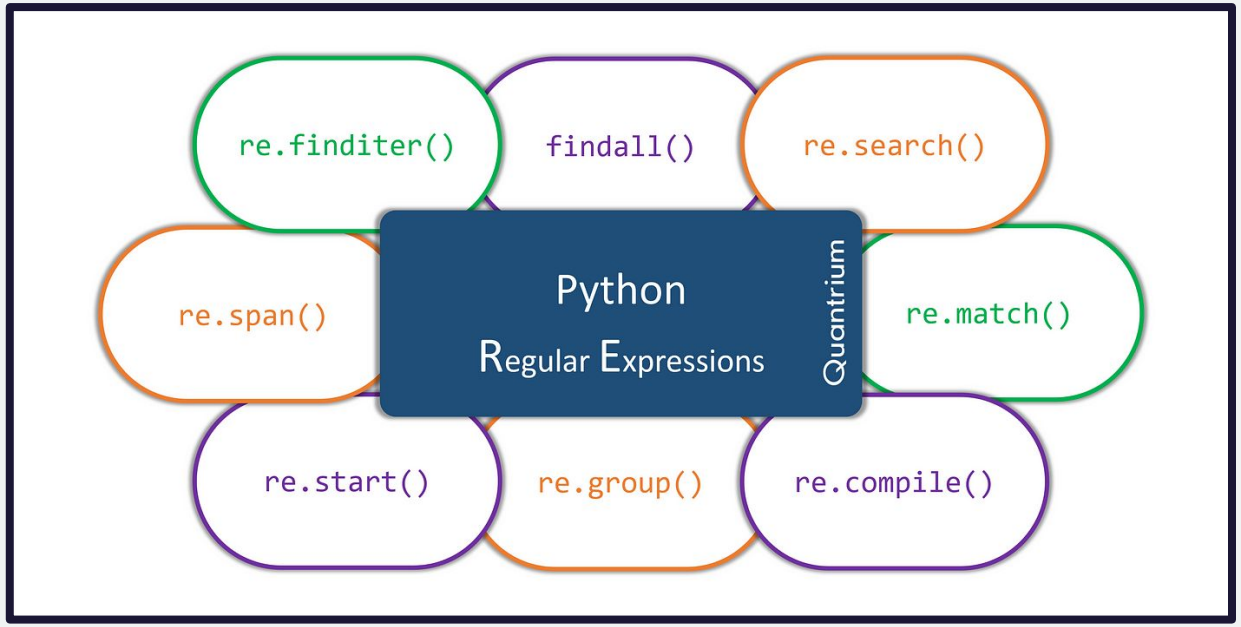
- **Description:**
  Utilized as the primary NLP library for processing and understanding user inputs.
- **Features Leveraged:**
  - **Lemmatization:** Simplifies words to their base forms for consistent matching.
  - **Noun Chunking:** Identifies meaningful phrases within user queries.
  - **PhraseMatcher:** Enables precise matching of menu items within user inputs.

Pattern Matching with spaCy's PhraseMatcher

- **Description:**
  Employed to accurately detect and prioritize menu items in user messages.
- **Benefits:**
  - **Accuracy:** Reduces false positives by matching exact phrases.
  - **Efficiency:** Enhances the chatbot's ability to handle complex orders involving multiple items.

Regular Expressions (re)

- **Description:**
  Used for preprocessing tasks such as replacing numerals with words.
- **Applications:**
  - **Numeral Replacement:** Converts digits (e.g., "2") to words (e.g., "two") for uniformity in processing.
  - **Text Cleaning:** Removes unwanted characters and standardizes input format.



Supporting Libraries & Data Management

Flask

- **Description:**
  Serves as the web framework for building the chatbot interface.
- **Key Uses:**
  - **Routing:** Manages URL endpoints for user interactions.
  - **Session Management:** Maintains user-specific order data throughout the chat session.

pandas

- **Description:**
  Utilized for data manipulation and handling the menu data.
- **Key Uses:**
  - **CSV Handling:** Reads and processes the `In N Out Menu.csv` file.
  - **Data Normalization:** Cleans and standardizes menu item names for accurate matching.

Regular Expressions (re)

- **Description:**
  Supports text preprocessing and pattern matching tasks.
- **Key Uses:**
  - **Numeral Conversion:** Transforms digits to words.
  - **Input Sanitization:** Cleans user input by removing punctuation and unwanted characters.

Session-Based Storage

- **Description:**
  Manages user orders without the need for an external database.
- **Advantages:**
  - **Simplicity:** Eliminates the complexity of integrating a separate database.
  - **Efficiency:** Stores order data temporarily, ensuring privacy and quick access.

Key Modules & Custom Functionalities

Order Parsing Module

- **Function:** `parse_order(user_input)`
- **Description:**
  Extracts ordered items and their quantities from user messages.
- **Key Features:**
  - **Lemmatization:** Converts words to their base forms for consistent matching.
  - **Prioritized Matching:** Sorts menu items by length to prioritize longer, more specific names, preventing partial matches.

Removal Parsing Module

- **Function:** `parse_removal(user_input)`
- **Description:**
  Identifies items and quantities the user wishes to remove from their order.
- **Key Features:**
  - **Quantity Extraction:** Determines the number of items to remove.
  - **Item Validation:** Ensures that only existing order items can be removed.

Modification Parsing Module

- **Function:** `parse_modifications(user_input, parsed_order)`
- **Description:**
  Handles ingredient-level modifications such as adding or removing specific components (e.g., "no onions", "extra cheese").
- **Key Features:**
  - **Action Identification:** Detects modification intents like 'add', 'remove', 'without'.
  - **Ingredient Association:** Associates modifications with the correct ordered item.

Multiple Actions Parsing Module

- **Function:** `parse_multiple_actions(user_input)`
- **Description:**
  Parses user inputs that include both additions and removals in a single message.
- **Key Features:**
  - **Simultaneous Handling:** Processes adding and removing actions without conflict.
  - **Sequential Processing:** Adds items before removing to maintain order integrity.

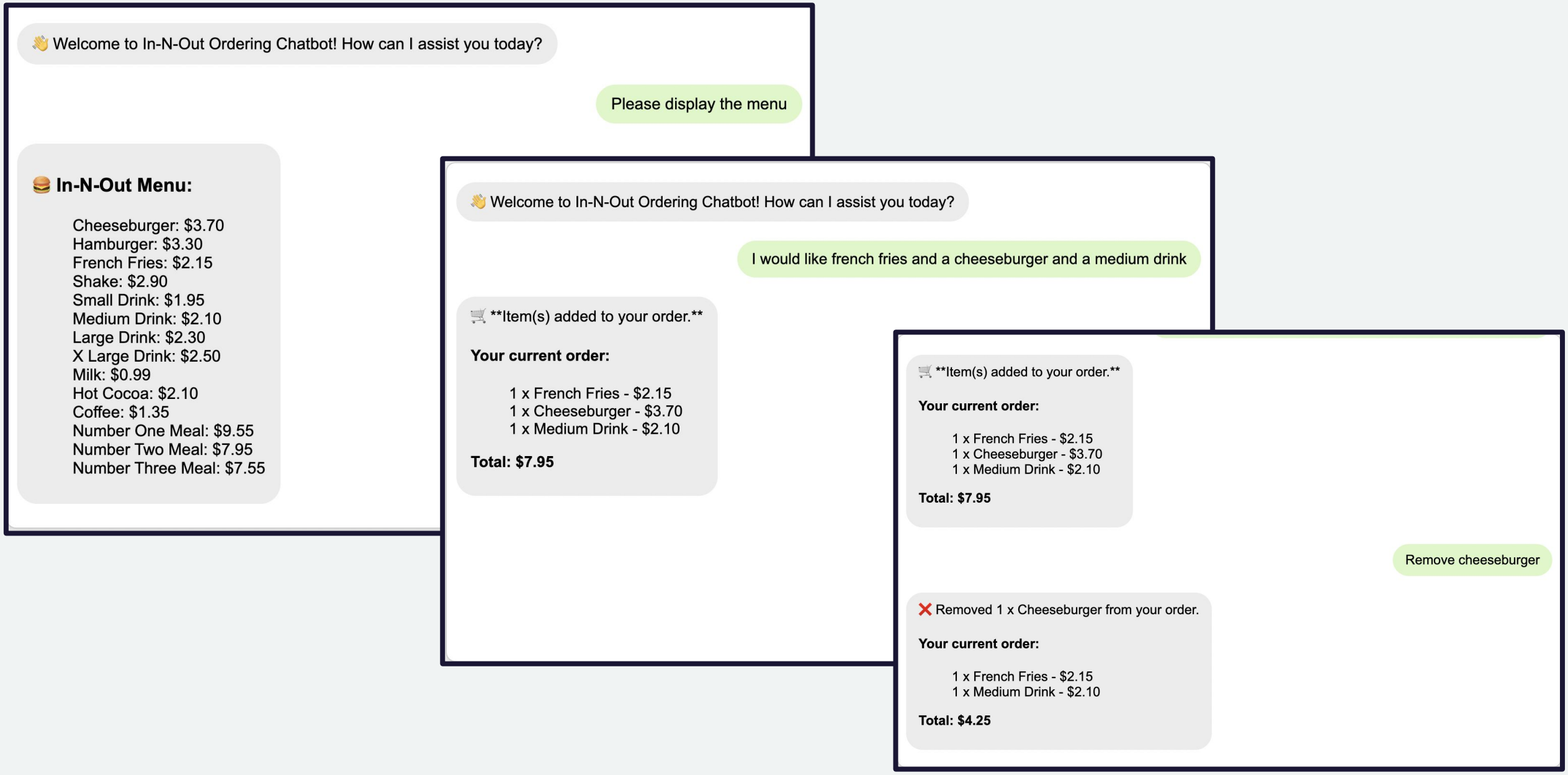
Session Management & Order Handling

- **Functions:** `handle_addition()`, `handle_removal()`, `handle_modifications()`, `handle_cancel_order()`
- **Description:**
  Manages the state of user orders, applying additions, removals, and modifications as per user requests.
- **Key Features:**
  - **Dynamic Updates:** Reflects real-time changes to the order based on user interactions.
  - **Error Handling:** Provides feedback when invalid actions are attempted (e.g., removing an item not in the order).

Chat Interface & Response Generation

- **Functionality:**
  Renders the chat interface, handles user inputs, and generates appropriate bot responses based on parsed data.
- **Key Features:**
  - **User-Friendly UI:** Clean and intuitive interface for seamless interactions.
  - **Automated Responses:** Delivers real-time updates and confirmations to enhance user experience.

Application User Interface Successes



❌ Removed 1 x Cheeseburger from your order.

Your current order:

1 x French Fries - $2.15
1 x Medium Drink - $2.10

Total: $4.25

What does french fries contain?

📝 The French Fries contains the following ingredients: Potato, Salt.

Add a cheeseburger with extra onions

What does cheeseburger contain?

📝 The Cheeseburger contains the following ingredients: Beef Patty, Cheese, Lettuce, Onion, Tomato, Spread, Pickle.

➕ Added Onion to your Cheeseburger.

Your current order:

1 x French Fries - $2.15
1 x Medium Drink - $2.10
1 x Cheeseburger (Add: Onion) - $3.70

Total: $7.95

1 x French Fries - $2.15
1 x Medium Drink - $2.10

Total: $4.25

Add a cheeseburger with extra onions

➕ Added Onion to your Cheeseburger.

Your current order:

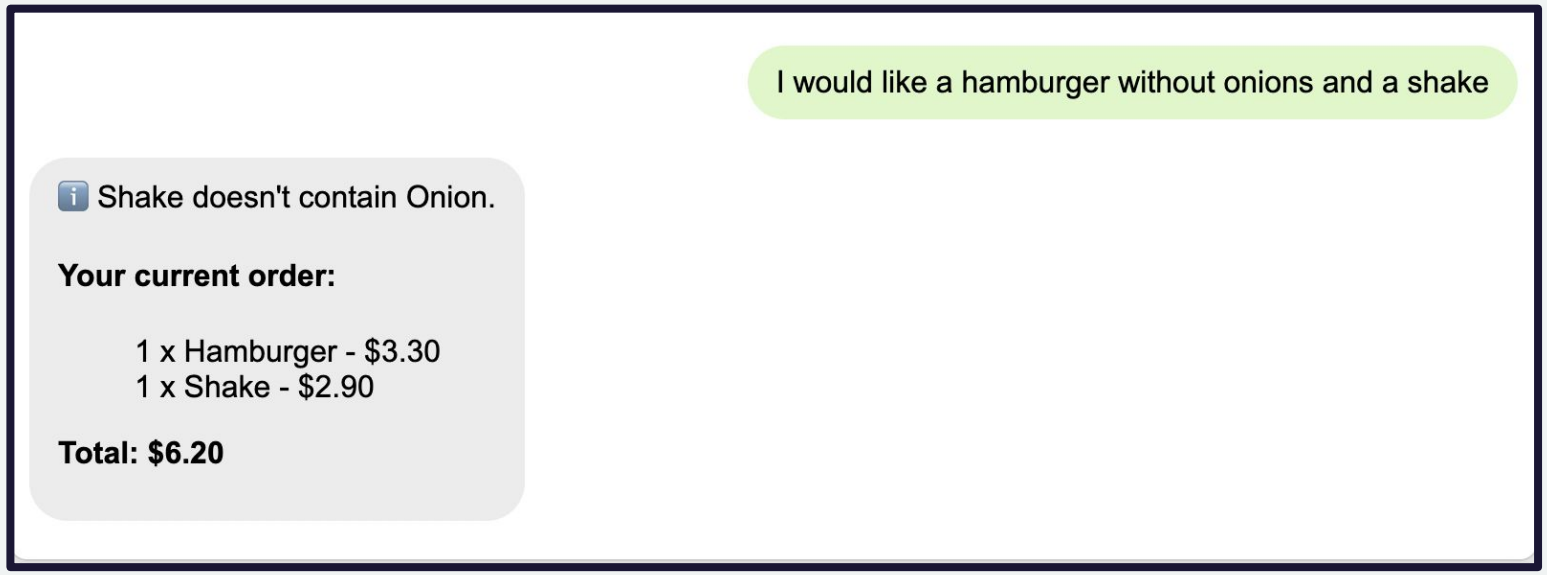
1 x French Fries - $2.15
1 x Medium Drink - $2.10
1 x Cheeseburger (Add: Onion) - $3.70

Total: $7.95

Cancel my order

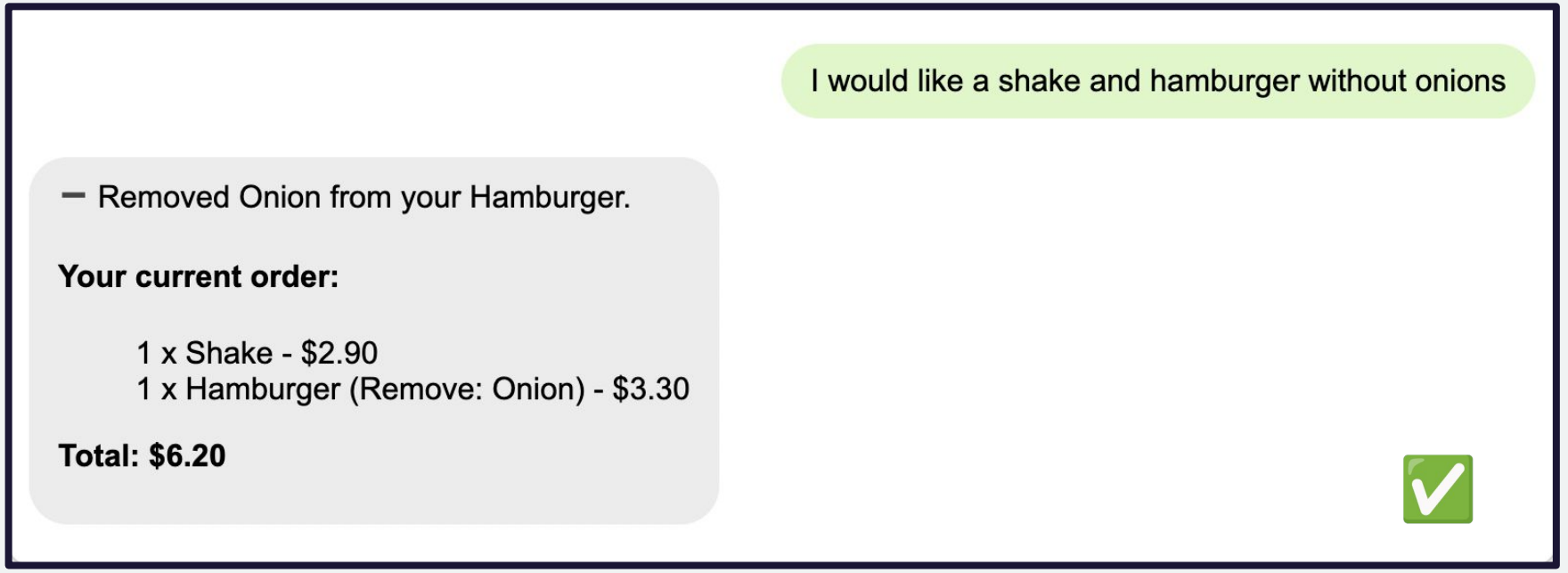
🗑️ Your entire order has been canceled.

Potential Drawbacks



❌

Customized Items Must Be at End of List in Order



Add a cheeseburger and french fries please

🛒 **Item(s) added to your order.**

Your current order:

1 x Cheeseburger - $3.70
1 x French Fries - $2.15

Total: $5.85

Remove the cheeseburger and add a hamburger

⚠️ You don't have any Hamburger in your order to remove.

Your current order:

1 x Cheeseburger - $3.70
1 x French Fries - $2.15

Total: $5.85

Cannot add or remove items in the same line as that causes confusion

Add a cheeseburger and french fries please

🛒 **Item(s) added to your order.**

Your current order:

1 x Cheeseburger - $3.70
1 x French Fries - $2.15

Total: $5.85

Add a hamburger and remove the cheeseburger

⚠️ You don't have any Hamburger in your order to remove.

Your current order:

1 x Cheeseburger - $3.70
1 x French Fries - $2.15

Total: $5.85


IN-N-OUT
Thank You!