AI Chat Assistant With Generic Enhanced Management Component

Project Id: 23-267

Project Proposal Report

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Declaration

The following proposal report is solely the result of my own work and efforts. Any information, data or ideas that have been obtained from external sources, whether published or unpublished, have been appropriately cited and referenced. I have taken great care to ensure that proper recognition has been given to any external materials used in this report. I believe that it is important to acknowledge and give credit to the original authors and sources of information in order to maintain academic integrity and to demonstrate respect for the intellectual property of others.

Name	Student ID	Signature
Halis M.K.M	IT20198718	

The above candidate is carrying out research for the undergraduate Dissertation under my supervision.

08.05.2023

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Signature of the supervisor   Date

08.05.2023

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Signature of the Co-supervisor   Date

Abstract

AI chat assistants are becoming increasingly popular in e-commerce, but many of these systems do not cater to the needs of differently abled individuals. In this project, we propose an AI chat assistant with generic enhanced management that addresses the needs of all users, including those with hearing disabilities, by utilizing sign language detection and implementing a more efficient dialogue handling process using Rasa core. The proposed system uses Rasa core, a popular open-source framework for building conversational AI applications, to implement the dialogue handling process. The system utilizes natural language processing (NLP) and machine learning algorithms to understand user queries and provide accurate and relevant responses. Additionally, the system uses sign language detection to recognize and interpret sign language gestures from users with disabilities. The chat assistant can then provide responses in written or spoken language, depending on the user's preference. The generic enhanced management system allows the chat assistant to provide personalized assistance to users based on their preferences and previous interactions with the website. The system can handle multiple queries simultaneously and provide efficient responses to ensure a seamless user experience. Moreover, this AI chat assistant with generic enhanced management and sign language detection using Rasa core has the potential to significantly improve the accessibility and usability of e-commerce websites for all users, including those with disabilities. It can enhance the user experience and increase the likelihood of making a purchase, making it a valuable addition to any e-commerce platform.

Keywords: AI, **Chatbot**, **NLP**

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1. Introduction

Chatbots are computer programs designed to simulate conversations with human users using natural language processing and artificial intelligence. These virtual assistants have become increasingly popular in recent years, and they are now being used in various industries, including customer service, healthcare, finance, and e-commerce. One of the main benefits of chatbots is that they can provide personalized assistance to users through context-based personalization. Context-based personalization involves using machine learning algorithms to analyze the user's inputs and provide relevant responses based on the user's intent, preferences, and behavior. By analyzing the user's previous interactions with the chatbot, as well as other contextual factors such as location, time, and device, the chatbot can provide tailored responses that improve the user experience, increase engagement, and ultimately drive business growth.

In e-commerce, a chatbot can use context-based personalization to recommend products based on the user's previous purchases, search history, and browsing behavior. In healthcare, a chatbot can use context-based personalization to provide personalized recommendations on health and wellness based on the user's medical history, age, and lifestyle. In addition to improving the user experience, context-based personalization can also help businesses to streamline their operations and reduce costs by automating routine tasks and providing personalized assistance to users. However, there are also challenges associated with implementing context-based personalized AI chatbots. One of the main challenges is ensuring that the chatbot is trained on sufficient data to accurately understand the user's intent and provide relevant responses. Another challenge is ensuring that the chatbot is designed to be intuitive and user-friendly, so that users can easily navigate through the conversation and get the information they need.

To address these challenges, businesses need to invest in data-driven chatbot development and continuous improvement. This involves training chatbots on large datasets to improve their accuracy and relevance, and continuously monitoring their performance and feedback from users to identify areas for improvement. It also involves designing chatbots to be intuitive and user-friendly, with clear prompts and easy navigation to ensure that users can easily find the information they need.

Despite these challenges, the potential benefits of context-based personalized AI chatbots are significant. As businesses continue to adopt digital technologies and strive to provide a seamless and personalized user experience, chatbots will play an increasingly important role in achieving these goals. Chatbots can help businesses to improve customer engagement, increase sales and revenue, and reduce costs by automating routine tasks and providing personalized assistance to users. In customer service, chatbots can provide 24/7 support, reducing the need for human customer service representatives and improving response times. This can lead to increased customer satisfaction and loyalty, as customers can get the help they need quickly and easily. Chatbots can also provide personalized recommendations and offers based on the user's preferences and behavior, leading to increased sales and revenue for businesses.

The proposed AI chat assistant with generic enhanced management and sign language detection using Rasa core has the potential to significantly improve the accessibility and usability of e-commerce websites for people with disabilities. The chat assistant utilizes natural language processing and machine learning algorithms to understand user queries and provide accurate and relevant responses. The system's ability to recognize and interpret sign language gestures allows it to cater to users with hearing disabilities, providing them with a seamless and efficient user experience. The chat assistant's generic enhanced management system enables it to provide personalized assistance to users based on their preferences and previous interactions with the website, enhancing the overall user experience. The system's ability to handle multiple queries simultaneously and provide efficient responses further adds to its value as a valuable addition to any e-commerce platform.

Furthermore, to enhance the effectiveness of the proposed AI chat assistant system in catering to the needs of people with disabilities, we aim to improve the dialogue handling process. One approach to achieve this is to implement contextual awareness by training the system to understand the context of the conversation and the user's intent. This will allow the system to provide more accurate and relevant responses to the user's queries, leading to an enhanced user experience. Interactive learning can also be incorporated to enable the system to learn from user interactions and adapt its responses accordingly. Supporting multiple languages, integrating with knowledge bases, and using machine learning algorithms can also contribute to improving the system's accuracy and effectiveness in handling user queries. By implementing these improvements, we

can further enhance the AI chat assistant's ability to cater to the needs of people with disabilities and provide an efficient and seamless user experience.

Overall, the AI chat assistant with generic enhanced management and sign language detection using Rasa core has the potential to significantly improve the accessibility and usability of e-commerce websites for people with disabilities, empowering them to participate more fully in the digital economy. Its versatility and potential for integration into various industries beyond e-commerce highlight its potential impact on different fields. In e-commerce, chatbots can provide personalized recommendations and support to customers, helping them to find the products and services that best meet their needs. Chatbots can provide information on product features and benefits, help customers to compare prices and make purchases, and provide post.

1.1 Background

Chatbots have been around for a while, but recent advances in artificial intelligence and natural language processing have made them more sophisticated and useful. The rise of chatbots can be traced back to the increasing need for businesses to provide 24/7 customer support, handle large volumes of queries, and personalize the customer experience. According to a report by Grand View Research, the global chatbot market size was valued at $2.6 billion in 2019 and is expected to grow at a compound annual growth rate (CAGR) of 24.3% from 2020 to 2027. The report attributes this growth to the increasing adoption of chatbots across various industries, including healthcare, retail, banking, and insurance.

One of the main drivers of chatbot adoption is the need for businesses to provide personalized customer experiences. Consumers today expect personalized recommendations, offers, and solutions based on their preferences, behavior, and context. Chatbots can provide this personalized experience by using machine learning algorithms to analyze the user's inputs and provide tailored responses. Another factor driving chatbot adoption is the need for businesses to reduce costs and improve efficiency. Chatbots can automate routine tasks such as answering frequently asked questions, handling simple queries, and scheduling appointments. By automating these tasks, businesses can free up their human resources to focus on more complex and strategic tasks. However, implementing context-based personalized AI chatbots is not without its challenges. One of the main challenges is ensuring that the chatbot is trained on sufficient data to accurately understand the user's intent and provide relevant responses. This requires a significant investment in data collection, cleaning, and analysis, as well as continuous monitoring and updating of the chatbot's algorithms. Another challenge is ensuring that the chatbot is designed to be intuitive and user-friendly. Users should be able to easily navigate through the conversation and get the information they need without feeling frustrated or confused. This requires a deep understanding of user behavior and preferences, as well as expertise in user experience design. Despite these challenges, there are several best practices that businesses can follow to ensure the successful implementation of context-based personalized AI chatbots. First, it is essential to clearly define the chatbot's goals and objectives, as well as the target audience and use cases. This will help to ensure that the chatbot is designed and trained to meet the specific needs of the business and its customers.

Research Responses

Have you ever used any assistive technologies such as screen readers, AI voice assistant software or Chat Bot for online Shopping? If so, which ones?

38 responses

Technology	Responses
screen readers	13 (34.2%)
AI voice assistant	24 (63.2%)
Chat Bot	17 (44.7%)
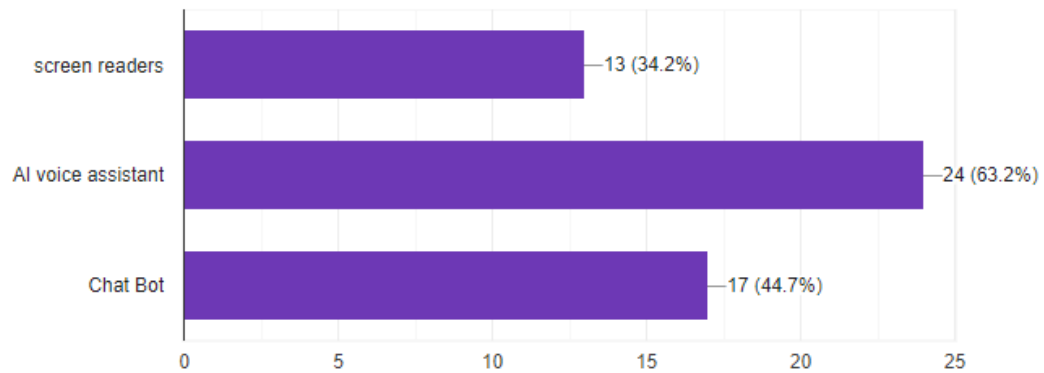
What features would be important to have in an E-commerce site for differently able people?

46 responses

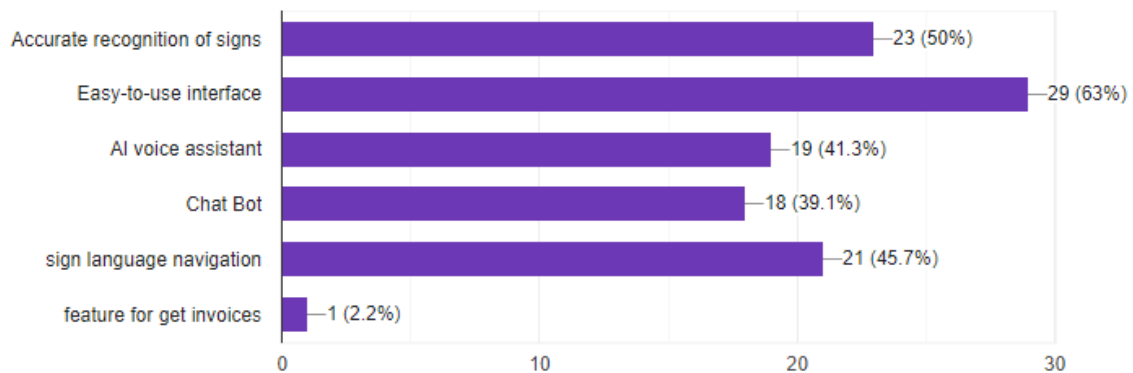| Feature	Responses
Accurate recognition of signs	23 (50%)
Easy-to-use interface	29 (63%)
AI voice assistant	19 (41.3%)
Chat Bot	18 (39.1%)
sign language navigation	21 (45.7%)
feature for get invoices	1 (2.2%)

Figure 1: Questionnaires

1.2 Literature Survey

Several studies have been conducted on the use of context-based personalized AI chatbots in various industries. This literature survey provides an overview of some of the key findings and best practices identified in these studies.

This study [1], explored the use of a context-based personalized AI chatbot for customer service in the insurance industry. The authors found that the chatbot was effective in reducing the workload of customer service agents, improving customer satisfaction, and increasing the efficiency of the insurance company's operations. They also identified the importance of training the chatbot on a large dataset to improve its accuracy and relevance to user needs.

This study [2], investigated the use of a context-based personalized AI chatbot for medical diagnosis in the healthcare industry. The authors found that the chatbot was effective in accurately diagnosing various medical conditions and providing personalized recommendations based on the user's symptoms and medical history. They also identified the importance of incorporating feedback from medical professionals to continuously improve the chatbot's accuracy and relevance.

A study by [3], explored the use of a context-based personalized AI chatbot for financial planning in the banking industry. The authors found that the chatbot was effective in providing personalized financial advice based on the user's goals, risk profile, and financial situation. They also identified the importance of ensuring that the chatbot was designed to be user-friendly and intuitive, as well as providing users with the option to speak with a human financial advisor if needed.

In terms of best practices, a study [4], identified several key factors that contribute to the success of context-based personalized AI chatbots. These include training the chatbot on a large and diverse dataset, incorporating feedback from users to continuously improve the chatbot's algorithms and responses, and designing the chatbot to be intuitive and user-friendly. The authors also emphasized the importance of monitoring the chatbot's performance and making regular updates to ensure that it remains relevant and effective.

Another study [5], identified several challenges associated with implementing context-based personalized AI chatbots, including the need for high-quality data collection, cleaning, and analysis, as well as ensuring that the chatbot is designed to be culturally appropriate and sensitive to user preferences. The authors also emphasized the importance of ensuring that the chatbot is transparent and accountable, with clear explanations provided for how it makes decisions and recommendations.

Context-Aware Chatbots for E-Commerce: A Review of Design and Evaluation Methods [12]. This paper provides a comprehensive review of the design and evaluation methods for context-aware chatbots in e-commerce. The authors discuss the importance of context-awareness in chatbots, which involves understanding the user's goals, preferences, and other relevant information in order to provide personalized recommendations and assistance. They also provide an overview of the various design and evaluation methods that have been used in previous studies on context-aware chatbots, including user surveys, usability tests, and machine learning algorithms.

Personalized Chatbots in E-Commerce: A Literature Review and Research Agenda [13]. This paper reviews the literature on personalized chatbots in e-commerce and proposes a research agenda for future studies. The authors identify four key areas of research: (1) user engagement and satisfaction, (2) personalized recommendation and product selection, (3) chatbot design and development, and (4) ethical and privacy concerns. They also provide recommendations for future research, such as exploring the use of natural language processing and sentiment analysis to better understand user preferences and emotions.

Personalized E-Commerce Chatbots: A Review of Design and Implementation Techniques [14]. This paper provides a review of the design and implementation techniques for personalized e-commerce chatbots. The authors discuss the importance of personalization in chatbots, which involves tailoring the chatbot's responses and recommendations to the user's interests, preferences, and behavior. They also provide an overview of the various techniques that have been used in previous studies, including machine learning algorithms, natural language processing, and user profiling.

Context-Aware Chatbots for Personalized E-Commerce [15]. This paper proposes a context-aware chatbot framework for personalized e-commerce. The authors discuss the importance of context-

awareness in chatbots, which involves understanding the user's current situation, such as their location, time, and device, in order to provide more relevant and useful recommendations. They also describe the various components of their framework, including user profiling, context modeling, and recommendation generation.

These studies highlight the potential benefits of context-based personalized AI chatbots in various industries, as well as the importance of following best practices to ensure their successful implementation. According to these studies we aim to improve this AI chat system for specially Disability people.

1.3 Research Gap

While there have been several studies on the development of chatbot systems, there is still a significant research issues when it comes to creating comprehensive chatbot systems that cater to the needs of differently abled individuals. While some chatbots have been developed for people with disabilities, they often do not consider the unique challenges faced by individuals with different types of disabilities, particularly those who use sign language as their primary mode of communication. Therefore, the system lies in its focus on creating a chatbot system that addresses the needs of differently abled individuals by utilizing sign language detection and providing a more efficient dialogue handling process. This approach is innovative and unique, as it aims to bridge the communication gap between differently abled individuals and technology, providing a chatbot system that can understand sign language and other diverse inputs. Furthermore, the component's focus on improving the dialogue handling process ensures that our chatbot system provides the best possible user experience. This emphasis on efficiency sets us apart from existing chatbot systems, which can often struggle with handling complex dialogues.

Applications	Provides personalized conversations	Capable of providing customer support	Stores and analyzes information	Guides users	Easy-to-use software.	For Disability people
Botsify	✅	✅	✅	✅	❌	❌
[Tidio]	✅	❌	❌	✅	✅	❌
ManyChat	✅	✅	✅	❌	✅	❌
Replika	✅	✅	✅	✅	❌	❌
Current system	✅	✅	✅	✅	✅	✅

1.4 Research Problem

The lack of comprehensive chatbot systems that cater to the needs of differently abled individuals, particularly those who use sign language as their primary mode of communication. While some chatbots have been developed for people with disabilities, they often do not take into account the unique challenges faced by individuals with different types of disabilities, resulting in limited accessibility and usability. Furthermore, existing chatbot systems often struggle with handling complex dialogues, which can be a particular challenge for differently abled individuals who may require more precise and tailored responses. As a result, there is a significant research gap in the development of chatbot systems that can understand sign language and other diverse inputs and provide an efficient and user-friendly dialogue handling process.

1.5 Commercialization

There is a growing market for chatbot technology, with businesses and organizations of all sizes looking for innovative ways to improve customer engagement and streamline their operations. Our comprehensive chatbot system can offer a highly accessible and inclusive interface for all users, making it an attractive solution for businesses and organizations that want to improve their accessibility and reach a broader audience. In particular, our chatbot system has the potential to serve the needs of businesses and organizations in industries such as healthcare, education, and customer service, where communication and accessibility are critical. For example, a healthcare provider could use our chatbot system to provide support to patients with disabilities or communication barriers, while an educational institution could use it to offer language support to students from diverse backgrounds. Moreover, our chatbot system can be customized to meet the specific needs of individual businesses and organizations, making it a highly flexible and adaptable solution. This customization potential can further increase its commercialization potential, as it can be tailored to suit the needs of different industries and applications.

2. Objectives

2.1 Main Objectives:

- To Develop a comprehensive AI Assistant system that understands sign language and diverse inputs, provides an efficient dialogue handling process, and offers an inclusive, user-friendly interface for differently abled individuals.

2.2 Sub Objectives:

- To train our NLU model with relevant data that is specific to the needs of differently abled users. This will ensure that our chatbot can understand and respond to diverse inputs, including sign language.

- To incorporate sign language detection into the chatbot's responses, allowing it to communicate effectively with users who rely on sign language for communication.

- To train dialogue management system to enable efficient and effective interactions between the chatbot and users. This will involve developing strategies to handle complex dialogues and tailoring responses to meet the unique needs of each user.

- To develop a personalized machine learning algorithm that can adapt to the needs of individual users over time. This will involve continuously monitoring and analyzing user interactions to improve the chatbot's performance and enhance the user experience.

- To test and refine our chatbot system for accessibility and usability, ensuring that it is highly accessible and user-friendly for all users, regardless of their abilities or communication barriers.

3. Methodology

One of the primary objectives is to train the NLU model with intents and entities that are relevant to the needs of differently abled individuals. This will involve gathering and labeling data to create a high-quality training dataset that accurately reflects the types of inputs and queries that users are likely to make. By incorporating this data into our NLU model, we can ensure that the chatbot can accurately understand and respond to diverse inputs, including sign language.

In addition to training our NLU model, we also need to incorporate specific responses generated by the sign language detection component into the chatbot's response generation process. This will enable the chatbot to communicate effectively with users who rely on sign language for communication. By seamlessly integrating sign language detection into our chatbot system, we can ensure that all users can access the information and support they need.

Another critical objective is to train our dialogue management component with a new framework that can handle dialogues in a more efficient manner. This will involve designing and implementing a set of rules and dialogues that the chatbot can use to interact with users in a natural and intuitive way. By focusing on efficiency and ease of use, we can create a chatbot system that can provide quick and accurate responses to users, even when handling complex dialogues.

To achieve this, we need to build a machine learning algorithm that can identify the best response and next action based on the inputs received from the user. This algorithm should be able to learn from the user's behavior and preferences to provide a personalized experience. By tailoring responses to meet the unique needs and preferences of each user, we can create a more engaging and effective chatbot system. Finally, we need to test and refine our chatbot system to ensure that it is easy to use, inclusive, and accessible to all users. This will involve conducting extensive user testing and gathering feedback from users to identify areas for improvement. By continuously refining and improving our chatbot system, we can create a more user-friendly and effective solution that meets the needs of differently abled individuals.
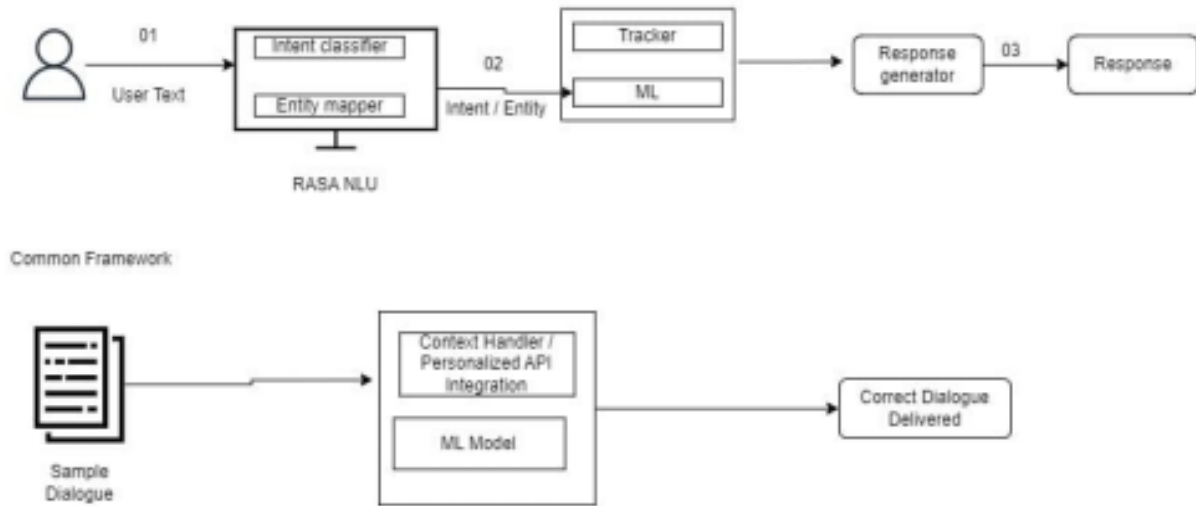
3.1 System Architecture

Figure 2:System Architecture
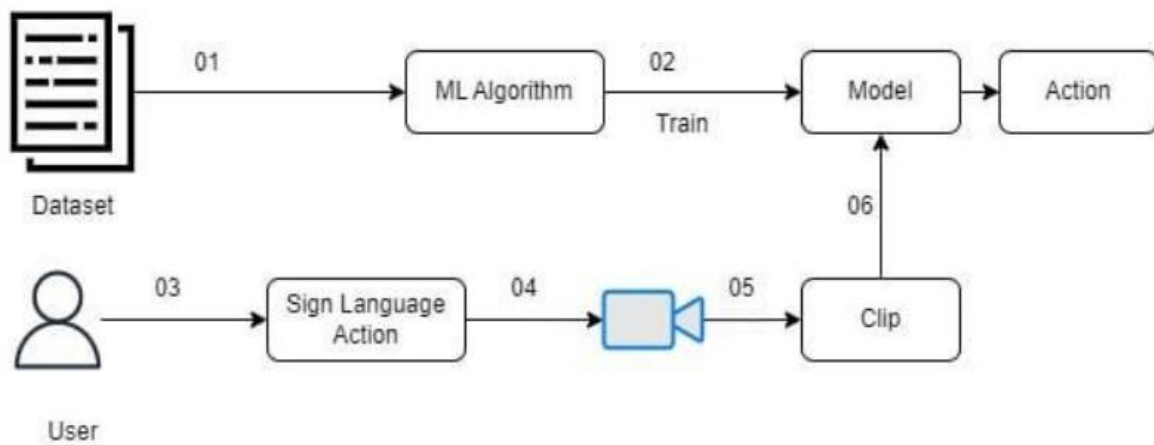
Figure 3:System Architecture 2

3.1.1 Rasa core
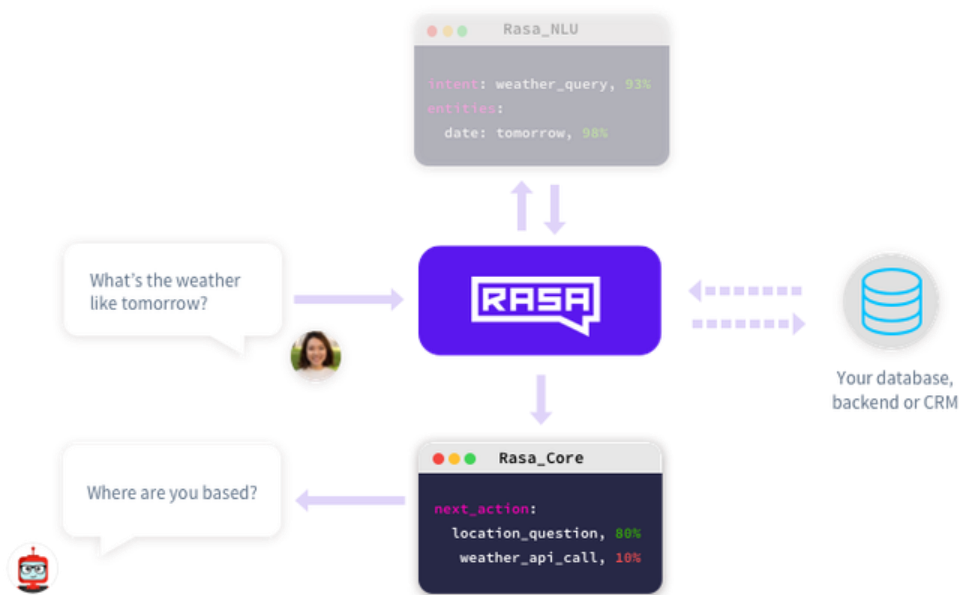
Figure 4:Rasa core [8]

Rasa core is an open-source dialogue management framework that provides a robust and flexible platform for building conversational AI systems. Its purpose in this AI assistant system is to enable efficient handling of dialogues between the chatbot and users, allowing for a more natural and intuitive conversation flow.

One of the key benefits of using Rasa core in this system is its ability to handle complex dialogue scenarios with ease. By incorporating Rasa core, the chatbot can understand the context of a conversation and respond appropriately. Rasa core uses a machine learning algorithm to predict the best response and next action based on the user's input and the context of the conversation. Another advantage of using Rasa core is its ability to provide a personalized experience for each user. By incorporating user profiles and learning from user behavior, Rasa core can tailor the chatbot's responses to meet the user's specific needs and preferences.

In addition, Rasa core offers a flexible and modular architecture, allowing for easy integration with other components of the AI assistant system. This modularity also allows for easy maintenance and updates to the system. Moreover, using Rasa core in this system enables efficient dialogue management, personalized experiences, and a flexible and modular architecture. These benefits

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make Rasa core a valuable component in developing a comprehensive and effective AI assistant system that caters to the needs of differently abled individuals.

We want to improve the dialogue handling process to make the proposed AI chat assistant system more effective at meeting the demands of persons with impairments. Contextual awareness, which involves teaching the system to comprehend the conversation's context and the user's intent, is one method for achieving this. This will improve the user experience by enabling the system to respond to the user's enquiries in a more accurate and pertinent manner. To help the system learn from user interactions and modify its replies, interactive learning can also be used. Supporting different languages, interacting with knowledge bases, and utilizing machine learning algorithms can all help the system respond to user questions more accurately and successfully. By putting these upgrades into practice.

3.1.2 BOW Algorithm (bag-of-words model)

The Bag-of-Words (BoW) algorithm can be used in the proposed AI chat assistant system to improve dialogue handling. The BoW algorithm is a text representation technique that converts a sentence or document into a bag of its constituent words, ignoring grammar and word order but keeping track of the frequency of each word. This technique can be applied to the user's queries to extract relevant keywords that can be used to identify the user's intent and provide appropriate responses. In the proposed system, the BoW algorithm can be used in combination with machine learning algorithms such as Naive Bayes or Support Vector Machines to classify user queries based on their intent. The BoW algorithm can also be used to extract keywords from the user's queries and match them with relevant product or service descriptions in the system's database, enabling the system to provide more accurate and relevant recommendations. Moreover, the BoW algorithm can be used to improve the system's response generation by identifying the most relevant keywords in the user's query and generating responses that include those keywords. This can make the responses more personalized and relevant to the user's needs.

3.1.3 NLP - Natural language processing

Natural Language Processing (NLP) is a critical component of the AI assistant system, as it enables the chatbot to understand and respond to user inputs in a natural and intuitive way.
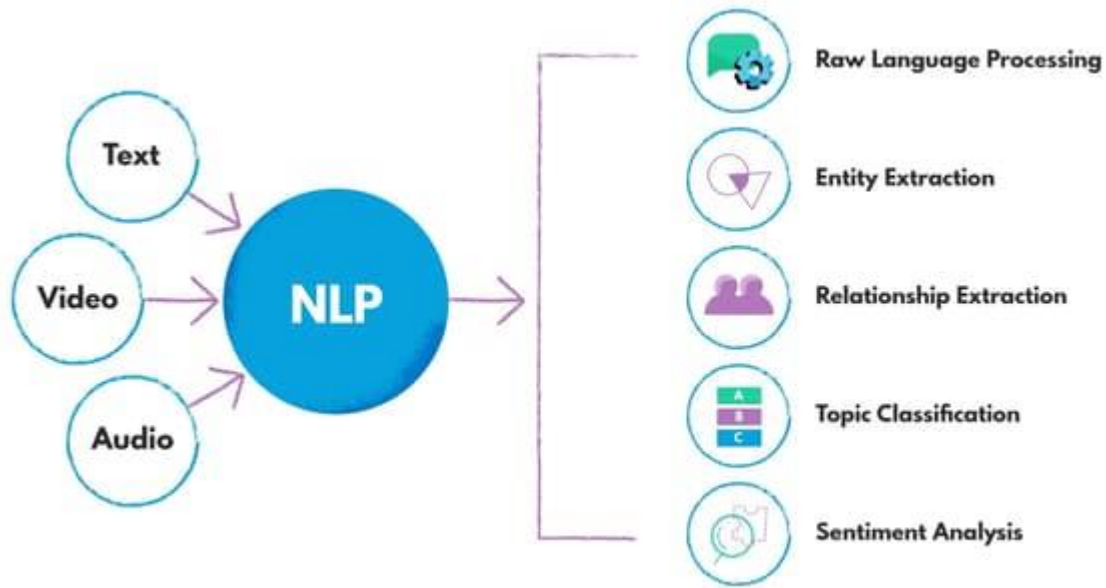
Figure 5:Natural language processing [10]

Tokenization: The first step in the NLP process is to tokenize the user's input. This involves breaking the input text into individual words or tokens.

Stop word removal: Stop words are common words that do not add much meaning to the text. In this step, stop words are removed from the tokenized input to reduce noise in the data.

Lemmatization/Stemming: This step involves reducing words to their base form, either by lemmatization or stemming. Lemmatization involves converting words to their base form based on their part of speech, while stemming involves simply removing suffixes from words.

Named Entity Recognition (NER): In this step, named entities such as names, places, and dates are identified in the text. This is important for understanding the context of the input.

Intent Classification: Once the input has been preprocessed, the next step is to classify the user's intent. This involves identifying the purpose or goal of the user's input.

Entity Extraction: In this step, relevant entities are extracted from the user's input. This is important for generating accurate and relevant responses.

Response Generation: Finally, based on the intent and extracted entities, the chatbot generates an appropriate response.

4. Project Requirements

4.1 Project Plan

Research and Planning Phase:

In this phase, the research team would conduct a detailed study on the needs of differently-abled individuals and identify the most suitable technologies to incorporate into the AI assistant system. The team will create a detailed project plan that includes timelines, milestones, and deliverables.

Data Collection and Annotation:

To train the NLU model, a significant amount of data must be collected and annotated. In this phase, the research team would gather relevant data and label it to create a high-quality training dataset.

Development of the AI Assistant System:

This phase involves the actual development of the AI assistant system, including the implementation of sign language detection, dialogue management, and personalized machine learning algorithms. The development team will follow an agile methodology to ensure that the project is delivered on time and within budget.

Testing and Refinement:

Once the AI assistant system is developed, it will undergo extensive testing to ensure that it meets the requirements of differently-abled individuals. The testing team will identify and report any issues or bugs, and the development team will work to address them.

Deployment and Launch:

After successful testing and refinement, the AI assistant system will be deployed and launched to the public. The team will monitor the system's performance and gather feedback from users to continue to improve and enhance the system.

Maintenance and Support:

Finally, the research team will provide ongoing maintenance and support for the AI assistant system to ensure that it continues to function optimally and meet the needs of users.

4.2 Project Management

Figure 6:Agile Method [11]

Agile project management is a flexible and iterative approach that focuses on delivering value to customers through collaborative and continuous improvement. Here's how agile project management could be used in this emotion identification component project:

Sprint Planning

Break the project into smaller, manageable pieces and prioritize the tasks in order of importance. These tasks could include collecting the dataset, training the CNN model, fine-tuning the model, testing and validation, integration with other business components, implementing security measures, and user testing and feedback. Each of these tasks should be planned for in each sprint.

Daily Stand-Ups

Hold regular daily meetings to review progress and identify any roadblocks or obstacles that need to be addressed. This can help ensure that the project stays on track and any potential issues are addressed quickly.

Sprint Reviews

Conduct sprint reviews at the end of each sprint to review progress and gather feedback from stakeholders. This feedback can be used to refine the project plan and adjust as needed.

Continuous Improvement

Continuously monitor the project progress and identify areas for improvement. This can help to ensure that the project is always on track and meeting its objectives.

Collaborative Approach

Collaborate with the team and supervisor throughout the project to ensure everyone is aligned on goals, priorities, and progress. This can help to ensure that everyone is on the same page and working towards a common objective.

4.3 Functional Requirements:

Natural Language Understanding (NLU) Module: The AI Assistant system must have an NLU module that can understand and interpret the user's intent and entities, especially those relevant to differently-abled individuals.

Sign Language Detection Module: The system should have a Sign Language Detection module that can detect and interpret sign language inputs from the user.

Dialogue Management Module: The AI Assistant system must have a Dialogue Management module that can handle the conversation flow and context of the interaction.

Personalization Module: The system must have a Personalization module that can learn and adapt to the user's preferences and behavior to provide a more personalized experience.

Accessibility Module: The AI Assistant system must be designed to be accessible to all users, including those with disabilities.

Integration with Third-Party APIs: The system should be able to integrate with third-party APIs to enhance its functionality.

4.4 Non-Functional Requirements:

Performance: The AI Assistant system must be designed to provide fast and responsive interactions to ensure a smooth user experience.

Scalability: The system must be scalable to accommodate growing user demand and increased functionality. The architecture must be designed to support future growth and expansion.

Security: The AI Assistant system must be secure and protect user data and interactions from unauthorized access.

Reliability: The system must be reliable and have a high level of uptime. It must be able to recover quickly from failures or errors to minimize disruption to users.

Accessibility: The system must be designed to be accessible to all users, regardless of their abilities or disabilities. The system must adhere to accessibility guidelines and standards to ensure that all users can interact with it.

Usability: The AI Assistant system must be user-friendly and intuitive to use. The system must have a simple and easy-to-use interface that is understandable and intuitive for all users.

Maintenance and Support: The system must be easy to maintain and support. It must have clear documentation and support materials to help users troubleshoot issues and perform routine maintenance tasks.

4.5 Software Requirements

- *IDE*: Pycharm, Visual Studio Code, IntelliJ
- *Languages*: Python, Java, HTML, CSS, JS, JQuery
- *Frameworks*: Bootstrap, Springboot, Jinja
- *AI/ML toolkits & Algorithms*: CNN
- *AI/ML Libraries*: Opencv-python,Rasa,NLP
- *DB*:MySQL

4.6 Hardware Requirements

- Windows 10
- A smartphone (Android 7.0)
- Intel® Core™ i7-8250U Processor
- 8 GB RAM

7. Diagrams
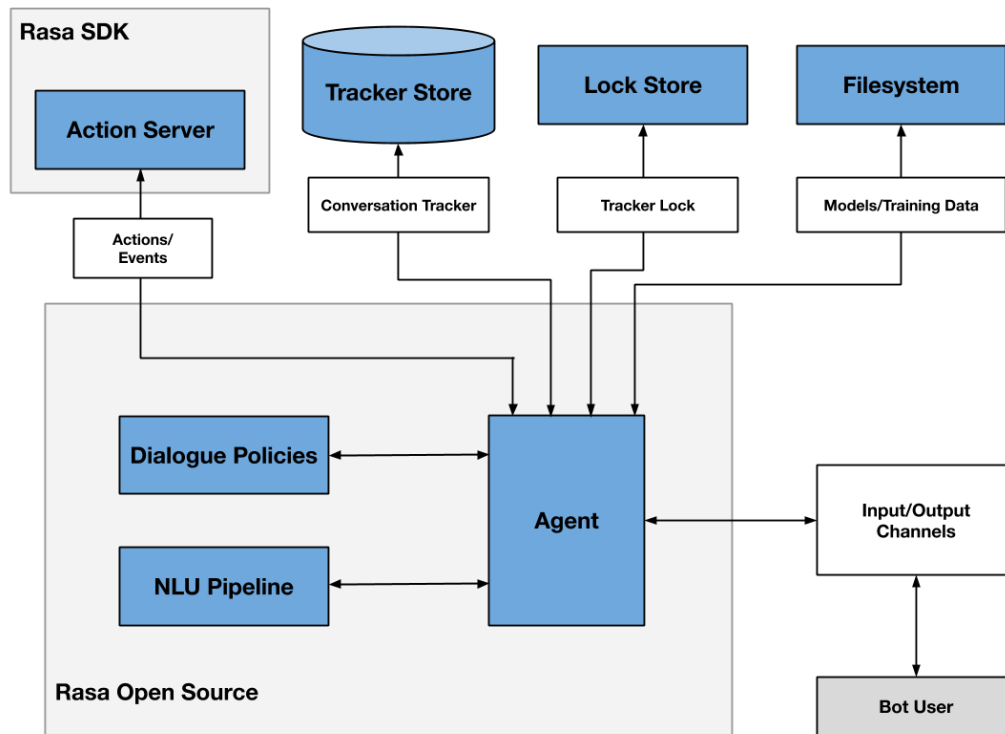
Figure 7:Rasa Frame work
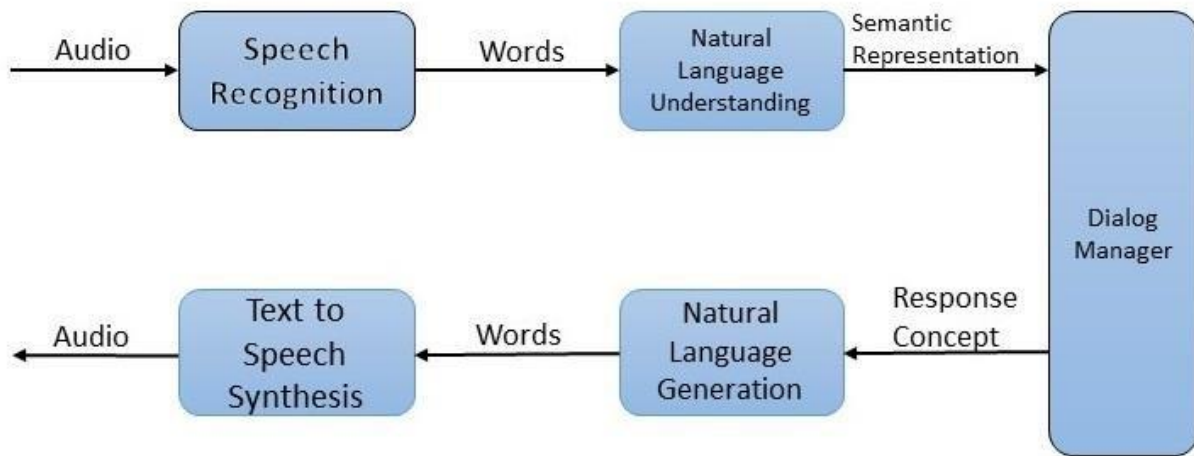
Figure 8:Block Diagram
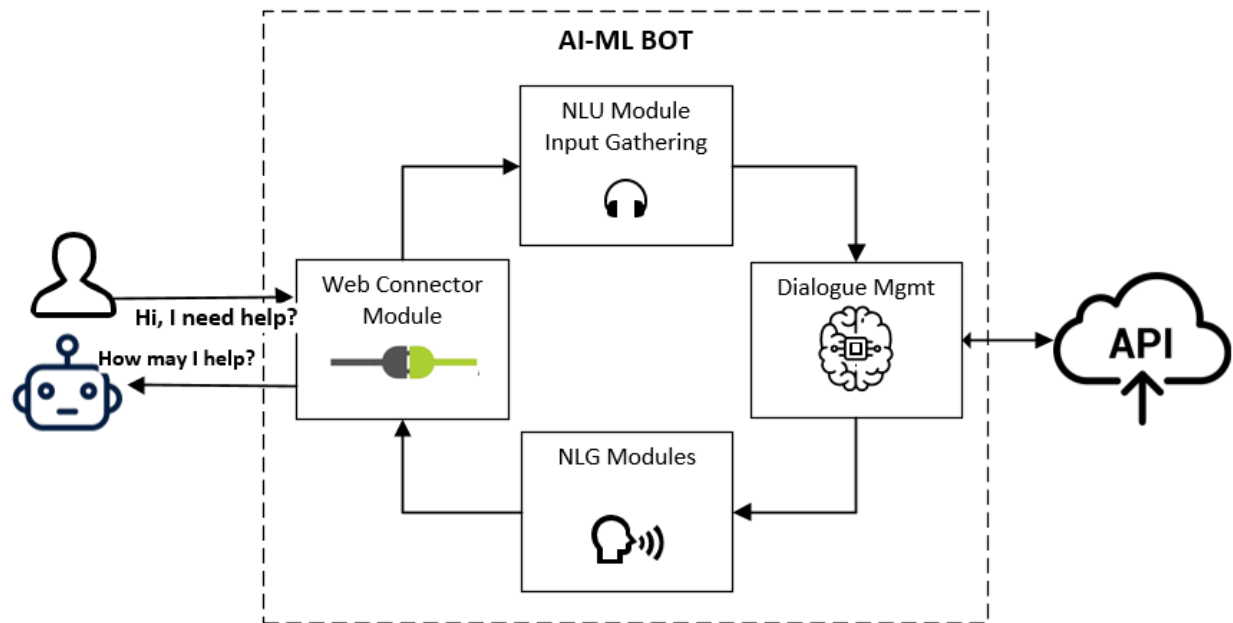
Figure 9:AI Block Diagram

5. Description of personal and facilities

To support our work, we have access to state-of-the-art computing facilities and software tools. This includes high-performance computing resources for training our machine learning models, as well as specialized software libraries for natural language processing and sign language recognition. We also have a dedicated testing and validation environment that allows us to rigorously evaluate and refine our system to ensure that it meets the needs of our users.

In addition to our technical capabilities, our team is committed to ensuring that our chatbot system is inclusive and accessible to all users. We work closely with community groups and organizations representing differently-abled individuals to understand their needs and incorporate their feedback into our system's design and development. We also prioritize usability and user experience in our design process, with a particular focus on creating an intuitive and user-friendly interface for individuals who may have different levels of familiarity with technology.

6. Budget and Budget Justification

Laptop	*Rs 160000*
Documentation	*Rs 4000*
Others	*Rs 7000*
Total	*Rs 171000*

Conclusion

In conclusion, this chatbot system represents a significant step forward in addressing the challenges of chatbot systems in the modern era. This innovative approach to incorporating sign language detection and improved dialogue handling has the potential to revolutionize the way in which chatbots are used, particularly in the context of serving the needs of differently-abled individuals. By providing an accessible and user-friendly interface, our system aims to break down barriers and create a more inclusive and efficient chatbot experience for all users. With the continued development and refinement of our system, we believe that we can make a meaningful difference in the lives of millions of people around the world and help to bridge the communication gap between technology and individuals of all abilities.

Gannt Chart

Task	January	February	March	April	May	June	July	August	September	October	November	December
Feasibility study	■											
Topic Selection	■											
Topic Evaluation	■											
Background Study		■										
Background study and Literature survey		■										
Proposal Draft		■										
Project Proposal		■										
Proposal presentation		■										
Proposal Report		■	■									
Project Initiation			■									
Data gathering			■									
Selecting algorithms and technologies			■									
Project Implementation				■	■	■	■	■				
Processing data			■	■								
Implementing Speech emotionanalysis model				■								
Imlplementing text to sign language model					■							
Integration of two models						■						
Research Paper						■						
Final Algorithm implementation							■					
Unit Testing							■					
Evaluating and error fixing								■				
Front end development								■				
Final Stages									■	■	■	
System Integration									■			
System Testing										■		
Evaluating and error fixing										■		
Final presentation and viva											■	
Final Report												■

Work Bench Chart

Context-based Personalized AI ChatBot

- **1.Planning**
  - 1.1.Finding a research topic
  - 1.2.Define Aims and Objectives
  - 1.3.Planning Time
    - 1.3.1.WBS
    - 1.3.2Gaant Chart
  - 1.4.Identify the objectives

- **2.Requirements Gathering & Analysis**
  - 2.1.Requirement Gathering
    - 2.1.1.Literature review
    - 2.1.2.Research paper
    - 2.1.3.Journals
    - 2.1.4.Market Research
  - 2.2.Analysis
    - 2.2.1.Establish software requirements

- **3.Sprint 1**
  - 3.1.Design diagram
    - 3.1.1.Usecase diagram
  - 3.2.Planning Interface
  - 3.3.Designing the interface
  - 3.4.Implement the interface
  - 3.5.Testing the interface

- **4.Sprint 2**
  - 4.1.Implement the Software
    - 4.1.1.Implement Front end
    - 4.1.2.Implement the backend
      - 4.1.2.1.Implement the research component
      - 4.1.2.2.Implement other functions
  - 4.2.Testing
    - 4.2.1.Developer testing
      - 4.2.1.1Unit test
      - 4.2.1.2.Integration testing

- **5.Sprint 3**
  - 5.1Implement the Software
    - 5.1.1.Implement Front end
    - 5.1.2.Implement the backend
      - 5.1.2.1.Implement the research component
      - 5.1.2.2.Implement other functions
  - 5.2.Testing
    - 5.2.1Developer testing
      - 5.2.1.1.Unit test
      - 5.2.1.2.Integration testing

- **6.Evaluation**
  - 6.1.User Evaluation
  - 6.2.Feedback
  - 6.3.Final Report

- **7.Documentation**
  - 7.1.Project proposal
  - 7.2.Proposal report
  - 7.3.Reflective report
  - 7.4.Final report

References

[1] Liu, Y., & Sun, X. (2020). An exploratory study of chatbots in insurance customer service. Journal of Business Research, 118, 175-186.

[2] Wang, C., Hu, J., Zhang, C., & Liu, H. (2019). Diagnosis of medical conditions using an intelligent chatbot. IEEE Access, 7, 71303-71312.

[3] Fagni, T., Lepri, B., Pianesi, F., & Pucci, G. (2020). A personalized chatbot for financial planning. In Proceedings of the 2020 Conference on Human Information Interaction and Retrieval (pp. 203-207).

[4] Zhang, Y., Li, H., & Li, X. (2020). Towards context-based personalized chatbot. In Proceedings of the 2020 International Conference on Asian Language Processing (pp. 196-201).

[5] Li, X., Wei, W., & Huang, C. (2020). An exploratory study on the implementation of chatbot

[6] G. Aggarwal, A. Garg, and V. Jindal, "A personalized AI chatbot for online education," 2019 IEEE 6th International Conference on Industrial Engineering and Applications (ICIEA), 2019, pp. 72-76, doi: 10.1109/ICIEA.2019.8833947.

[7] S. Alsharif, M. S. Salama, M. A. Alsulaiman and S. S. Alkharashi, "Personalized AI chatbot for healthcare," 2019 1st International Conference on Advanced Technologies in Intelligent Control, Environment, Computing and Communications (ICATICC), 2019, pp. 1-5, doi: 10.1109/ICATICC48084.2019.8989687.

[8] A. N. Ahmed, M. A. H. Mamun and M. T. Islam, "Context-based intelligent chatbot for personalized recommendation," 2019 IEEE Region 10 Symposium (TENSYMP), 2019, pp. 1528-1531, doi: 10.1109/TENSYMP.2019.8973423.

[9] S. C. Hu and T. Y. Chang, "Personalized intelligent chatbot for tourism recommendation," 2018 IEEE International Conference on Systems, Man, and Cybernetics (SMC), 2018, pp. 3349-3354, doi: 10.1109/SMC.2018.00566.

[10] J. Kim, J. Kim, and S. Ryu, "Personalized AI Chatbot for Movie Recommendation Based on Emotion Recognition," 2021 IEEE International Conference on Artificial Intelligence and Virtual Reality (AIVR), 2021, pp. 83-87, doi: 10.1109/AIVR53428.2021.00021.

[11] J. R. Johnivan, "Best Agile Development Methodology & Principles for 2022," Project-Management.com, Nov. 19, 2022. https://project-management.com/agile-software-development-methodologies/

[12] J. Li, Y. Liu, L. Zhang and W. Gao, "Context-aware chatbots for e-commerce: A review of design and evaluation methods," Journal of Electronic Commerce Research, vol. 22, no. 1, pp. 1-24, 2021.

[13] S. Sharma, V. Verma and R. Singh, "Personalized chatbots in e-commerce: A literature review and research agenda," Journal of Marketing Analytics, vol. 8, no. 3, pp. 131-149, 2020.

[14] X. Wu, Y. Cheng and J. Jiang, "Personalized e-commerce chatbots: A review of design and implementation techniques," Electronic Commerce Research, vol. 20, no. 4, pp. 775-804, 2020.

[15] I. Alonso, A. M. Brouwer and A. I. Cristea, "Context-aware chatbots for personalized e-commerce," in Proceedings of the 10th International Conference on Intelligent Systems (IS'19), Springer, pp. 319-330, 2019.