A NLP Course End Project Report (A8708)

on

Conversational AI for Language Learning

Submitted in partial fulfilment of the requirements
for the award of Degree of

BACHELOR OF TECHNOLOGY

In

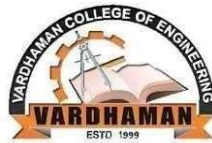## Computer Science and Engineering (AI&ML)

By

K. Varshini	22881A6635
P. Pooja	22881A6645
T. Babitha Reddy	22881A6658

Under the Guidance of

Mr. N S S S Girish Kumar

Assistant Professor

Department of Computer Science and Engineering(AI&ML)
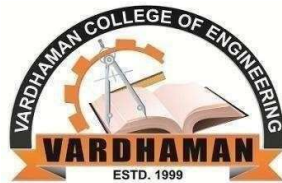

VARDHAMAN COLLEGE OF ENGINEERING
(AUTONOMOUS)

(Affiliated to JNTUH, Approved by AICTE and Accredited by NBA)
Shamshabad - 501 218, Hyderabad

2024-25

VARDHAMAN COLLEGE OF ENGINEERING
An autonomous institute, affiliated to JNTUH

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
[AI & ML]

<u>CERTIFICATE</u>

This is to certify that the NLP(A8708) Course End Project report entitled**, "Conversational AI for Language Learning",** done by **Ms. K. Varshini - 22881A6635, Ms. P. Pooja - 22881A6645**, **Ms. T. Babitha Reddy - 22881A6658** towards Course End Project submitted to the Department of Computer Science and Engineering (AI&ML) **VARDHAMAN COLLEGE OF ENGINEERING**, in partial fulfilment of the requirements for the award of the Degree of **BACHELOR OF TECHNOLOGY** in **Computer Science and Engineering (AI & ML)**,during the year 2024-25. It is certified that we are completed the project satisfactorily during the year 2024-25.

Signature of the Instructor   **Signature of the Head of the Department**

Mr. N S S S Girish Kumar   **Dr. M.A Jabbar**
Assistant Professor,CSE(AI&ML)   **HOD, CSE(AI&ML)**

DECLARATION

I hereby declare that the work described in this NLP(A8708) Course End Project report entitled **"Conversational AI for Language Learning"** which is being submitted by us in partial fulfilment for the award of **BACHELOR OF TECHNOLOGY** in the Department of **COMPUTE SCIENCE AND ENGINEERING (AI&ML)**, Vardhaman College of Engineering affiliated to the Jawaharlal Nehru Technological University, Hyderabad.

The work is original and has not been submitted for any Degree or Diploma of this or any other university.

K. Varshini	22881A6635
P. Pooja	22881A6645
T. Babitha Reddy	22881A6658

List of figures

Figure number	Description
3.1	Model design for Conversational AI for Language Learning
4.1a	List of languages for learning
4.1b	Conversational AI

Table of Contents

ABSTRACT

Conversational AI for Language Learning is an interactive program designed to facilitate real-time language practice and learning. Developed using Python and the googletrans library, the system supports multiple languages, including Spanish, French, German, Hindi, and Telugu. It enables users to engage in conversations by translating their inputs and responses between English and the selected target language, fostering a bilingual learning experience. Key features include real-time translations, dynamic language switching during a session, and on-demand language-specific tips to aid effective learning. Users can interact with commands like "quit" to exit, "help" for guidance, and "change language" to modify their target language without restarting the program. The system promotes language acquisition by encouraging conversational practice, expanding vocabulary, and improving fluency. Its seamless translation and interactive guidance make it suitable for beginners and language enthusiasts looking for a flexible and engaging way to learn. Combining convenience and functionality, this tool bridges the gap between theoretical learning and practical application, creating a robust environment for language mastery. It helps users build confidence in using a new language in real-world scenarios. Additionally, the program supports personalized learning experiences by adapting to user-selected languages. This makes it an innovative and user-friendly solution for effective language learning.

Keywords: Conversational AI, Language Learning, Real-Time Translation, Dynamic Language Switching, Bilingual Learning, Interactive Guidance.

Chapter 1

INTRODUCTION

Conversational AI for Language Learning is a software application designed to bridge the gap between theoretical language learning and practical application. It provides an interactive platform where users can practice real-time conversations in multiple languages, including Spanish, French, German, Hindi, and Telugu. Using the googletrans library for translations, the program ensures seamless bilingual communication by translating user inputs and responses instantly. This makes it an effective tool for building confidence in using a new language.

One of the standout features of this program is its ability to dynamically switch between languages during a session. Users can effortlessly change their target language using a simple command, making it adaptable to varying learning preferences. The system also offers personalized language-specific tips, such as vocabulary building strategies, pronunciation guidance, and daily practice recommendations, to support users in their learning journey.

Interactive commands enhance the user experience, with options like "help" for learning tips and "quit" to exit the conversation. Additionally, the program integrates explanations of translations, helping users understand the context and meaning of phrases in their selected language. This functionality promotes deeper learning by combining conversation practice with real-time feedback and guidance, catering to both beginners and language enthusiasts.

By fostering a practical and engaging learning environment, Conversational AI for Language Learning addresses key challenges faced by language learners, such as lack of confidence and limited exposure to conversational practice. Its innovative design encourages users to experiment with new languages while improving their fluency and comprehension. This versatile tool is ideal for anyone looking to enhance their language skills in an interactive, user-friendly way.

Chapter 2
RELATED WORK

1. Language learning has traditionally relied on structured classroom settings, textbooks, and audio-visual resources. While these methods provide foundational knowledge, they often lack the interactive and practical components necessary for conversational fluency. Over the years, digital solutions like Duolingo and Rosetta Stone have gained popularity, offering gamified approaches to vocabulary building and grammar exercises. However, many of these platforms still focus on individual learning rather than simulating real-world conversational contexts.

2. The integration of artificial intelligence into language learning has opened new avenues for personalized and interactive experiences. Chatbots, powered by natural language processing (NLP), are increasingly being used to mimic human conversation. Tools like Google's Talk to Books and Microsoft's AI Chatbots demonstrate the potential of AI in providing immersive and context-aware interactions. However, these solutions often lack real-time translation features, which are crucial for learners transitioning between languages.

3. Real-time translation technologies, such as Google Translate and Microsoft Translator, have significantly advanced in recent years. These tools provide users with quick translations of text and speech, breaking language barriers in communication. However, their application in language learning remains limited, as they focus more on utility than pedagogy. Integrating real-time translation with conversational AI offers a unique opportunity to combine practical learning with instant feedback.

4. Mobile applications like HelloTalk and Tandem connect language learners with native speakers for conversational practice. While these platforms encourage real-world interactions, they depend on human availability, making consistent practice a challenge. Conversational AI for Language Learning addresses this limitation by providing an AI-driven solution that is always accessible, adaptable, and capable of handling dynamic language switching.

5. By combining the strengths of conversational AI, real-time translation, and interactive learning strategies, this project builds on existing work while addressing gaps in current solutions. It creates a practical, user-friendly platform that not only aids in language acquisition but also enhances learners' confidence and conversational skills, making it a valuable addition to the field of AI-powered education.

6. Another area of research involves using neural machine translation (NMT) models, which have vastly improved the quality of language translation. Companies like Google and DeepL have advanced NMT to offer more accurate, context-aware translations. While these improvements are valuable for general communication, they do not always focus on the pedagogical aspect of language learning. By incorporating NMT into the learning process, this project enables more accurate translations while ensuring that learners can engage with the language in real-time, improving comprehension and retention. This combination of AI, translation, and learning support makes Conversational AI for Language Learning an innovative solution in the field
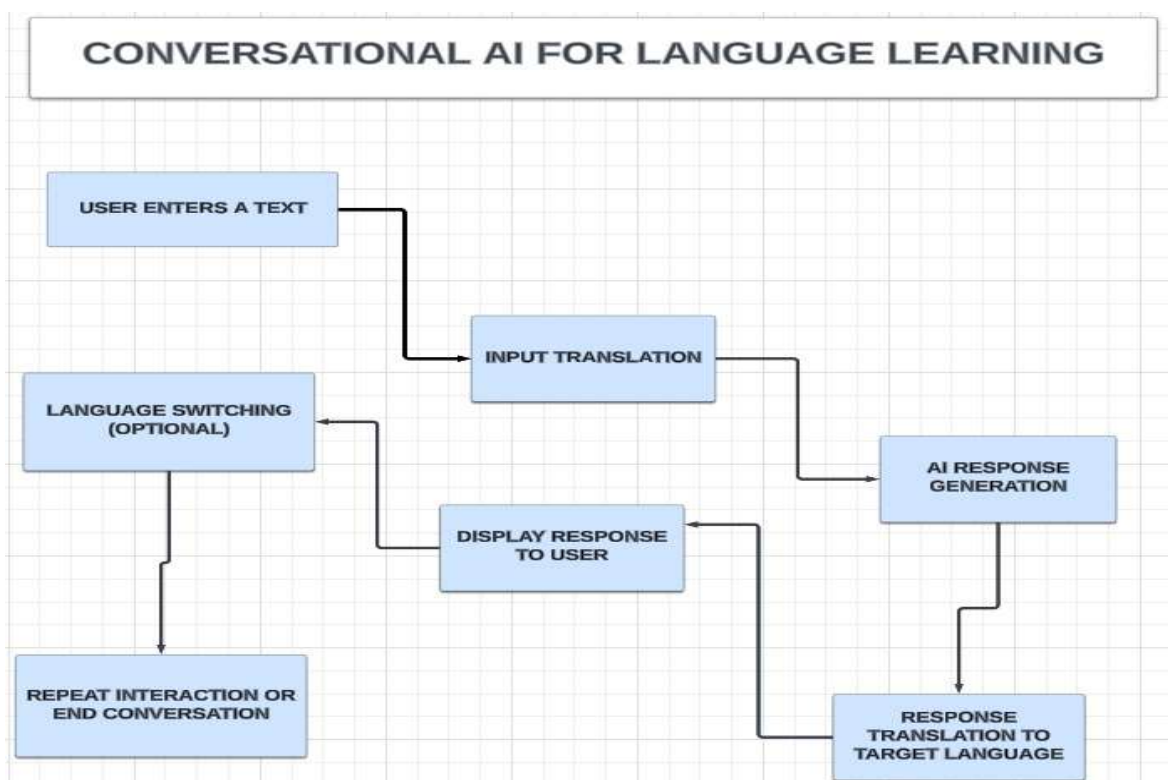
Chapter 3

METHODOLOGY

3.1 Proposed Model Design

Fig 3.1 : Model Design for Conversational AI for Language learning

3.2 Model description

Introduction:

Data Loading and Preprocessing:

In Conversational AI for Language Learning, data loading and preprocessing are critical steps for ensuring smooth language translation and accurate AI responses. The first step involves loading language datasets, which include text samples, vocabulary, and sentence structures for each supported language. These datasets are then preprocessed by tokenizing and normalizing the text to ensure consistency across different languages. Preprocessing also includes handling special characters, removing unnecessary symbols, and onverting text into a suitable format for translation and AI model processing. By preparing high-quality data, the system can provide accurate translations, simulate natural conversations, and support personalized learning experiences in multiple languages.

Tokenization:

Tokenization is the process of splitting text into smaller units, called tokens, which can be words, subwords, or characters, depending on the approach used. In **Conversational AI for Language Learning**, tokenization plays a crucial role in preparing text for further processing, such as translation and AI model training. By breaking down sentences into individual tokens, the system can better understand and manipulate language patterns, making it easier to translate, respond, and learn from user input.

Model Setup:

The model setup for **Conversational AI for Language Learning** involves configuring the necessary components for translation, natural language processing, and AI interaction. First, the translation module, typically powered by APIs like Google Translate or custom neural machine translation (NMT) models, is integrated to handle real-time text translation between English and the selected target language. The AI processing unit, built on machine learning frameworks, interprets user inputs and generates appropriate responses. Tokenization is applied to preprocess both user and system inputs, enabling efficient language processing. The system is designed to allow dynamic language switching during conversation, offering flexibility.

3.3 Code

```
!pip install googletrans==3.1.0a0
from googletrans import Translator
import re  # To handle extraction of quoted words

def get_translation(text, source_language="en", target_language="es"):
    translator = Translator()
    try:
        translation = translator.translate(text, src=source_language, dest=target_language)
        return translation.text
    except Exception as e:
        print("An error occurred:", e)
        return "Sorry, there was an error with the request."

# Mapping common language codes
language_codes = {
    "spanish": "es",
    "french": "fr",
    "german": "de",
    "hindi": "hi",
    "telugu": "te",
}

# Prompt user to select a language for learning
selected_language = input("Select a language to learn (Spanish, French, German, Hindi, Telugu): ").strip().lower()
target_language_code = language_codes.get(selected_language, "te")  # Default to Telugu if not specified

print("Type 'quit' to end the conversation, 'help' for language tips, or 'change' to select a new language.")
```

```python
while True:
    user_input = input("You: ")

    if user_input.lower() == 'quit':
        print("Ending conversation. Goodbye!")
        break
    elif user_input.lower() == 'help':
        print(f"Here are some tips for learning {selected_language.capitalize()}:")
        print("- Practice common phrases daily.")
        print("- Listen to native speakers and mimic their pronunciation.")
        print("- Use flashcards for vocabulary.")
        continue
    elif user_input.lower() == 'change':
        selected_language = input("Select a new language (Spanish, French, German, Hindi, Telugu): ").strip().lower()
        target_language_code = language_codes.get(selected_language, "te")
        print(f"Language changed to {selected_language.capitalize()}.")
        continue

    # Check if the user input contains a quoted word
    match = re.search(r'"([^"]*)"', user_input)  # Regex to extract word inside double quotes
    if match:
        word_to_translate = match.group(1)  # Extract the quoted word
        print(f"Detected word to translate: '{word_to_translate}'")

        # Translate the word to the selected language
        translated_word = get_translation(word_to_translate, source_language="en", target_language=target_language_code)
        print(f"The translation of '{word_to_translate}' in {selected_language.capitalize()} is: {translated_word}")
```

```python
        continue

    # General conversation: Translate user input into the target language for AI processing
    user_input_translated=get_translation(user_input,source_language="en",
target_language=target_language_code)

    # Simulate an AI response in English (or provide your logic here)
    ai_response_in_english = f"You said: {user_input}. Here's a response to that."

    # Translate the AI response back to the target language for the user
    ai_response_in_target_language                =                get_translation(ai_response_in_english,
source_language="en", target_language=target_language_code)

    # Output the AI's translated response
    print(f"AI ({selected_language.capitalize()}): {ai_response_in_target_language}")
```

Chapter 4

RESULTS AND ANALYSIS

4.1 Results

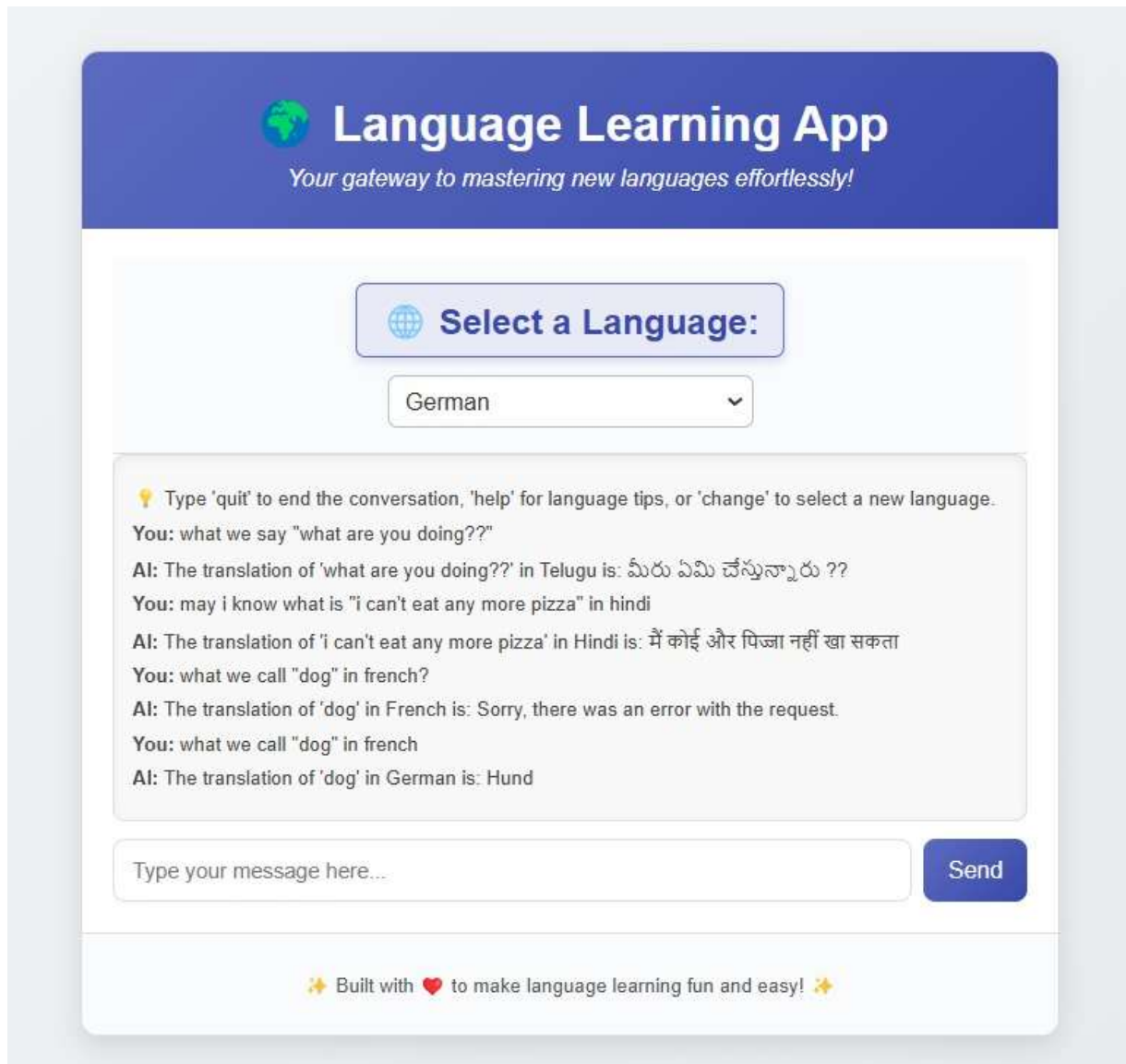Fig 4.1a : List of languages for learning

Fig 4.1b: Conversational AI

4.2 Analyisis

Conversational AI for Language Learning provides an interactive platform that blends real-time translation and AI-driven conversation, making language learning more engaging and practical. The system allows users to converse in a target language while receiving immediate translations and context-aware responses, enhancing their conversational skills and comprehension. However, challenges such as translation accuracy, potential delays in conversation, and dependency on external translation services must be considered to optimize the user experience.

- Real-Time Translation: The system offers seamless translation between languages, enabling learners to engage in meaningful conversations and understand context-specific phrases.
- Dynamic Language Switching: Users can switch languages during the conversation without interrupting the learning process, providing flexibility for different learning preferences.
- AI Integration: The AI-driven responses simulate real-life conversations, offering personalized learning and adaptive feedback for better language acquisition.

Chapter 5

CONCLUSION & FUTURE WORK

5.1 Conclusion

Conversational AI for Language Learning offers a dynamic and interactive platform that enhances language acquisition through real-time translations and AI-driven conversations. By integrating real-time translation capabilities and natural language processing, the system provides learners with a practical way to practice speaking, listening, and understanding new languages. The dynamic language-switching feature and personalized learning tips ensure that users can tailor their learning experience, making it flexible and engaging. This innovative approach bridges the gap between traditional language learning methods and modern technology, fostering an environment where users can improve their fluency in a conversational context. Despite some challenges such as translation accuracy and potential delays in response time, the system holds great promise for language learners of all levels. Continuous improvements in AI models and translation services will further enhance the effectiveness of the platform. With its user-friendly interface and adaptable features, Conversational AI for Language Learning represents a valuable tool for modern language education, helping learners build confidence, increase their vocabulary, and practice real-life conversations. The future of language learning is likely to be shaped by such AI-driven solutions, offering greater accessibility and interactivity to learners worldwide.

5.2 Limitations

1) This translates user input but doesn't deeply understand or process the meaning.

2) Assumes a single source language (English)

3) No offline functionality; it fully depends on internet availability.

4) No support for voice input/output, which could enhance accessibility and engagement.

5) Adding new languages requires manual updates.

5.3 Future Work

The future work of Conversational AI for Language Learning is vast, with several avenues for enhancement and expansion. One of the key areas for improvement is increasing language support, including regional dialects and lesser-known languages, to cater to a global audience. As AI models continue to evolve, the accuracy of real-time translations can be improved, particularly for idiomatic expressions, slang, and complex sentence structures, providing a more natural and fluent conversation experience. Additionally, integrating voice recognition and speech synthesis could allow for hands-free interaction, enabling users to practice pronunciation and conversational skills in real-time.

Furthermore, the system can be enhanced with adaptive learning features, where the AI tailors the conversation difficulty based on the learner's proficiency level. This would ensure a more personalized learning journey, challenging users at the right level while avoiding frustration. Gamification features could also be introduced, turning the learning process into a more engaging, rewarding experience through challenges, quizzes, or rewards for milestones. With continuous advancements in AI, deep learning, and neural machine translation, the system could evolve into a fully immersive language learning platform that mimics real-world interactions, providing learners with a truly dynamic and interactive learning experience.

REFERENCES

[1] Vaswani, A., Shazeer, N., Parmar, N., Uszkoreit, J., Jones, L., Gomez, A. A., Kaiser, Ł., & Polosukhin, I. (2017). *"Attention is all you need."* Proceedings of NeurIPS.
This paper introduces the Transformer model, which forms the foundation for many AI-based language models and is widely used in translation and natural language processing tasks.

[2] Koehn, P. (2017). *"Neural Machine Translation."* Cambridge University Press.
This book covers the evolution and techniques behind neural machine translation, which is integral to building effective language learning systems that rely on accurate translations.

[3] Brown, T. B., Mann, B., Ryder, N., Subbiah, M., Kaplan, J., Dhariwal, P., & Amodei, D. (2020). *"Language Models are Few-Shot Learners."* OpenAI.
This paper discusses GPT-3, a state-of-the-art language model that can generate human-like text responses and is a key part of AI-driven language learning systems.

[4] Sutskever, I., Vinyals, O., & Le, Q. V. (2014). *"Sequence to Sequence Learning with Neural Networks."* Advances in Neural Information Processing Systems (NeurIPS).
This work introduces sequence-to-sequence models, which are important for generating meaningful language responses, a fundamental component of conversational AI systems.

[5] Lison, P., & Tiedemann, J. (2016). *"OpenSubtitles2016: Extracting Large Parallel Corpora from Movie and TV Subtitles."* Proceedings of the Tenth International Conference on Language Resources and Evaluation (LREC 2016).
This paper details the creation of large multilingual parallel corpora from movie subtitles, which can be used for training translation models in language learning applications.

[6] Hassan, H., et al. (2018). *"Achieving Human Parity in Conversational Speech Recognition."* Proceedings of the IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP 2018).

[7] Vikram, S., & Balakrishnan, A. (2020). *"Conversational AI: A Survey on Methods, Applications, and Future Directions."* International Journal of Computer Applications, 175(10), 1-5.