Conversational Agents For Enhancing AAC Experiences

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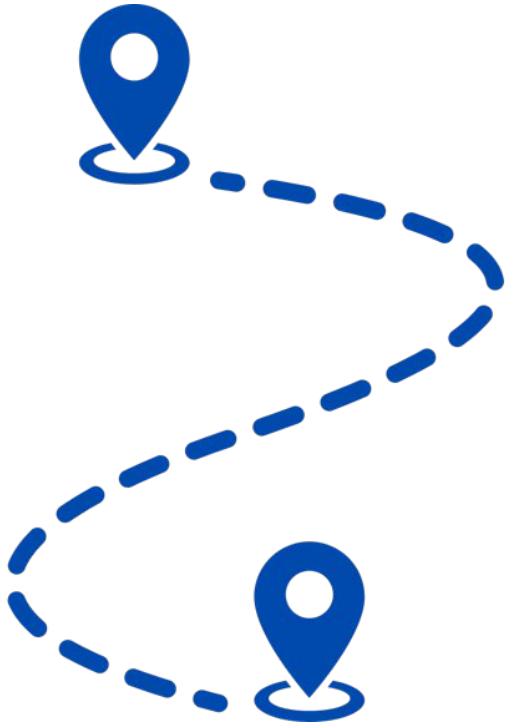
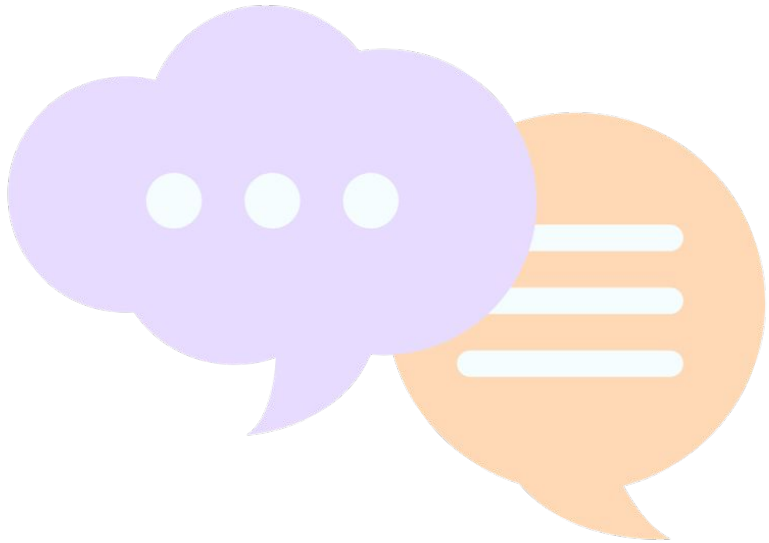
Roadmap

1. Overview – AAC, Importance of Conversational AI in AAC, Role of AI
2. Conversational AI – What is the role of Neural LMs in Enhancing AAC
3. Understanding Response Generation – How does the AI generate a response for a given prompt
4. Informed vs Generalized AI – How are they different
5. Training Data – What training data do we have and why is it required
6. Finetuning – How should we adapt to the new task
7. Limitations and Future Work



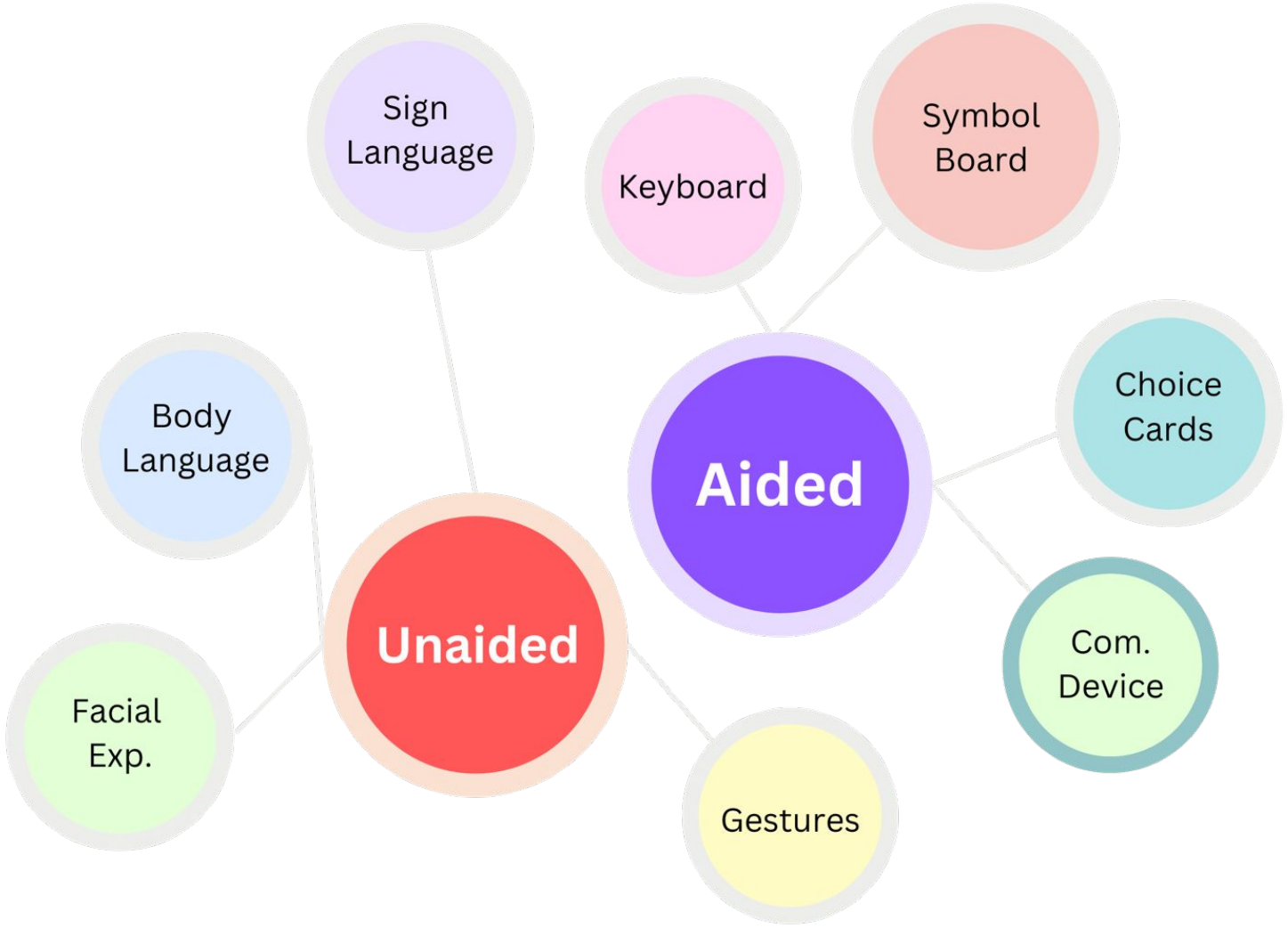
Overview

1. AAC – Augmentative and Alternative Communication
2. Conversational AI is a subset of artificial intelligence that enables machines to understand, process, and respond to human language in a natural, conversational manner. It's used to automate communication and create personalized interactions through chatbots, voice assistants, and messaging apps.
3. Conversational AI can empower AAC users by simulating real-time interactive dialogues, enhancing their communication capabilities and facilitating more personalized, context-specific conversations.



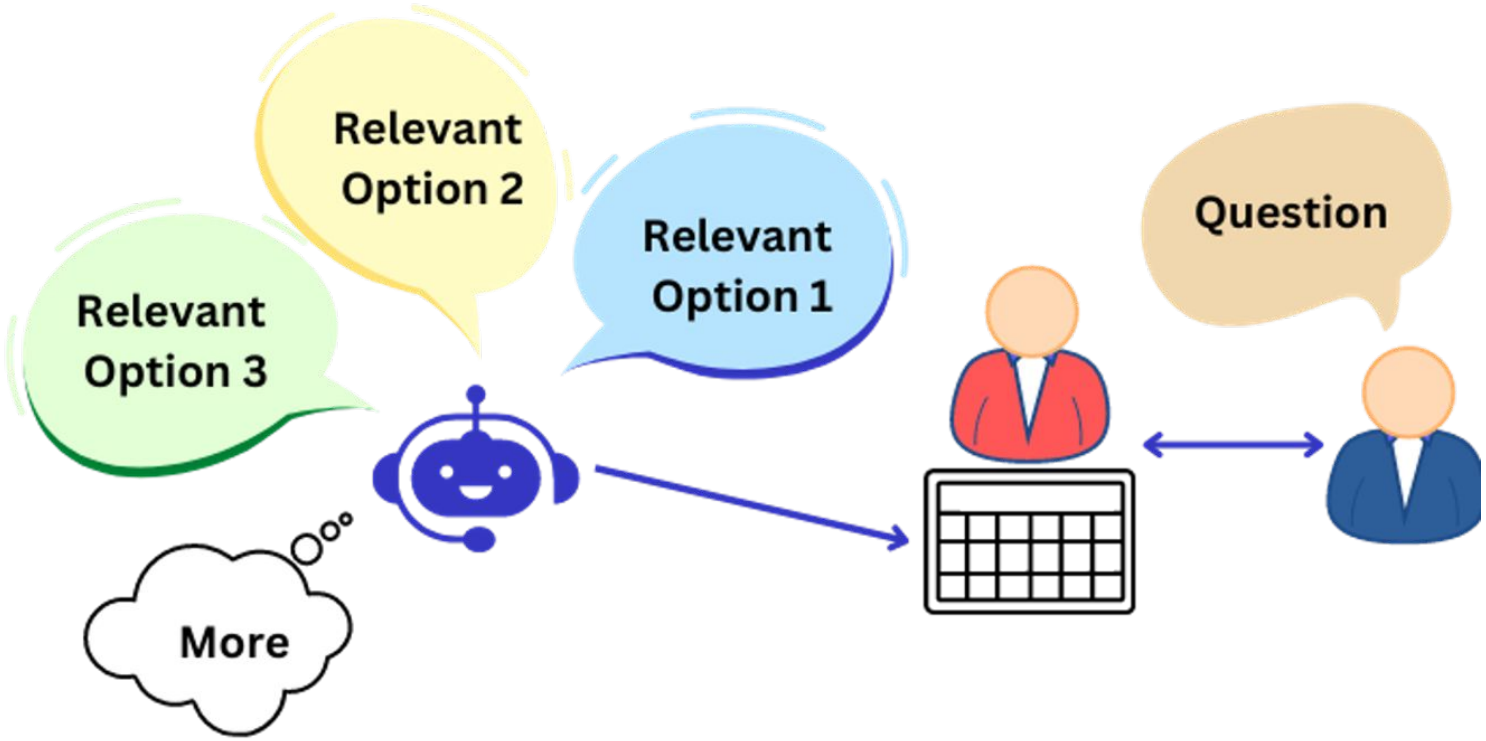
Aided vs Unaided AAC

Our focus area is Aided AAC, using Communication Device integrated with Conversational AI



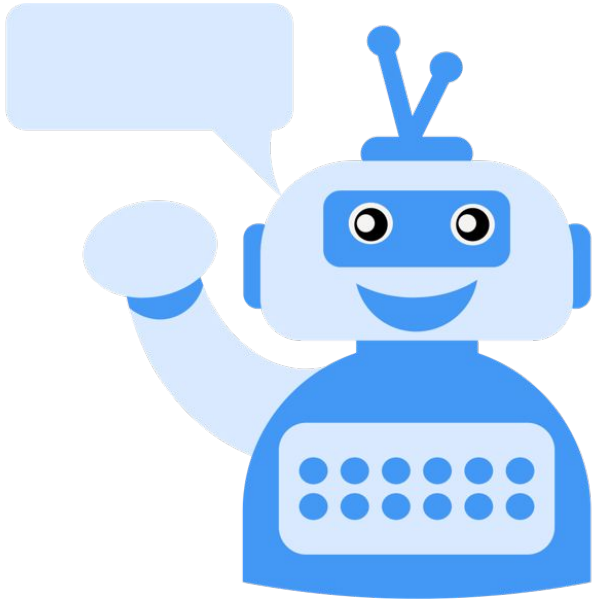
Conversational AI And Neural Language Models

Neural LMs - Neural LMs (Neural Language Models) are machine learning models that use neural networks to model the statistical relationships between words in a natural language text corpus. It generates human-like text by predicting the likelihood of the next word in a sentence given the previous words.



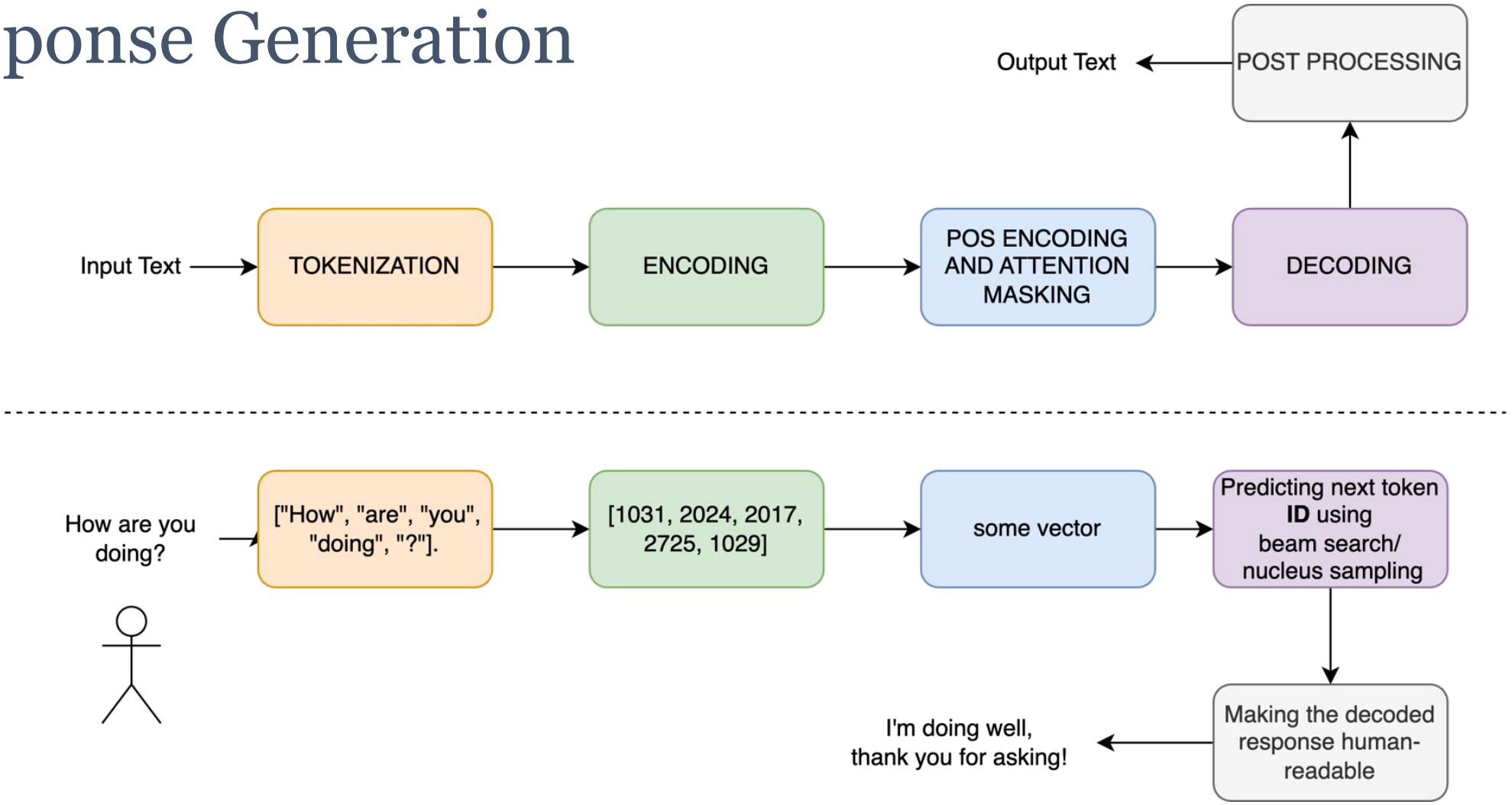
Neural Language Models

1. DialoGPT - Trained on 147M conversation-like exchanges extracted from Reddit comment chains from 2005 through 2017, DialoGPT extends the Hugging Face PyTorch transformer to attain a performance close to human both in terms of automatic and human evaluation.
2. Blender Bot - Blender Bot is a more recent model by Facebook, that is trained on a diverse range of dialogues from various domains and languages and incorporates a number of advanced features such as persona-based generation and multi-turn conversation handling.



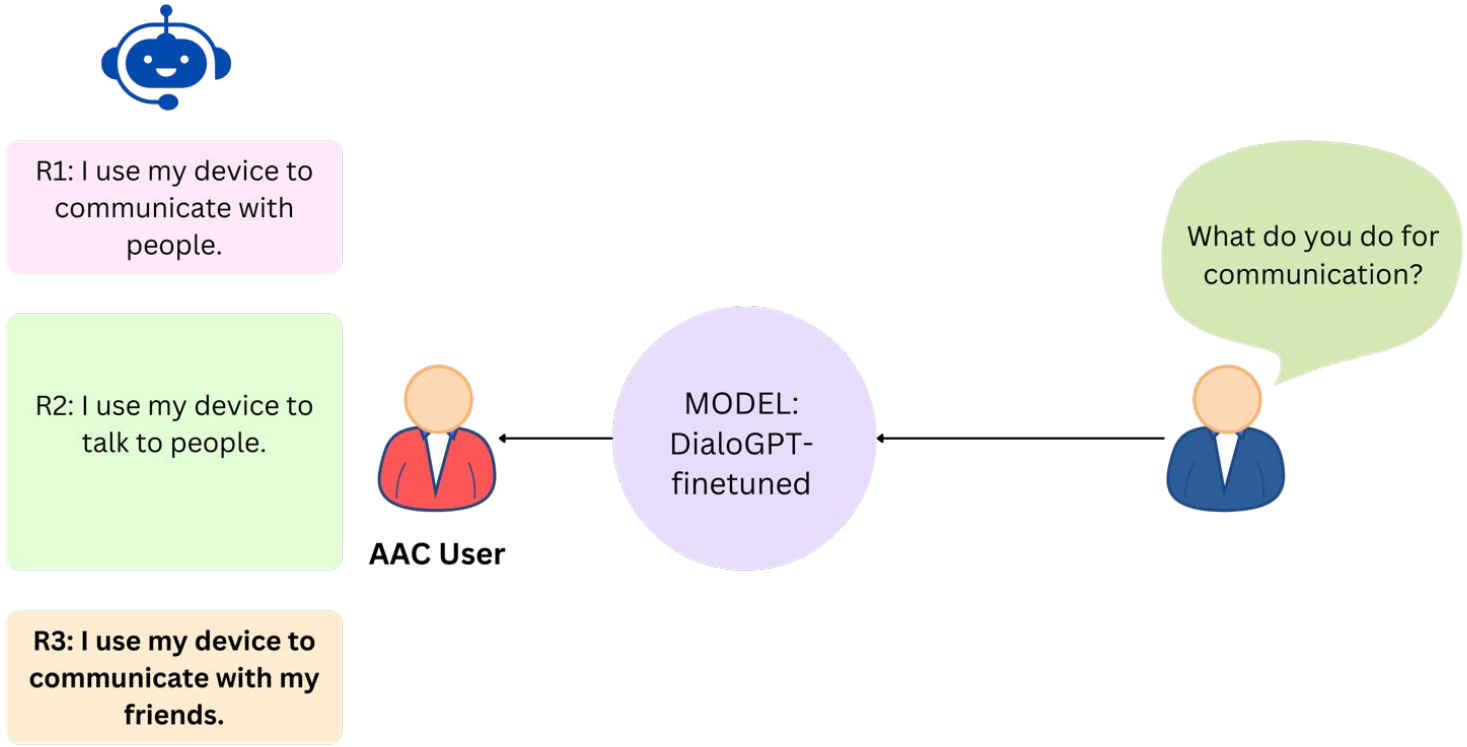
Source BlenderBot: https://huggingface.co/docs/transformers/model_doc/blenderbot
Source DialoGPT: https://huggingface.co/docs/transformers/model_doc/dialogpt

Response Generation



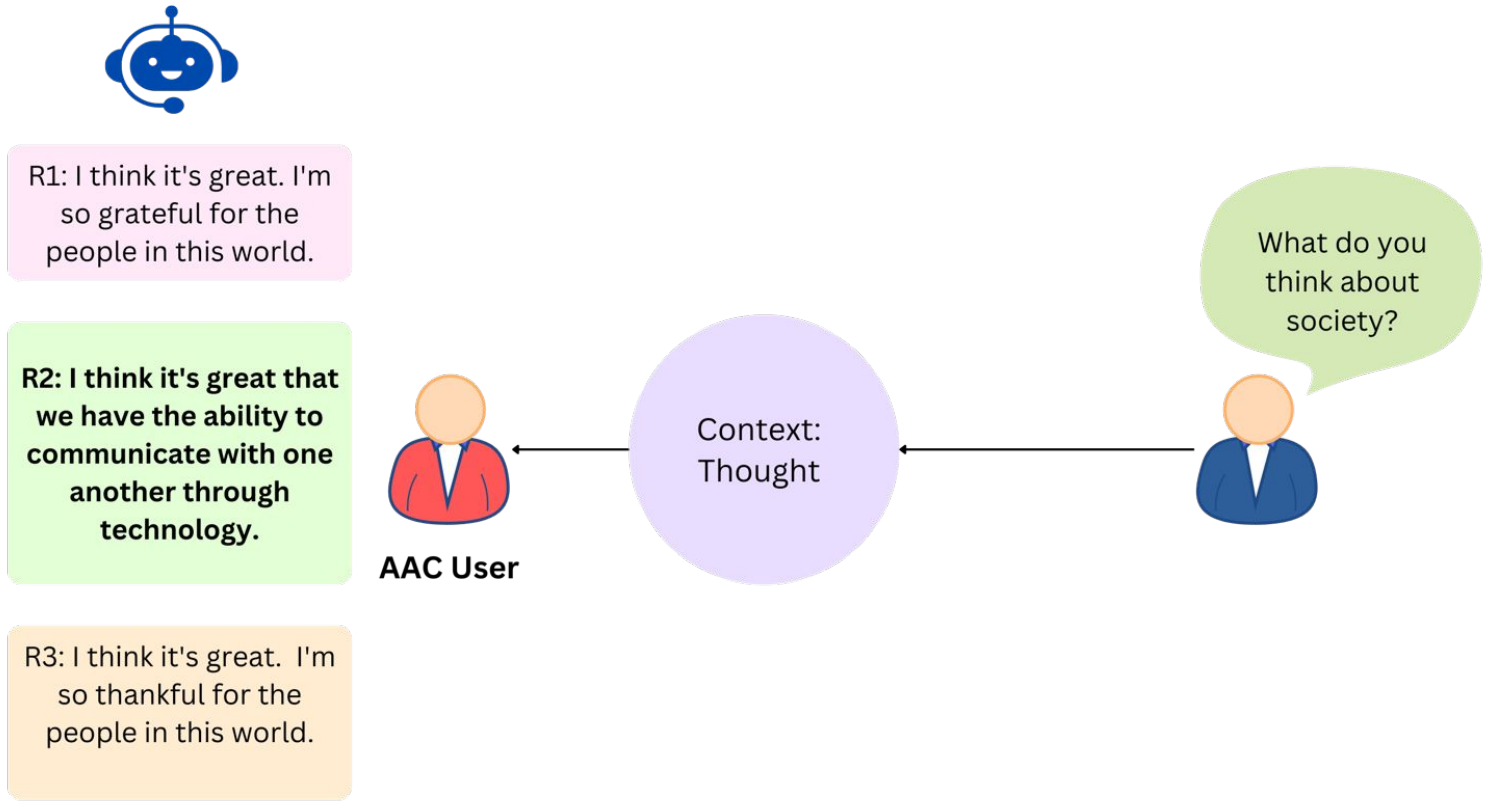
Informed AI

Informed AI, in our project, is a fine-tuned version of DialoGPT-small, customized to converse on subjects specific to our AAC user. It utilizes a personalized dataset derived from a book written by the user, enabling it to deliver contextually relevant and user-specific dialogues.



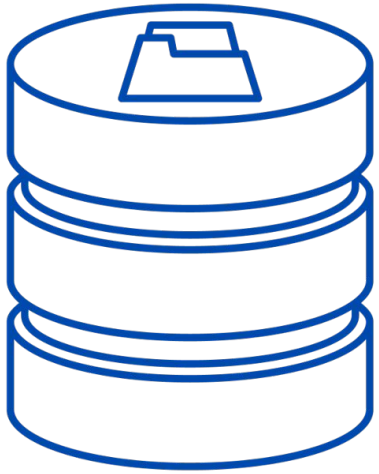
Generalized AI

Generalized AI, in our project, is represented by the BlenderBot-400M model, adept at facilitating open-domain conversations on a broad range of topics. It's capable of generating diverse and dynamic responses, simulating natural, everyday human interactions.



Training Data

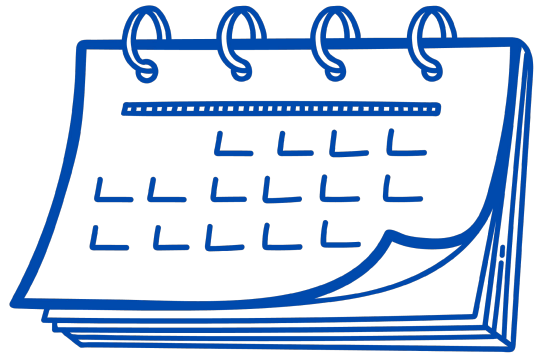
1. The DialoGPT model is currently trained on Reddit data
2. The Blender Bot, on the other hand, uses a combination of Datasets (which are typically better than DialoGPT) - The main datasets that were used for BlenderBot include the Cornell Movie Dialogs Corpus, the Persona-Chat dataset, and the EmpatheticDialogues dataset, as well as a large-scale web-crawled dataset
3. Our data: The Book (Question Answer pairs)



Finetuning Our Model

1. Adapts to Specific Domains: By fine-tuning the model on a relevant dataset, it can generate responses that are more accurate, relevant, and coherent for the specific task at hand.
2. Improves Relevance and Coherence: This can help the model to generate responses that are more natural and contextually appropriate.
3. Increases Efficiency: Fine-tuning a pre-trained model can be more efficient than training a model from scratch, as the model has already learned a broad range of language features from a large dataset.
4. Enhances Performance: It can enhance the performance of the model by improving the accuracy of the generated responses. This can lead to improved user satisfaction and engagement, and can help to drive better outcomes for the intended use case.

Limitations And Future Work



1. Limitation: Our Informed AI model cannot generalize well and generates response that is short and lacks human-like natural conversation flow.
2. Future Work:
    1. Generate a better Dataset from the Book: Use turn-based conversation prompts and response pairs.
    2. Create an Instruction Following Model: It allows to perform more complex tasks based on user instructions.
    3. Finetune Blender Bot: Enhances its ability to generate even more contextually accurate and engaging dialogues.

Thank You

Please feel free to ask questions