Chatbot & Question-Answer

Topic 9

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Agenda

01 Chatbot

02 Question Answer

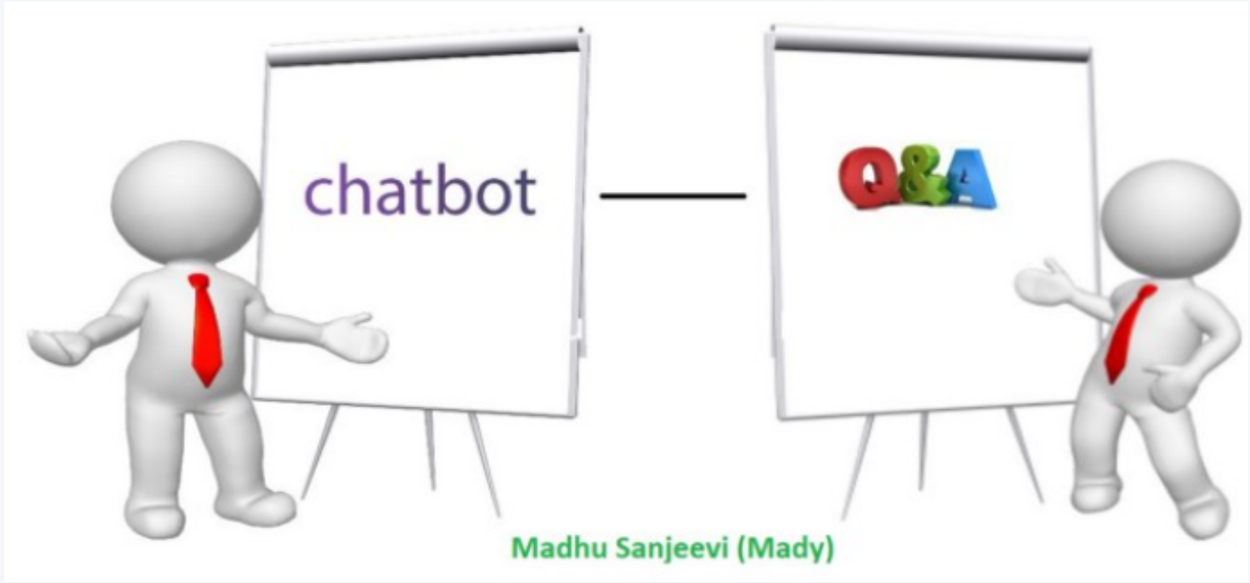


Image source: https://medium.com/deep-math-machine-learning-ai/chapter-11-chatbots-to-question-answer-systems-e06c648ac22a

Chatbot

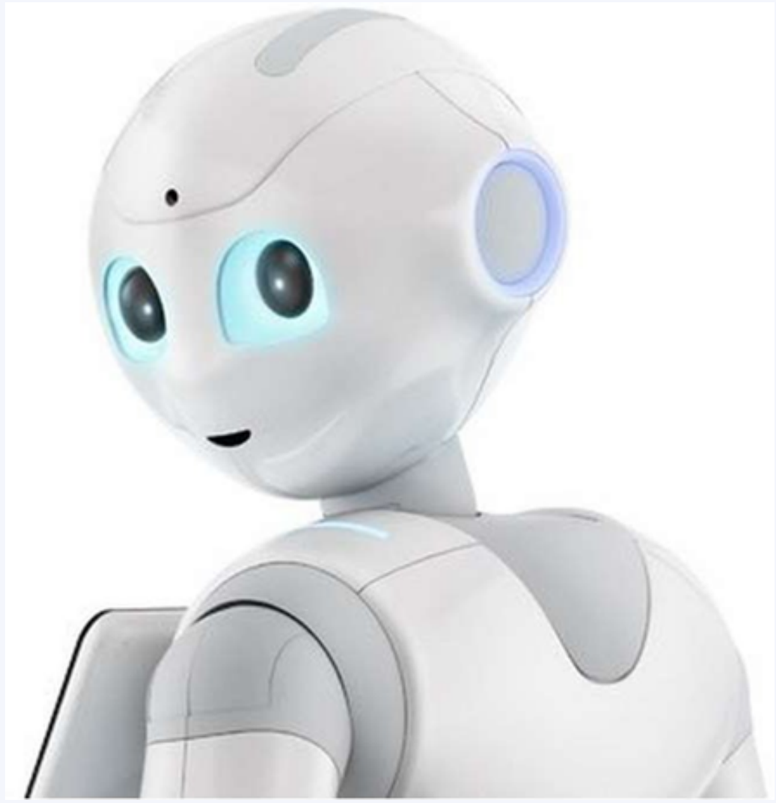
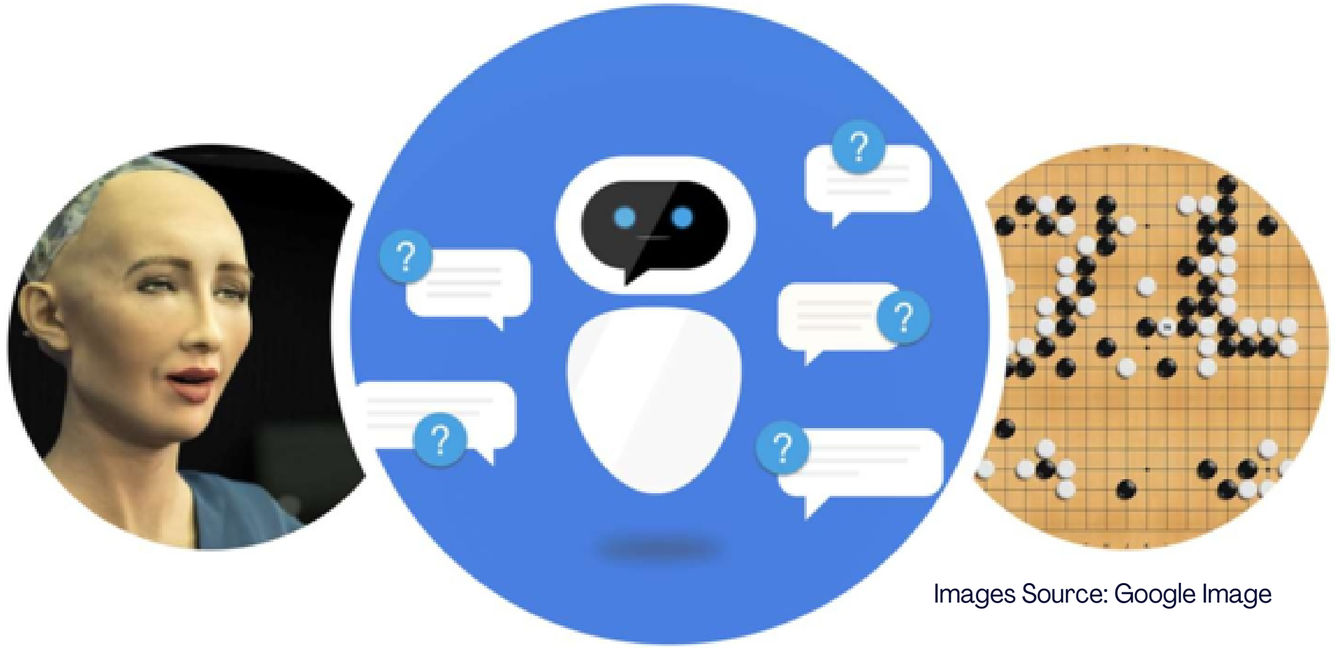


Image source: weaknowyourdreams.com

- A chatbot is a conversational agent that interacts with users using natural language.
- Chatbot is used to do conversations with users via text or speech.

Where it is used?

- Customer service
- Call centers
- Customer support
- Help desk
- Booking service
- Transaction processing



Images Source: Google Image

All of them is providing 24/7 with users/clients

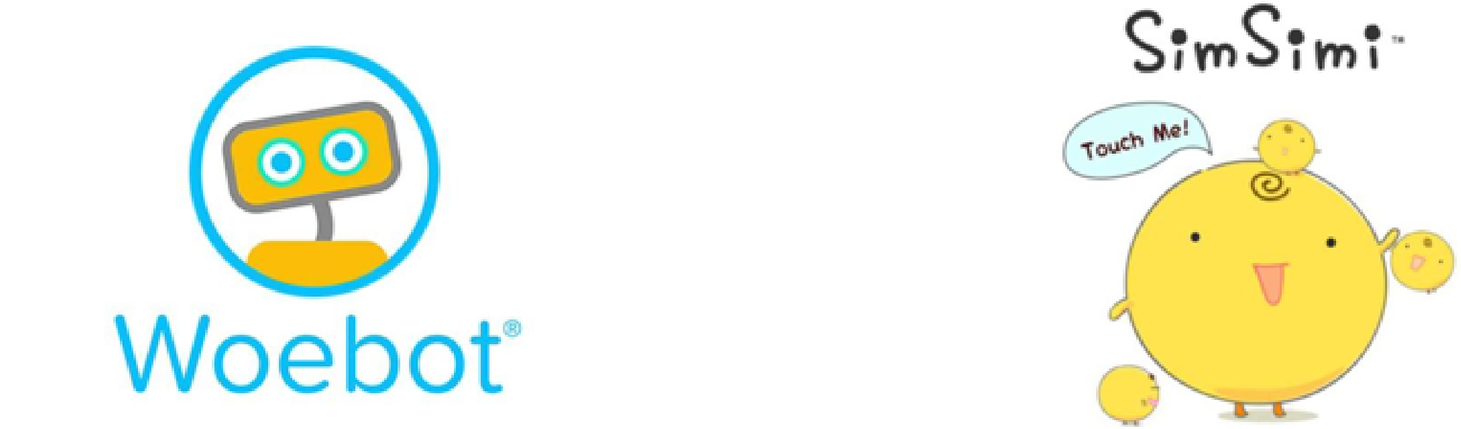
Example (1)

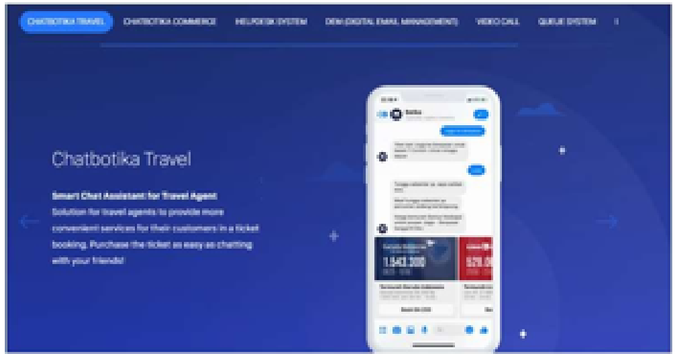
Images Source: Google Image

Example (2)

Woebot®

SimSimi™





Images Source: Google Image

History of Chatbot(1)

ELIZA

- Developed in the 1960s
- Looks for pronouns and verbs
- Parodies a therapist rephrasing statements of the user and posing them back as questions
- Works by simple parsing and substitution of key words into canned phrases
- People get emotionally caught up by ELIZA’s confident replies forgetting that it’s a machine

Images Source: Google Image

History of Chatbot (2)

Example of Conversation

- Eliza's conversation with a patient is:-
  - Human: Well, my boyfriend made me come here.

    ELIZA: Your boyfriend made you come here?

    Human: He says I'm depressed much of the time.

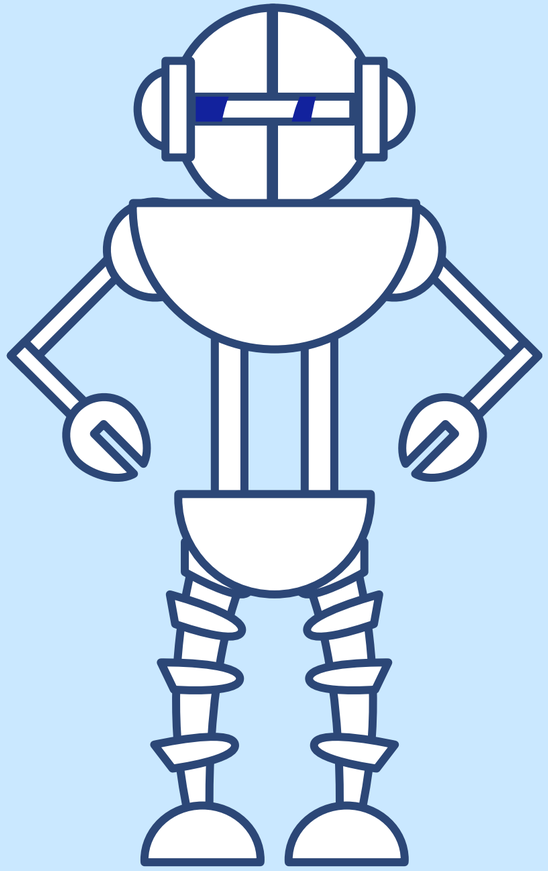
    ELIZA: I am sorry to hear you are depressed.

    Human: It's true. I'm unhappy.

    ELIZA: Do you think coming here will help you not to be unhappy?

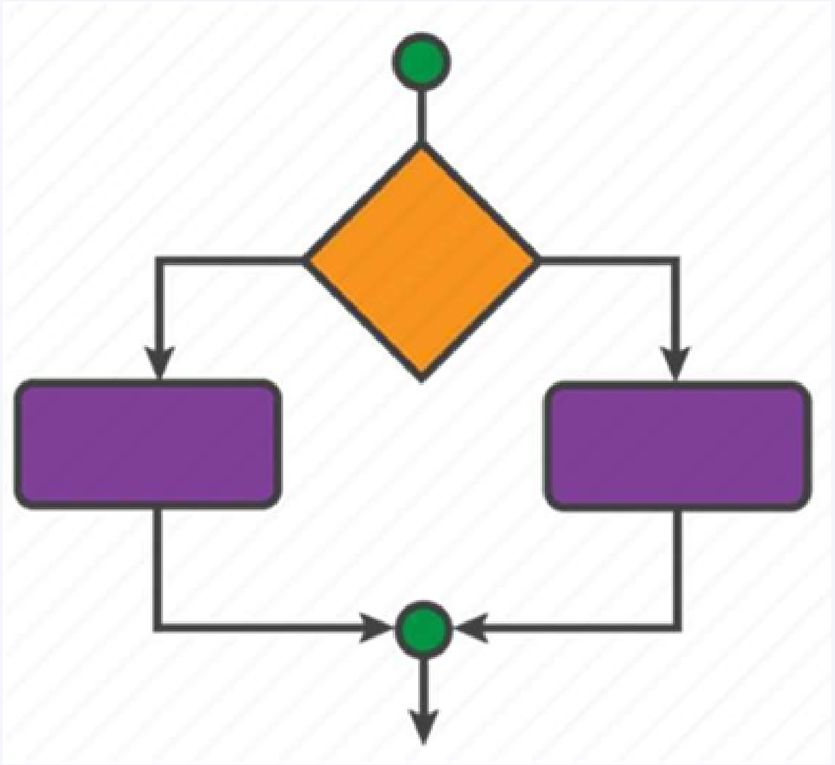
Chatbot Categories

Rules-Based Approcch



Self Learning Approach

Rules-Based Approach



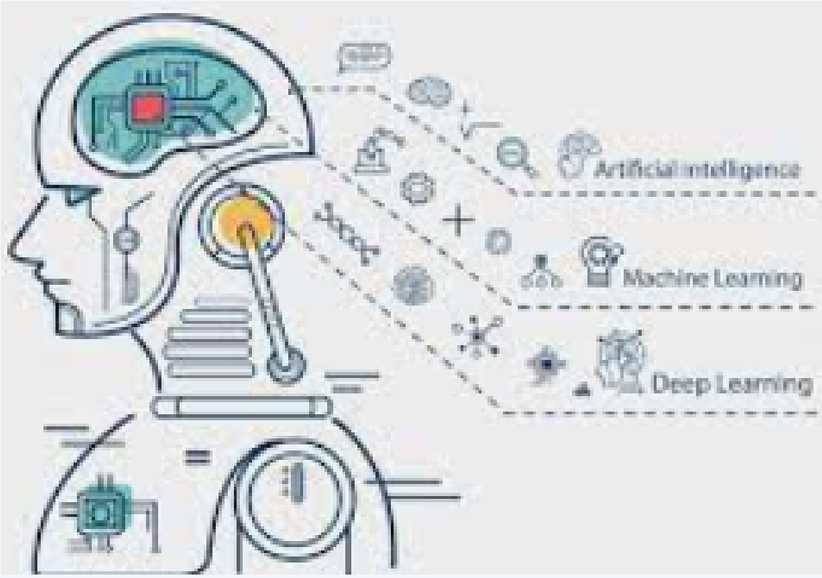
Images Source: Google Image

Here the bot is trained based on some set rules. It is from these rules that the bot can process simple queries but can fail to process complex ones.

Self Learning Approach

Here the bot uses some machine learning algorithms and techniques to chat. It is further subcategorized into two:

1. **Retrieval-Based models - In this model, the bot retrieves the best response from a list depending on the user input.**
2. **Generative models - This model comes up with an answer rather than searching from a given list. These are the Intelligent Bots.**



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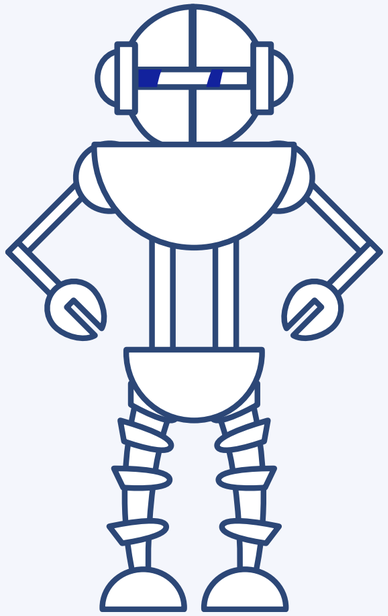
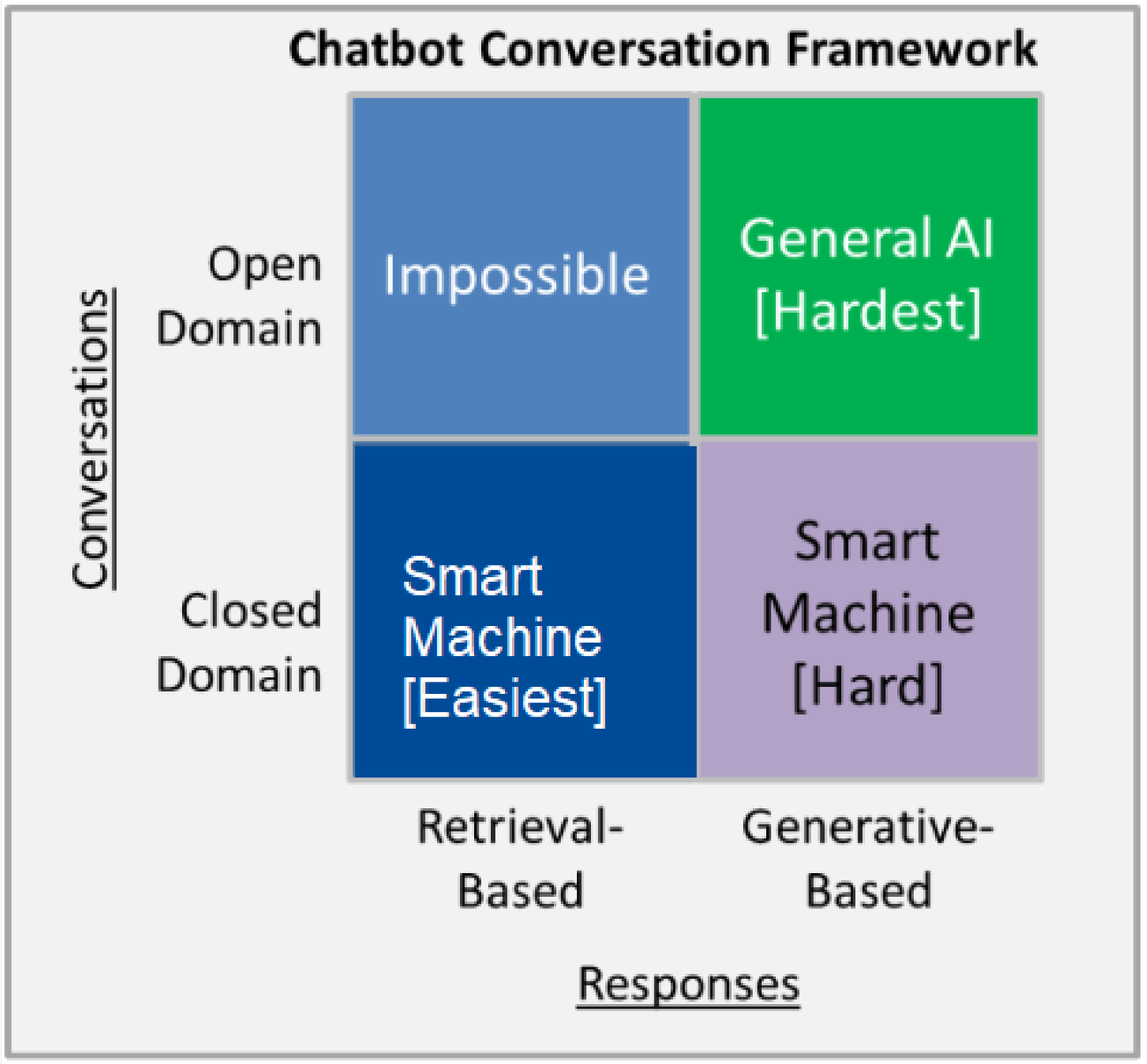
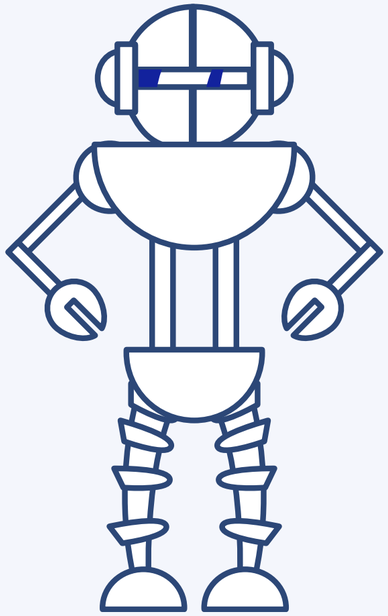



Chatbot Conversation Framework
Conversations
Open Domain
Closed Domain
Impossible
General AI [Hardest]
Smart Machine [Easiest]
Smart Machine [Hard]
Retrieval-Based
Generative-Based
Responses



Retrieval-based model

As the name says it retrieves the answers/responses from a set of predefined responses and some kind of heuristic to pick an appropriate response based on the input and context.

The heuristic could be as simple as a rule-based expression match, or as complex as an ensemble of Machine Learning classifiers.

Pro's

1 . No grammtical or meaning less errors as we store the answers

2. Works 100% well for the business problems and customer satisfaction and attention can be gained

3. Super easy to build these models as we don't require huge data.

Con's

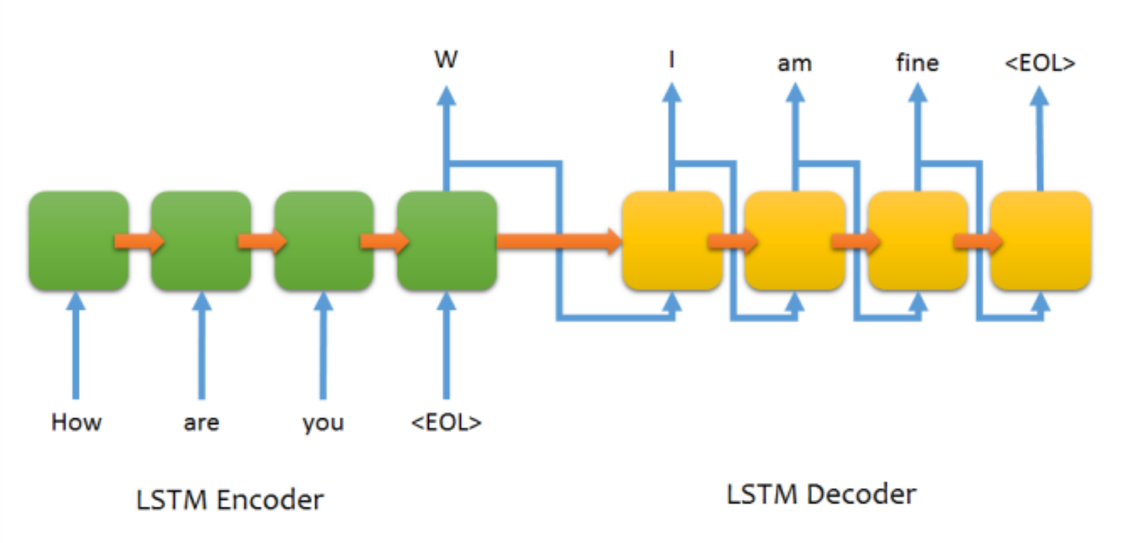
1. These systems don't generate any new text, they just pick a response from a fixed set.

2. A lot of hard coded rules have to be written so not much intelligent.

Generative model (1)

These models don't rely on pre-defined responses. They generate new responses from scratch. Generative models are typically based on Machine Translation techniques, but instead of translating from one language to another, we "translate" from an input to an output (response).

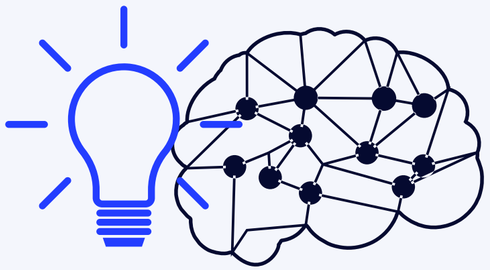
it uses sequence to sequence models for generating the text (we will implement these also in the next stories)



Generative model (2)

Pro's

No need to worry about the predefined responses and the rules.

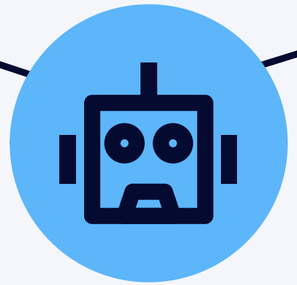


Con's

- Super difficult to implement these and the output may not be accurate (grammatical / meaning less errors may occur)
- Not applicable for the business problem (unless you are providing a service which may require text summarization techniques) #willexplain
- Huge data is required to train these models.

Domain of Chatbot

Open Domaini



Close Domain

Open Domain

https://chat.kuki.ai

Open domain is the place where the chat conversation can go anywhere, users can type/ask anything.There isn't necessarily have a well-defined goal or intention.

The chatbot mitsuku is the example for this.

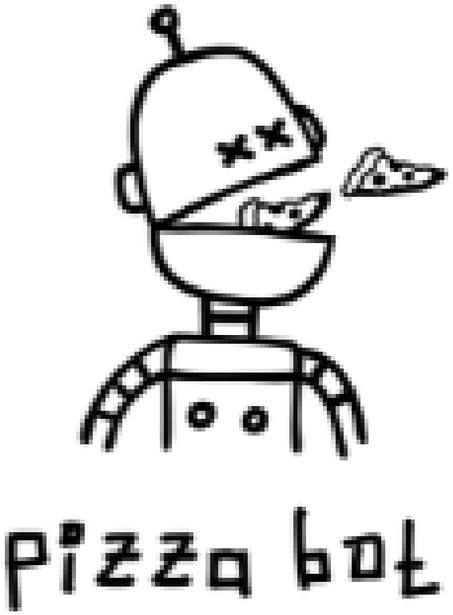
The convo can go into all kinds of directions. The infinite number of topics and the fact that a certain amount of world knowledge is required to create reasonable responses makes this a hard problem.

Close Domain

Closed domain is the place where you are solving a particular business problem (The bussiness could be in any sector/industry)
ex : Pizza bot, Bankingbot, Medical bot, CricketScore bot etc.

Closed domain bots focus on one particular sector or industry. so you can't ask questions like "how is the weather now??", "what is the score for IndVsPak match today?" when you dealing with a banking bot or pizza bot.

Similarly you can't ask pizza bot a banking query. if you ask , you will get a decent answer "I am sorry I don't understand".
The closed domain bots have the limited functionalities/ services based on the business problem.

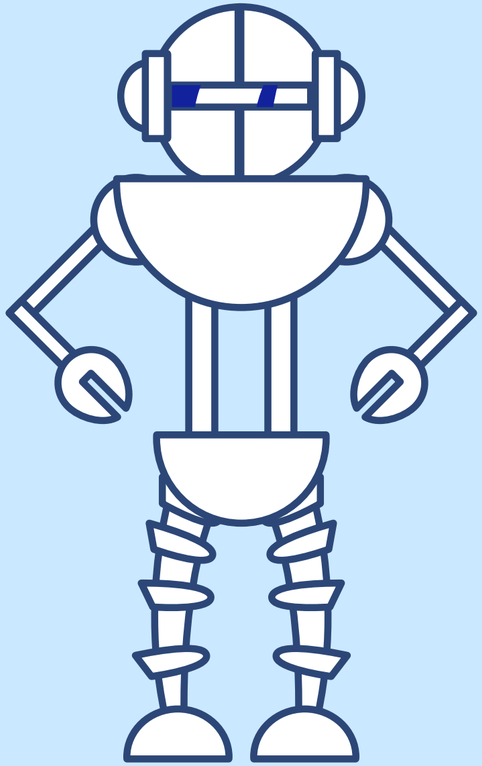


Images Source: hellopizzabot.com

Required for Building AI Chatbot

1. First of all we need to have the clear idea about what problem we are solving (this is the most important part, 90 % people fail here as far as my experience is concerned for last 2 years.)

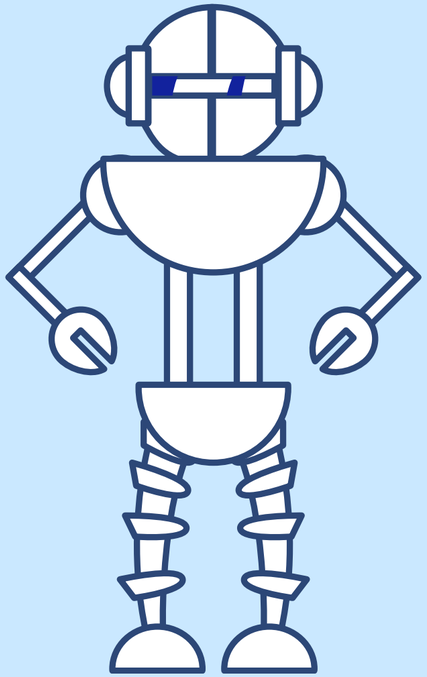
2. Identify the intents , entities and responses of all.



3. Collect the training data to build the ml model.

4. build the model (cloud platforms or customized tools) and start coding based on the requirements.

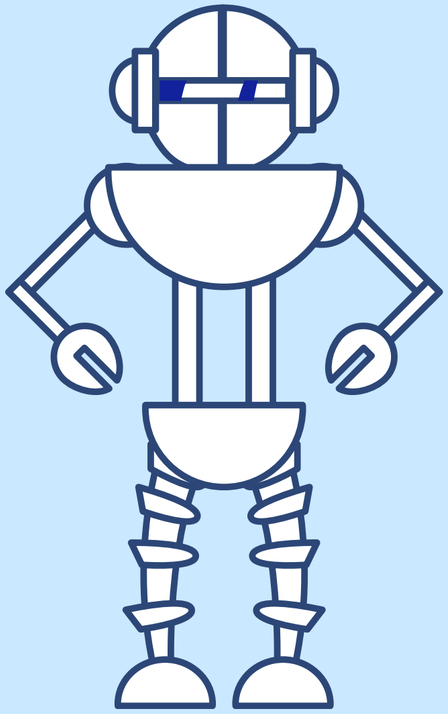
Step for Building AI Chatbot



Speech to Text

1. Cosine Similarity
2. Machine Learning/ Deep Learning
3. Generative Pretrained

Practice for Building AI Chatbot



https://dev.to/dennismaina/how-to-create-an-ai-chatbot-in-python-and-flask-1c3m