

CHATBOT

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ABSTRACT-A computer program designed to simulate conversation with human users, especially over the Internet. A chatbot is a software application used to conduct an on-line chat conversation via text or text-to-speech, in lieu of providing direct contact with a live human agent.^[1] Designed to convincingly simulate the way a human would behave as a conversational partner, chatbot systems typically require continuous tuning and testing, and many in production remain unable to adequately converse or pass the industry standard Turing test.^[2] The term "ChatterBot" was originally coined by Michael Mauldin (creator of the first Verbot) in 1994 to describe these conversational programs. Chatbots are used in dialog systems for various purposes including customer service, request routing, or information gathering. While some chatbot applications use extensive word-classification processes, natural language processors, and sophisticated AI, others simply scan for general keywords and generate responses using common phrases obtained from an associated library or database. Most chatbots are accessed on-line via website popups or through virtual assistants. They can be classified into usage categories that include: commerce (e-commerce via chat), education, entertainment, finance, health, news, and productivity.^[4]

1 How is the Chatbot Trained

Training a Chatbot happens at much faster and larger scale than we teach a human. Among the most notable early chatbots are ELIZA (1966) and PARRY (1972).^{[8][9][10][11]} More recent notable programs include A.L.I.C.E., Jabberwacky and D.U.D.E (Agence Nationale de la Recherche and CNRS 2006). While ELIZA and PARRY were used exclusively to simulate typed conversation, many chatbots now include other functional features, such as games and web searching abilities. In 1984, a book called The Policeman's Beard is Half Constructed was published, allegedly written by the

chatbot Racter (though the program as released would not have been capable of doing so).^[12] Jabberwacky learns new responses and context based on real-time user interactions, rather than being driven from a static database. Some more recent chatbots also combine real-time learning with evolutionary algorithms that optimize their ability to communicate based on each conversation held. Still, there is currently no general purpose conversational artificial intelligence, and some software developers focus on the practical aspect, information retrieval.

1. For example:-Humans Customer Service Representatives are given manuals and have them read it and understand.
2. While the Customer Support Chatbot is fed with thousands of conversation logs and from those logs, the Chatbot is able to understand what type of question requires what type of answers.
3. For example: If a customer is asking, "Where is my payment receipt?" and "I have not received a payment receipt", mean the same thing. • Developers strength is in training The models so that the chatbot is able to connect both of those questions to correct intent and as an output produces the correct answer

Examples Of Chatbots :

1. Eliza
2. Cortana
3. Siri

2 Applications

A chatbot can be used anywhere a human is interacting with a computer system. These are the areas where the fastest adoption is occurring:

Customer Service : A chatbot can be used as an "assistant" to a live agent, increasing the agent's efficiency. When trained, they can also provide service when the call centre is closed, or eventually even act as an independent agent, if desired.

Sales/Marketing/Branding : Chatbots can be used for sales qualification, ecommerce, promotional campaigns, or as a branding vehicle.

Human Resources : An HR chatbot can help with frequently asked questions (“how many vacation days do I have left?”) and can act as an onboarding assistant.

Benefits

1. Economically offer 24/7 Service
2. Improve Customer Satisfaction
3. Reach a Younger Demographic
4. Reduce Costs
5. Increase Revenue

3 How Our Project Work

A) Introduction to Rasa Open Source

Rasa is an open source machine learning framework for automated text and voice-based conversations. Understand messages, hold conversations, and connect to messaging channels and APIs. Rasa Open Source uses YAML as a unified and extendable way to manage all training data, including NLU data, stories and rules.

You can split the training data over any number of YAML files, and each file can contain any combination of NLU data, stories, and rules. The training data parser determines the training data type using top level keys.

The domain uses the same YAML format as the training data and can also be split across multiple files or combined in one file. The domain includes the definitions for responses and forms. See the documentation for the domain for information on how to format your domain file. Each file can contain one or more **keys** with corresponding training data. One file can contain multiple keys, but each key can only appear once in a single file. The available keys are:

- version
- nlu
- stories
- rules

You should specify the version key in all YAML training data files. If you don't specify a version key in your training data file, Rasa will assume you are using the latest training data format specification supported by the version of Rasa Open Source you have installed. Training data files with a Rasa Open Source version greater than the version you have installed on your machine will be skipped. Currently, the latest training data format specification for Rasa 2.x is 2.0.

The goal of NLU (Natural Language Understanding) is to extract structured information

from user messages. This usually includes the user's intent and any entities their message contains. You can add extra information such as regular expressions and lookup tables to your training data to help the model identify intents and entities correctly. Entities are structured pieces of information inside a user message. For entity extraction to work, you need to either specify training data to train an ML model or you need to define regular expressions to extract entities using the RegexEntityExtractor based on a character pattern.

B) Actions

After each user message, the model will predict an action that the assistant should perform next. This page gives you an overview of the different types of actions you can use.

C) Domain

The domain defines the universe in which your assistant operates. It specifies the intents, entities, slots responses, forms, and actions your bot should know about. It also defines a configuration for conversation sessions.

D) Multiple Domain Files

The domain can be defined as a single YAML file or split across multiple files in a directory. When split across multiple files, the domain contents will be read and automatically merged together.

4 Bag of Words Model

The **bag-of-words model** is a simplifying representation used in natural language processing and information retrieval (IR). In this model, a text (such as a sentence or a document) is represented as the bag (multiset) of its words, disregarding grammar and even word order but keeping multiplicity. The bag-of-words model has also been used for computer vision.^[1] A bag-of-words model, or BoW for short, is a way of extracting features from text for use in modeling, such as with machine learning algorithms. The approach is very simple and flexible, and can be used in a myriad of ways for extracting features from documents. A bag-of-words is a representation of text that describes the occurrence of words within a document. It involves two things:

1. A vocabulary of known words.
2. A measure of the presence of known words.

It is called a “bag” of words, because any information about the order or structure of words in the document is discarded. The model is only concerned with whether known words occur in the document, not where in the document.

Example of the Bag-of-Words Model

1. Collect data
 2. Design the Vocabulary
 3. Create Document Vectors
- module is Google firebase.

5 Future Scop of Chatbot

1. Messaging apps

Many companies' chatbots run on messaging apps or simply via SMS. They are used for B2C customer service, sales and marketing.^[17]

In 2016, Facebook Messenger allowed developers to place chatbots on their platform. There were 30,000 bots created for Messenger in the first six months, rising to 100,000 by September 2017.^[18]

Since September 2017, this has also been as part of a pilot program on WhatsApp. Airlines KLM and Aeroméxico both announced their participation in the testing,^{[19][20][21][22]} both airlines had previously launched customer services on the Facebook Messenger platform.

The bots usually appear as one of the user's contacts, but can sometimes act as participants in a group chat.

Many banks, insurers, media companies, e-commerce companies, airlines, hotel chains, retailers, health care providers, government entities and restaurant chains have used chatbots to answer simple questions, increase customer engagement,^[23] for promotion, and to offer additional ways to order from them.^{[24][25]}

A 2017 study showed 4% of companies used chatbots.^[26] According to a 2016 study, 80% of businesses said they intended to have one by 2020.^[27]

2. As part of company apps and websites

Previous generations of chatbots were present on company websites, e.g. Ask Jenn from Alaska Airlines which debuted in 2008^[28] or Expedia's virtual customer service agent which launched in 2011.^{[28][29]} The newer generation of chatbots includes IBM Watson-powered "Rocky", introduced in February 2017 by the New York City-based e-commerce company Rare Carat to provide information to prospective diamond buyers.^{[30][31]}

3. Chatbot sequences

Used by marketers to script sequences of messages, very similar to an Autoresponder sequence. Such sequences can be triggered by user opt-in or the use of keywords within user interactions. After a trigger occurs a sequence of messages is delivered until the next anticipated user response. Each user response is used in the decision tree to help the chatbot

navigate the response sequences to deliver the correct response message.

4. Customer Service

Many high-tech banking organizations are looking to integrate automated AI-based solutions such as chatbots into their customer service in order to provide faster and cheaper assistance to their clients who are becoming increasingly comfortable with technology. In particular, chatbots can efficiently conduct a dialogue, usually replacing other communication tools such as email, phone, or SMS. In banking, their major application is related to quick customer service answering common requests, as well as transactional support.

Several studies report significant reduction in the cost of customer services, expected to lead to billions of dollars of economic savings in the next ten years.^[35] In 2019, Gartner predicted that by 2021, 15% of all customer service interactions globally will be handled completely by AI.^[36] A study by Juniper Research in 2019 estimates retail sales resulting from chatbot-based interactions will reach \$112 billion by 2023.^[37]

Since 2016, when Facebook allowed businesses to deliver automated customer support, e-commerce guidance, content, and interactive experiences through chatbots, a large variety of chatbots were developed for the Facebook Messenger platform.^[38]

In 2016, Russia-based Tochka Bank launched the world's first Facebook bot for a range of financial services, including a possibility of making payments.^[39]

In July 2016, Barclays Africa also launched a Facebook chatbot, making it the first bank to do so in Africa.^[40]

The France's third-largest bank by total assets^[41] Société Générale launched their chatbot called SoBot in March 2018. While 80% of users of the SoBot expressed their satisfaction after having tested it, Société Générale deputy director Bertrand Cozzarolo stated that it will never replace the expertise provided by a human advisor.^[42]

The advantages of using chatbots for customer interactions in banking include cost reduction, financial advice, and 24/7 support.^{[43][44]}

5. Next-generation chatbots will become increasingly utilitarian.
6. Chatbots will become more specialized.
7. As bots become more specialized and popular, they will proliferate; managing them could become as overwhelming as managing apps is today.

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