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Assignment of data mining

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1. Data Enabled Chatbot

1.1. Introduction

A chatbot is an artificial intelligence (AI) program that simulates interactive human conversation by using key pre-calculated user phrases and auditory or text-based signals. These are computer programs designed to have a conservation with human being over the internet or we can define it as programs developed to aid customers access desired products.They accomplish this through interactions with clients, based on details obtained, so as to redirect the marketers on the type of products is required.

A chatbot (also known as a smartbot, talkbot, chatterbot, Bot, IM bot, interactive agent, conversational interface, Conversational AI, or artificial conversational entity) is a computer program which conducts a conversation via auditory or textual methods. Such programs are often designed to convincingly simulate how a human would behave as a conversational partner, thereby passing the Turing test.

Chatbots are typically used in dialog systems for various practical purposes including customer service or information acquisition. Some chatbots use sophisticated natural language processing systems, but many simpler ones scan for keywords within the input, then pull a reply with the most matching keywords, or the most similar wording pattern, from a database.

A chatbot is a service, an intuitive operator, and a conversational space rooted in AI. It chats with clients/customers through sound or content, especially over the Internet.The bot chat logs page enables us to include new answers, greetings, phrases, and predefined reactions. You can see the discussions you've had with the bot and accordingly correct its responses to make business strategy by analyzing the chat logs.

Early classic chatbots include ELIZA (1966), a simulation of a psychotherapist, and PARRY (1972), based on paranoid schizophrenic behavior. Modern chatbots are frequently used in situations in which simple interactions with only a limited range of responses are needed. This can include customer service and marketing applications, where the chatbots can provide answers to questions on topics such as products, services or company policies. If a customer's

questions exceed the abilities of the chatbot, that customer is usually escalated to a human operator.

Chatbots are often used online and in messaging apps, but are also now included in many operating systems as intelligent virtual assistants, such as Siri for Apple products and Cortana for Windows. Dedicated chatbot appliances are also becoming increasingly common, such as Amazon's Alexa. These chatbots can perform a wide variety of functions based on user commands.

Chatbot virtual assistants are increasingly being used to handle simple, look-up tasks in both business-to-consumer (B2C) and business-to-business (B2B) environments. The addition of chatbot assistants not only reduces overhead costs by making better use of support staff time, it also allows companies to provide a level of customer service during hours when live agents aren't available.

Chatbots can have varying levels of complexity and can be stateless or stateful. A stateless chatbot approaches each conversation as if it was interacting with a new user. In contrast, a stateful chatbot is able to review past interactions and frame new responses in context. Adding a chatbot to a company's service or sales department requires low or no coding; today, a number of chatbot service providers that allow developers to build conversational user interfaces for third-party business applications.

There are primarily two types of chatbots - those that use AI (Artificial Intelligence) and those that are based on multiple choice scripts (i.e. selection option X leads to path A and so on). These chatbots are deployed to make user experience more personalized.

Chatbots built using AI to have intelligent meaningful conversations with humans are evolving, and companies are making some path-breaking advances in the area. But they aren’t ready for prime time yet (think Microsoft Tay).

Multiple-choice script-based bots on the other hand are safe and can be controlled to a large extent since their data set is limited. So you know that while the bot will interact with customers on behalf of the brand, it won’t at any time say anything inappropriate or cringe-worthy.

1.1.1 Types of Chatbots

1.1.1.1 Menu/Button-Based Chatbots

In most cases, these chatbots are glorified decision tree hierarchies presented to the user in the form of buttons. Similar to the automated phone menus we all interact with on almost a daily basis, these chatbots require the user to make several selections to dig deeper towards the ultimate answer.

While these chatbots are sufficient for answering that handful of nagging FAQs that make up 80% of support queries; they fall well short in more advanced scenarios in which there are too many variables or too much knowledge at play to predict how users should get to specific answers with confidence. It's also worth noting that menu/button-based chatbots are the slowest in terms of getting the user to their desired value. Menu buttons help guide new users in the Relay Chatbots.

1.1.1.2 Keyword Recognition-Based Chatbots

Unlike menu-based chatbots, keyword recognition-based chatbots can listen to what users type and respond appropriately, or at least try to. These chatbots utilize customizable keywords and AI to determine how to serve an appropriate response to the user.

For example, if a user asked the question 'How do I set up an auto logout transaction on a Poynt device?', the bot would likely use the keywords 'auto', 'logout', and 'Poynt', to best determine which answer to respond with.The Relay Poynt Bot using keyword recognition to respond with the right answer.These types of chatbots fall short when they have to answer a lot of similar questions. The chatbots will start to slip when there are keyword redundancies between several related questions.

It is becoming quite popular to see chatbots that are a hybrid of keyword recognition-based and menu/button-based. These chatbots provide users with the choice to try to ask their question directly or use the chatbot's menu buttons if the keyword recognition functionality is yielding poor results or the user requires some guidance to find their answer.

1.1.1.3 Contextual Chatbots

Contextual chatbots are by far the most advanced of the three bots discussed in this post. These chatbots utilize Machine Learning (ML) and Artificial Intelligence (AI) to remember conversations with specific users to learn and grow over time. Unlike keyword recognition-based chatbots, contextual chatbots are smart enough to self-improve based on what users are asking for and how they are asking it.

For example, a contextual chatbot that allows users to order pizza will store the data from each conversation and learn what the user likes to order. The result is that eventually when a user chats with this chatbot, it will remember their most common order, their delivery address, and their payment information and merely ask if they'd like to repeat this order. Instead of having to respond to several questions the user just has to answer with 'Yes' and pizza is on its way!

1.2 steps of building a customer service chatbot from scratch.

1.2.1 Determine the role of the bot and set goals

Before you start anything, identify what you want your bot to do and be specific. Following the Pareto rule about an 80-20 focus, identify the top 20 percent of questions that are answered in your contact center today, but which make up 80 percent of the volume of incoming inquiries. Determine whether you want your bot to interpret questions very narrowly deflecting fewer questions from the contact center but being highly precise or broadly, creating a higher rate of deflection at the risk of answering incorrectly.

1.2.2 Evaluate and pick a channel

Text-based chatbots can live on any communication channel that can carry a dialog, whether that's a traditional mobile carrier channel (SMS, USSD), a messaging app (Facebook Messenger, WeChat), social networks like Twitter, or chat embedded on a website. If you are considering adding a conversational experience to your existing mobile app, ask this question: Given general app fatigue, does this experience add enough new value that it justifies the investment? Sometimes a fresh channel opens up new perspectives for better customer service.

1.2.3 Create the Conversational Architecture

Chatbots are about a continuous conversation that allows for any number of responses between the bot and the user. Contrary to what users experience with mobile apps or websites, the messaging channel is story- or flow-based, where all previous interactions are always visible to both parties.

What this means for your chatbot design is that user messages can never be analyzed in isolation they are part of a larger conversation. As a first design step you therefore want to create a Conversational Architecture. This is similar to an Information Architecture for a GUI, which puts the website content into a hierarchy of web pages (a site map). Pay attention to which interactions might lead to follow-up steps that refer to previous dialogue, and figure out how you are going to handle them.

1.2.4 Design dialog flows and storyboards

Conversational Architecture is an exercise to help you organize your content and start thinking about the best ways to word the bot's answers. The dialog flow goes into all the detail needed for your developer to implement the bot, and represents each branch and juncture in the conversation.

The detailed message design happens outside of the flow diagrams, as you will want to design variations of the same message for frequently occurring dialog steps. This is a technique called random prompting, where you make the bot use wording variations to essentially say the same thing. This will make the whole experience feel less robotic and more human, which is something we should strive for in bot design.

1.2.5 Design the integrations

Backend and data integrations can be as varied as the applications you want to automate. If you already have an integration with your existing self-service platforms (web or voice) to some of your systems, the same integrations may be re-used for chatbot purposes. For example, if your IVR (interactive voice response) application already verifies your customer and can provide order status information, then most likely the integration can be re-used for your chatbot.

1.2.6 Collect chat data

One of the most important resources you will need to assemble is a collection of question variations reflecting the different ways your customer can ask for something. If you're lucky enough to have had agents communicating with customers in chat channels, you can mine those conversations for real examples.

If you need to create your initial data by hand, make certain that your collection includes not just one developer's intuitions but also input from as large a variety of people as possible. One useful approach is therefore to work with quality assurance and crowdsourcing companies who have access to a large number of people from around the world. Finding people with the same linguistic background as your target users is helpful. The same linguistic background helps create more realistic data — data that might even include mistakes that are typical for some non-native speakers.

1.2.7 Pick a platform and a development approach

In essence, most chatbots consider the following the key tasks to be performed on natural language sentences:

1. Determine the intent of the sentence and

2. Extract data from the sentence.

There are essentially two different approaches to these tasks:

1. Based on explicitly creating rules from the top down and

2. Using machine learning algorithms to learn the task from a large collection of transcribed interactions.

If you do not have an existing data set to train a machine on, you will be better off with a linguistic rules-based approach. The latter also allows you to retain more control over how a question is interpreted, which matters in customer service, as you want to minimize the number of wrong answers given.

1.2.8 Implement the dialogue flow and engineer the Natural Language Understanding

If you selected a platform based on machine learning, you will provide this platform with your example sentences for each possible intent. The more examples you provide, the better the algorithm will learn the variations of linguistic expressions that can be used for each intent, and the better it will learn how to distinguish between intents. Note that you will want to reserve some of your example sentences for the next step (testing).

If you are working with a linguistic rules-based platform, you will use the sentences in a different way. The rules you craft will explicitly represent the characteristics that determine that a given sentence belongs to intent A or intent B.

1.2.9 Internal testing and revision of your use case detection

Now you're ready for the second use of your collection of example sentences: automated testing. You also want as many diverse human testers as possible for "real user" testing. Test and revise your Natural Language Understanding component, as well as the dialog flow, until you reach an acceptable level of accuracy. Note that this step and the step that precedes it are iterative and approximative. Because of the nature of human language and the infinite possible expressions of every question or intent, the goal of 100 percent accuracy is an unattainable one, even for a human being. Each time you iterate through these steps, however, you get closer.

1.2.10 Early deployment and revisions

Even though you're ready to go live, the work is not over when the bot gets deployed. Typical adjustments include rewording your bot's responses as you review follow-up clarification questions from your customers that wouldn't have been necessary if the bot's answer had been clearer. You may need to adjust the logic of your intent classification, either through explicit manipulation of the rules or through providing more example sentences. Finally, you may need to add new use cases if the designed use cases do not cover the majority of user requests.

To ensure a successful outcome of your chatbot deployment, view the creation as an iterative process: Gather the data, review it, and apply it to your bot's design. Repeat. Above all, log everything for the future.

1.3 Application of chatbot

- **Bots Can Be Used for Specialized Tasks**: Tasks like hiring a cab, ordering food online, or even checking the weather can be easily accomplished via chatbots. Similarly, businesses can make use of chatbots to manage inventory and purchase orders
- **Chatbots Offer Better Service on Mobile Devices**: There is no doubt that the future of browsing is mobile; already the number of mobile users is higher than PC users. Using chatbots in mobile apps enables the creation of more streamlined user interfaces. It allows users to browse, evaluate, purchase, and get support from a single interface.
- **You Can Scale Up Your Operations:** Human beings have their limitations; an agent may be able to engage with a maximum of 3 customers at a time, whereas AI-based chatbots have no such limits. By fortifying your workforce with chatbots, you can interact with more users, helping you increase your customer base and even enter new markets.

- **Divert Human Resources to Core Tasks:** By deploying AI-based chatbots you can divert precious human resources to more important tasks. Bots allow humans to handle customer queries only if they are very complicated, and human intervention becomes extremely necessary. In fact, you can set your chatbots to screen calls, so that simpler queries or issues are resolved by the bot. Over time, the chatbot can become smarter through machine learning, and may hand off fewer queries to human agents.
- **Smart Messaging Provides More Value to Customers:** Your chatbot can be used to deliver smart messages to your customers - combining big data, personalization, and machine learning. This is especially useful in financial institutions. Let's suppose there is a credit card transaction in addis ababa for a user whose address is California. The chatbot can pop up and ask - I noticed a big charge made to your card this afternoon in China. Are you travelling? If it's not made by the customer, they can instantly inform the card company. Similarly, the chatbot can warn the customer about overdraft fees, or overdue bills - it's less intrusive for the customer, and easier for them to make the payments as they are already on that site.
- **Assist Customers in Making the Right Choice:** Do you sell goods and services that are almost substitute of each other? Are you selling higher-end goods or gadgets? Here too, a chatbot can provide invaluable service. Choosing can become very difficult when the choices are very close, or the customer has to shell out big bucks. Chat bots can easily guide the customer and help them get the right product or service.
- **Upselling and Recouping Carts:** Customers who have completed a purchase are more likely to purchase again. Chatbots can interact with these customers and leverage the opportunity of upselling to them. Cart abandonment rate is high in e-commerce; email marketing has been marginally successful in getting people to go back to their carts and complete purchases. However, chatbots are capable of doing this job even better.
- **Increased Personalization:** Chatbots allow you to categorize your audience and provide different persons a customized experience. It's human nature that we feel pleased when we are recognized, and our preferences are remembered - just as when you walk into a restaurant and the waiter asks you ‘Your usual table? Chatbots can recommend products to you based on your purchase history. This is especially helpful when the product is something the customer would need to buy repeatedly - say pet food, or kitchen towels.

- **Tap into the Millennials Segment:** Millennials prefer to chat rather than talk over phone; they also like to ask around and compare dozens of products before they make a final decision. A chatbot will do this task efficiently; introducing chatbots can therefore help you to get millennials to purchase from you.
- **Leverage the benefits of Interactive Marketing**: Chatbots represent an active user experience, unlike websites and apps, which are passive. Not only can you use them for interactive marketing, you can reach out to a larger audience; in fact, several people simultaneously. Using chatbots can also simplify several tasks for you when you use online channels like your social media networks to engage with customers.

1.4 what can be done ?

The evolution of artificial intelligence is now in full swing and chatbots are only a faint splash on a huge wave of progress. Today the number of users of messaging apps like WhatsApp, Slack, Skype and their analogs is skyrocketing, Facebook Messenger alone has more many users. With the spread of messengers, virtual chatterbots that imitate human conversations for solving various tasks are becoming increasingly in demand.

Online chatbots save time and efforts by automating customer support.The opportunites provided by chatbot systems go far beyond giving responses to customers' inquiries. They are also used for other business tasks, like collecting information about users, helping to organize meetings and reducing overhead costs. There is no wonder that size of the chatbot market is growing exponentially.

Of course, it is not so simple to create an interactive agent that the user will really trust. It is an assistant that communicates with us through text messages, a virtual companion that integrates into websites, applications or instant messengers and helps entrepreneurs to get closer to customers. Such a bot is an automated system of communication with users.

Why does a business need chatbots?

There are reasons for that like getting rid of routine tasks and simultaneous processing of multiple requests from users. Besides, a tremendous speed of processing users' requests with chatbots helps gaining customers' loyalty.

Consumers also benefit from chatbots and they are getting increasingly interested in this technology.

- Chatbots provide the assistance or access to information quickly and efficiently.
- Chatbots amuse people by giving them funny tips, they also help killing time when users have nothing to do.
- Chatbots fuel conversions and enhance social experiences. Chatting with bots also helps to avoid lonliness, gives a chance to talk without being judged and improves conversational skills.
- The novelty of chatbots sparks curiosity. People want to explore their abilities and to try something new.

1.5 Conclusion

From our perspective, chatbots or smart assistants with artificial intelligence are dramatically changing businesses. There is a wide range of chatbot building platforms that are available for various enterprises, such as e-commerce, retail, banking, leisure, travel, healthcare, and so on.

Chatbots can reach out to a large audience on messaging apps and be more effective than humans. They may develop into a capable information-gathering tool in the near future

Chatbots have great potential as an element of customer service, that's a fact. Yet you shouldn't fall for them just because it's a new fancy thing to do.

Being a part of the business means it has to reflect its main aims and values. So you should consider chatbots as a consistent extension of your strategy that will harmoniously complete your social media presence.