

STUDY MATERIAL

Preliminary Concepts of Chatbots

· 03 MARKS IN Artificial Intelligence [ ARTI ] ---- CLASS XI

Syllabus for Section 7 : Preliminary Concepts of Chatbots

- What is Chatbot ?
- Examples of Different chatbots
- Working principle of chatbots

• **CONTENTS**

<b>Sl No</b>	<b>Topic</b>	<b>Page No</b>
<b>1</b>	<b>What is Chatbot ?</b>	<b>3</b>
<b>2</b>	<b>History of chatbots</b>	<b>4</b>
<b>3</b>	<b>How chatbots work?</b>	<b>6</b>
<b>4</b>	<b>Types of chatbots</b>	<b>9</b>
<b>5</b>	<b>How businesses use chatbots?</b>	<b>8</b>
<b>6</b>	<b>Examples of chatbots</b>	<b>10</b>
<b>7</b>	<b>Working principle of chatbot</b>	<b>11</b>
<b>8</b>	<b>Advantages and Disadvantages</b>	<b>13</b>
<b>9</b>	<b>Chatbot : Present Day</b>	<b>14</b>

## **What is a chatbot?**

A chatbot is a computer program that simulates human conversation through voice commands or text chats or both. Chatbots, also called chatterbots, is a form of artificial intelligence (AI) used in messaging apps. Organizations are using chatbots to engage with customers alongside traditional customer service channels like phone, email, and social media.

Chatbots are also called "talkbot", "bot", "interactive agent" or "artificial conversation entity."

A chatbot is a program that uses artificial intelligence (AI), natural language processing (NLP), and machine learning (ML) to generate automated responses to customer queries. But that doesn't mean that customers can tell they're speaking to a robot. Chatbots simulate human conversation so that users feel like they're talking to a real person while addressing their issues.

Chatbots help businesses keep up with customers' increasing demand for immediate help without overwhelming the customer service team. Chatbots have a range of capabilities, from answering basic questions to acting as digital assistants.

While they don't necessarily replace human customer care agents, chatbots can help businesses save time by answering simple customer queries. If a chatbot doesn't know the answer, it can always route your customers to a human agent, along with a transcript of the conversation.

## History of chatbots

While today's "smart" chatbots are relatively new, the technology itself is rather old.

Modern chatbots have their origins in phone trees, which customers would navigate by selecting various options. If you've ever called the pharmacy, for example, you've experienced a phone tree. Businesses used phone trees to route calls to the best contact for the job, reducing the need to hire phone operators.

Fortunately, chatbots are much more user-friendly than phone trees. The first chatbot, as we've come to know it, was named ELIZA. An MIT professor Joseph Weizenbaum created ELIZA in the 1960s with the goal of mimicking human speech using technology. ELIZA was able to recognize key phrases and even respond with open-ended questions. While it wasn't perfect, many human users couldn't guess whether they were speaking to a human or to ELIZA.



Technology has improved since the 1960s, and chatbots have evolved to a point where they can learn from massive amounts of data, adapting to user behavior and additional context.

The additions of artificial intelligence, machine learning, and natural language processing make chatbots sound more human — and also make them more useful. For example, chatbots like ChatGPT are making it possible to generate an immense amount of information from a short input query.

Today's chatbots are able to look for additional context and offer help even when customers ask less straightforward questions. This means users can get better help from a chatbot without the need to route the conversation to a customer care agent.

Chatbots can effectively and efficiently respond to both simple and complex queries, helping reduce workloads and save time.

Chatbots undeniably became smarter in 2022, with NLP capabilities being put to good use by chatbot builders of all sizes. Chatbots today have an improved understanding of the human language, with more and more training fed into chatbots that are constantly evolving.

## **How chatbots work**

Chatbots are automated computer programs, so they work independently of your customer care team. Chatbots use AI, NLP, and ML to process data and respond to queries.

Some businesses use chatbots that work off of a script. These can be effective for basic questions, but they tend to result in a poorer customer experience. Many businesses opt for NLP-powered chatbots to step away from scripts and allow chatbots to generate more intelligent contextual answers.

The type of chatbot you choose will affect how it ultimately functions. There are lots of chatbots on the market, but there are two primary types of chatbots – declarative and predictive.

### **Declarative chatbots**

Declarative chatbots are the most common type of chatbot. They're typically designed for a single purpose and use sets of rules defined by the owner, as well as limited NLP and ML.

More often than not, businesses use declarative chatbots for common support and customer service questions, such as hours of operation. This means declarative chatbots usually pull from your frequently asked questions.

The downside to declarative chatbots is the fact that they can't answer more advanced or nuanced questions. This can give your customers a worse experience. However, they're easier and cheaper to implement, so many businesses opt for these chatbots to save time and resources.

Plus, if the declarative chatbot can't solve a customer's issue, it can always route the chat to a human agent.

## **Predictive chatbots**

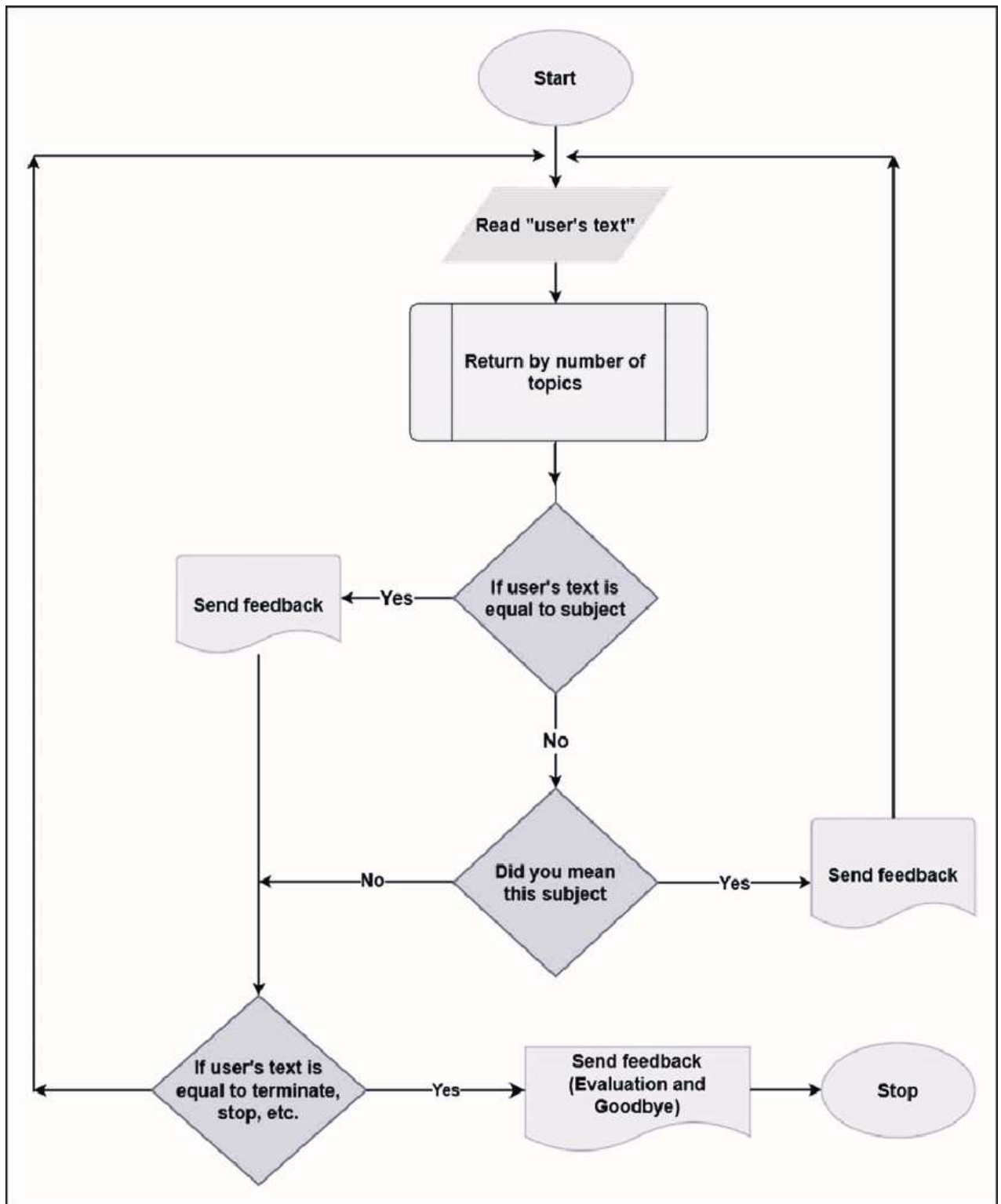
Predictive chatbots are also known as virtual or digital assistants. They're more interactive and personalized based on user profiles and past behaviour. Apple's Siri and Amazon's Alexa are examples of predictive chatbots.

Predictive chatbots take things a step further, using natural-language understanding (NLU) in addition to NLP and ML. They can pull from past contexts and conversations to engage in hyper-personalized conversations with your customers. For example, if a customer recently logged into their account, the chatbot might say, "I saw you logged into the app. Are you having trouble with your account?"

Predictive chatbots offer the best customer experience, but they require a lot of data, intelligent models, and context to work properly. They're also more complicated and expensive to produce, which is why many companies opt for declarative chatbots instead.

Chatbots work on the principle of interacting with users in a natural language via applications, websites, or even telephone. They use a combination of predefined scripts and machine learning algorithms to provide responses. Here are the key components involved in the working of a chatbot:

1. Natural Language Processing (NLP): This is the process of converting the user's input into a format that a machine can understand.
2. Natural Language Understanding (NLU): This involves understanding the user's intent and extracting relevant information from their input.
3. Solution Flow Management: This involves managing the flow of conversation based on the user's input and the chatbot's understandings.
4. Natural Language Generation: This is the process of converting the chatbot's understanding into a human-readable output.





## Types of chatbots

Declarative and predictive are the two most common types of chatbots, but there are subcategories of these two types:

- **Scripted.** This is the most basic type of chatbot. It replies to user questions using a decision tree to spit out pre-written answers to common questions. It usually offers a menu of options that users can choose from to share quick data, like their account balance or shipping information.
- **Keyword recognition.** This type of chatbot is slightly more advanced. It uses a blend of AI and a keyword bank to guess what your customer needs. This offers more customized help, but it can be difficult if the customer doesn't use the "right" keywords.
- **Hybrid.** This is a mix of scripted and keyword-recognition chatbots. Customers can choose from a menu of options or type their queries to use keyword recognition.
- **Contextual.** AI and ML power contextual chatbots, which allow them to remember user interactions and improve over time. They don't use keywords – they rely on customer data and assessments to answer user needs. This is the gold standard of chatbots, but it does require a lot of data to work properly.
- **Voice-enabled.** Users ask for information from Siri, Google Assistant, and Alexa with just their voice. Your customers expect to be able to have voice conversations with your chatbot, and this type of technology allows for that. It uses text-to-speech and voice recognition technology to mimic human conversations.

## How businesses use chatbots

While we're used to asking Alexa about the weather or sending a quick text with Siri, chatbots have plenty of applications outside of our personal lives. In fact, there are a wide variety of uses for chatbots in business, including:

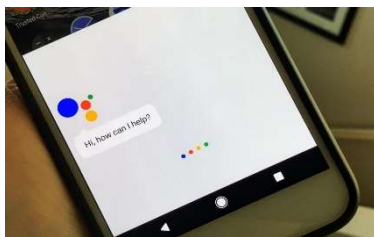
1. **Customer service.** Answer common questions with the power of a chatbot. If you opt for a predictive chatbot, you can help customers order tickets, book hotels, or access banking services without even leaving the chat.
2. **Online shopping.** Respond to questions about product availability and cost quickly with an ecommerce chatbot. It can even track a customer's order with a few clicks.
3. **Internal IT self-service.** Employees can use chatbots for password updates and to check for outages.
4. **Virtual assistants.** Siri, Cortana, Alexa, and Google can be helpful virtual assistants for running your business, but they also serve a purpose for SEO. By targeting featured snippets in SEO, you can ensure these VAs choose your content when your target audience types a query into Google.
5. **Appointment scheduling.** Ask potential customers to do a chatbot assessment before a sales meeting to assess their level of interest before you even speak to them.

## Examples of Chatbots

- Lead generation chatbots on websites:  
Lead generation chatbots on websites that capture and qualify leads for businesses.

Example: Domino's Pizza converts prospects through different channels by accepting orders from customers. The chatbot can choose the type of pizza customers want and get it delivered right away.

- Virtual assistants for information search on Smartphones :  
Virtual assistants for information search on Smartphone that use voice or text commands to provide answers and suggestions.  
Example: Amazon's Alexa, Apple's Siri, Microsoft's Cortana, and Google Assistant have become our voice-activated helpers.

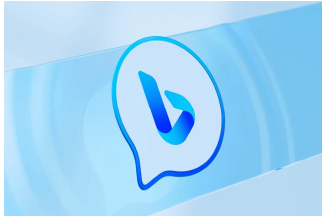


### Google Assistant

- Bill payment bots by utility companies  
Bill payment chatbots by utility companies that enable customers to pay their bills and check their balances.  
Example: PAI The chatbot is designed to create awareness about payment products such as FASTag, RuPay, UPI, and AePS on a real-time basis.
- Language-Learning:  
Chatbots can help us learn several languages even from basic to advance also help us in reading, writing, listening and speaking.  
Example: Duolingo, Mondly are probably the most popular language learning chatbot platforms in the world.
- Creative uses :  
People have put the chatbot to all kinds of creative uses,

including writing articles and emails, designing websites, and writing software code.

Example: CHATGPT, BING AI, BARD



- **Banking Chatbots:**

The utility of financial chatbots from banks and financial institutions is growing day by day as customers now expect prompt services all the time.

Example: Eva by HDFC bank, SIA by SBI



## ADVANTAGES AND DISADVANTAGES OF CHATBOT

### Advantages:

- ➔ Chatbots are cheap, easy and efficient way to communicate with customers.
- ➔ Chatbots are intelligent. Advanced software learns from past interactions/responses and hence improves responses over time.
- ➔ Chatbots are effective. It allows users to perform tasks efficiently and accurately.
- ➔ Chatbots are engaging. It enables human like interaction delivered through a channel that is easily scalable.
- ➔ It does not require human being for its operation and hence saves cost of hiring human beings. It can be employed as per business model.

### Disadvantages

- ➔ Chatbots can't answer all the queries and hence it can be seen as lacking personal touch.
- ➔ Certain chatbots are poor in processing and takes time to filter results. This annoys the users.
- ➔ Different chatbots require different installation procedures and hence increases initial installation cost unlike human beings.
- ➔ Certain chatbots have limited availability of data and require some time for their self update. This process leads to slower response times and expensive solutions.
- ➔ Chatbots are poor in making decisions unlike human beings.
- ➔ Certain chatbots are poor in memory and do not store past conversations. This annoys users as they need to re-type same things. This requires more efforts from user point of view.

## **Chatbot : Present day**

Chatbot was one of the biggest technology developments in 2022, and you can see chatbots almost everywhere in the digital space, from websites to Facebook, Telegram, and Slack. Forecasts show that 2023 will continue to be a year in which chatbot development remains a popular search.

Chatbots have proven to be a successful replacement for humans in certain situations, such as responding to queries. About 62% of customers prefer using a chatbot if that means they can grab the answer quickly. Moreover, 3 out of 4 businesses are happy with the results of the chatbot establishment on their platforms. Seeing how useful chatbots have been to their competitors, other enterprises are also planning to hop on the chatbot trend.

### **Types of chatbots**

Chatbots are divided into 3 categories:

- *Rule-based chatbots*: Chatbots respond to queries following a set of rules of flows they have been trained. This type of chatbot is useful for completing simple tasks they were programmed to perform. Yet, with more training from its developers, it will become more capable of handling complex tasks.
- *Machine learning-based chatbots*: These chatbots can hold more complicated conversations since they attempt to process the question and comprehend its meaning. It takes what it has learned from the last dialogues to handle more complicated inquiries in the future.

- *Hybrid chatbots*: The hybrid chatbot, as the name implies, combines the best of rule-based and AI technology with live chat capability to create a greater customer experience.

## **Industry Use Cases Of Chatbots**

Chatbots now can be used in almost all sectors, thanks to their outstanding features. Nevertheless, we have seen some industries that benefit more from this chatbot development trend:

### **E-Commerce**

E-commerce may be the industry that sees the most use of chatbots. They help businesses in:

- Customer onboarding – educate users to utilize your e-commerce app.
- Customer support – searching for products or other information.
- Generate leads- engage and encourage customers to provide their email addresses.
- Upsell – giving personalized recommendations or suggesting similar products.
- Improve the buying experience – completing orders, and supporting the refund process.
- Collect customer feedback about your services.

- Track the status of a customer's order through social media like Facebook and Messenger.

## **Retail**

If you are a retailer and have a website, a chatbot can help in improving the customer experience:

- Give personalized recommendations.
- Engage users on social media by answering their questions or providing information about specific products.
- Provide order confirmation and package tracking details instantly.

## **Education**

Educational apps can integrate chatbots for a better learning journey:

- Simulate conversations with users
- Explain questions for learners
- Help users find the suitable courses

## **Healthcare**

Given how patients are sensitive regarding their health issues, chatbot integration might be an extremely helpful tool in this case:

- Schedule appointments with care providers
- Address patient's concerns



- Encourage patients to follow through with the health check process
- Remind users to take medications
- Collect patient data
- Offer quick medical assistance
- Provide mental healthcare

## **Banking**

Banking is also one of the industries that can leverage their services using chatbots:

- Analyze and offer insights into a user's financial health
- Advise people on their financial situation
- Track user's expenses and create useful reports
- Send balance notifications and bill reminders
- Alert users about suspicious activities or scams

## **Travel**

The development of chatbots also benefits the travel industry as it helps businesses:

- Generate leads
- Provide 24/7 customer support
- Search for travel services that suit buyer's requirements

