e-bot7
Artificial Intelligence for Customer Service

# The Disruptive Power of Artificial Intelligence in Customer Service

## A Practical Guide

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# GLOSSARY OF TERMS

### Artificial Intelligence (AI)
AI is intelligent behavior by a machine. Based on training data, the machine aims to maximise its chance to successfully fulfil the given objective.

### Chatbots
A service trained to conduct a conversation by using an input-output system via a chat interface.

### Customer Relationship Management (CRM)
CRM is the company’s management of interaction with current and potential customers by analysing customer’s data.

### CSAT Scores
CSAT is a broad term that describes many different types of customer service survey questions. The goal of any CSAT score is to measure a customer's satisfaction level with your company's product, service or interaction.

### Deep Learning
The subfield of Machine Learning which enables computers to analyse and process datasets very precisely through neural networks.

### Machine Learning
As a subfield of AI, machine learning builds a model that is able to learn based on data and algorithms.

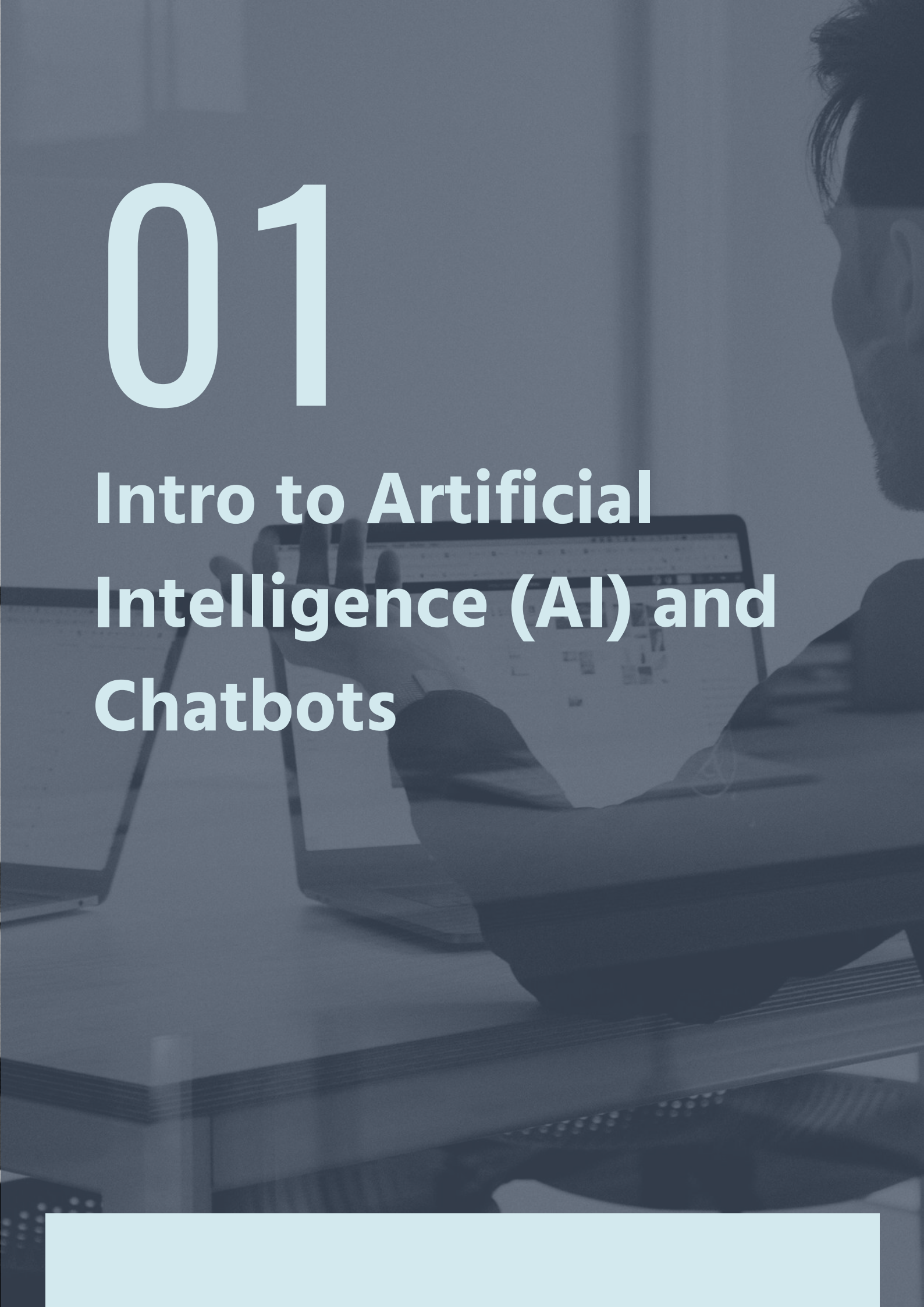
### Natural Language Processing (NLP)
NLP is a sub-field of Artificial Intelligence which provides virtual machines with the ability to read and understand human language input.

### Neural Networks
Neural network process information in a mathematical or computational model for information processing, inspired by the human brain.

### Net Promoter Score (NPS)
Net Promoter or Net Promoter Score (NPS) is a management tool that can be used to gauge the loyalty of a firm's customer relationships.

### Supervised Learning
Supervised learning is the machine learning task of learning a function that maps an input to an output based on example input-output pairs.

### Support Tickets
In regard to CRM, support tickets or queries are lists of customer issues assigned to a level of importance.



# 01

# Intro to Artificial Intelligence (AI) and Chatbots

The first machines to automate tasks were introduced during the industrial revolution. Since then, we have seen machines outperforming humans in a wide range of areas like medicine, production or manufacturing.

Back then, automated machines took over simple repetitive workflows such as turning screws as machines could perform these tasks more precisely and efficiently, shifting human labour to more critical supervision tasks. This trend has been started in the industrial revolution and has been massively accelerating with the rise of the internet and AI.

> Artificial Intelligence is the **science** and engineering **of making intelligent machines**, especially intelligent computer programs.
> (John McCarthy)

The term AI was coined by John McCarthy amongst others during the Dartmouth Conference in 1956, which was one of the first academic conference on the subject.

Some describe AI as a computer science application modelled on the neuronal network of the human brain. Others describe it as algorithms simulating cognitive 'human' functions such as learning or problem-solving. These definitions distinguish an AI system from conventional computer programs. Instead of telling a program what to do, the AI is given a task that it has to solve independently.

There is lot of skepticism about AI especially due to the effects on the labor market. Yes, AI will takeover repetitive tasks and processes and thereby reduce the overall employment rate in specific areas (Russell &Norvig, 2003). However, if a machine outperforms humans with regard to accuracy, speed and hndurance, companies and as a result the overall economy, could gain important productivity improvements. According to several studies (Gartner 2017) AI can also help create new jobs such as supervision, maintenance and/or training support since machines need to be trained and maintained when implemented.

Also, employees could focus on quality work instead of repetitive and mundane tasks which they were actually trained for. Especially in Customer Service, as being one of the disrupted areas of AI, support agents are often occupied by copy and pasting repetitive answers instead of focusing on personalized retention measures or upselling opportunities.

In the twenty-first century, Artificial Intelligence and its subfields of machine learning, deep learning or natural language processing (NLP) have been rapidly increasing in various fields. NLP for instance, is the ability of machines to understand text-related inputs. Oftentimes, it is the underlying technology that powers Chatbots or Virtual assistants which develop into valuable business applications.

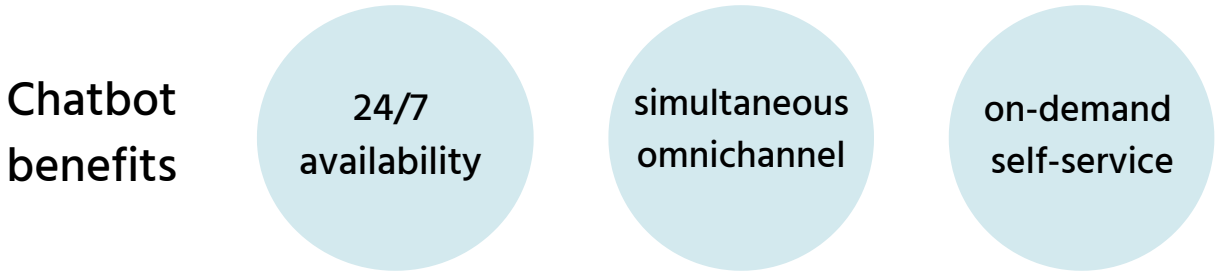
> Chatbots will be responsible for cost **savings** of **over $8 billion per annum** by 2022. (Juniper Research)

Chatbots are powered through a series of defined rules. These rules are the basis for the types of problems the Chatbot is familiar with and can deliver solutions for. As technology has been rapidly advancing in the last couple of years, especially with the rising field of Deep Learning, Chatbots can now understand the incoming input, process it and deliver the desired output at a high speed and reliability with no or little human assistance.

# 02

# A New Era of Customer Service

One of the fields where AI is thriving is Customer Service. Integrating smart machines into repetitive labour processes allows employees to focus on high-level activities without being distracted by the same tasks and processes over and over again. Especially in Customer Service where in some cases 80% of all incoming queries are repetitive, AI and Chatbots can add enormous value to all stakeholders involved. They are able to process customer requests 24/7 at high speed, reliability and accuracy without needing a break.




This is especially helpful since the expectations of customers changed over time. Due to the emergence of new platforms, the habits of how consumers seek service and engage with brands is changing. This evolvement is disrupting how traditional Customer Service and contact centers work. Even though today's Customer Service centers typically range from using ancient to extremely modern technologies, a lot of them still rely on phone calls and e-mails to connect with their customers.

Since the majority of the millennials (aged 18-24) and the generation X (aged 35-49) not only own a smartphone but also spend on average 4-6h a day on the device, text-based communication and messaging is becoming the preferred communication method (Nielsen, 2017). This trend is so apparent, that in 2017, people were using messaging platforms such as Facebook Messenger, WhatsApp and Telegram more than social networks such as Facebook or Twitter (Statista, 2017).

It is no secret that every business strives to provide exceptional service. Satisfied customers are not only willing to buy the product or service of your company, but they are also likely to promote it to their friends and families by word-of-mouth or through social networks. This likelihood of "promotion" is typically measured by the Net Promoter Score (NPS) and has become a widely used measure to capture customer satisfaction.

Offering and executing an effective customer communication strategy can be very challenging. This is not only due to frictions caused by time, capacity and technological barriers but also due to constantly changing customer demands. If companies are too slow to adapt to these ever-changing customer demands and preferences, they will reduce customer satisfaction and hence the NPS.

"Today's customer service leaders must **respond to rising customer expectations** and acclimatize to the breakneck speed of technology. The pace of change is accelerating. Those that do not start their journey now will be left behind." (Deloitte)

Since the NPS and customer experience are becoming the new measures of how successful a company performs, technologies and tools that meet and exceed the ever-increasing demands of customers will make the difference between success and failure. Studies show that in 2017, customers do not want to deal with long waiting times, outdated support systems, inter-departmental transfers or inefficient service. What customers prefer is a simultaneous omnichannel 24/7 on-demand self- service (Deloitte, 2013).

> By 2020 customers will manage **85%** of their relationships with the enterprise **without interacting with a human**. (Gartner)

By leveraging new technologies such as AI, intelligent automation and Chatbots, businesses have the large opportunity to build the Customer Service of the future. This will enable companies to gain a competitive advantage, by offering a Customer Service that improves relationships with customers while maintaining cost efficient and scalable.

# 03

# AI and Chatbots in Customer Service

Customer service is often considered as a mere cost driver rather than an opportunity. The reasons are clear. Scaling up customer service capabilities is painful and labour-intensive. Adding capacity means hiring more employees. At the same time fluctuations in Customer Service are the highest among departments. Agents in Customer Service respond to the same repetitive questions every day. This not only drives up costs but also prevents support agents from taking time to solve more complex, non-routine problems that require domain knowledge, experience, and empathy. Those agents have dedicated their professional careers to solve problems of others, so why should the majority of their daily tasks be simple copy-paste work?

From a customer's perspective, the integration of AI into Customer Service implies more convenience. So far, customers who want to get in touch with Customer Service must either send an e-mail, or call hotlines, often enduring long waiting times in both cases. This type of communication is one-sided and doesn't offer a great customer experience.

> **Poor customer service** leads consumers to abandon planned purchases, resulting in **$75 billion in lost revenue** each year. (Forrester Research)

AI and Chatbots can allow businesses to provide a better user experience, a higher satisfaction (NPS) and retention, as well as lower operational costs, by delivering customers the right information at the right time, 24/7. The figure below shows some **advantages of Chatbots**:

### INCREASE REVENUE

The AI solution will take over the repetetive questions so that your customer service team can focus on more complex, non-routine problems that require domain knowledge, experience, and empathy.

### IMPROVE CUSTOMER EXPERIENCE

Rapidly scale up and serve your customers with advanced digital capabilities and cognitive technologies. Chat interfaces are everywhere, automate your customer communications via chat.


### REDUCE CUSTOMER CHURN

Offer an around the clock customer service 365 days per year. Increase customer satisfaction by providing a high customer support quality whenever the customer demands it.

### MINIMIZE COSTS

Automation through AI offers 15 to 90% cost reduction opportunities depending on their fuctions. At the same time, scalability and easy integration mitigate security risks and offer high potential ROI.

Handling a conversation, however, is a very challenging task and not all Chatbots can deliver the advantages above when the technology is not implemented correctly. In general, there are three levels of Chatbots based on different complexities and technologies:

## Chatbot Models

01

A first-level Chatbot is rule- or keyword-based, programmed by handwritten rules to answer questions. The range of conversation is limited to a very specific use case and the Chatbot has very limited or no NLP ability. It follows if-then statements to match question and answers however, the bot might be not very efficient if question patterns do not match the rules. Ultimately, the bot can answer simple questions, but fails to respond to complex questions. This can be frustrating for customers and hinders a dynamic conversation flow.

02

Second-level Chatbots use retrieval-based models, another subfield of machine learning, which processes customer requests not only by a subset of rules and behaviors but by trying to understand the text and thereby provide the best possible output retrieved by the model. Typically, the process consists of matching words or a subset of words to a preexisting database. The knowledge base is typically prefilled with questions and answers which are processed with a certain probability.

03

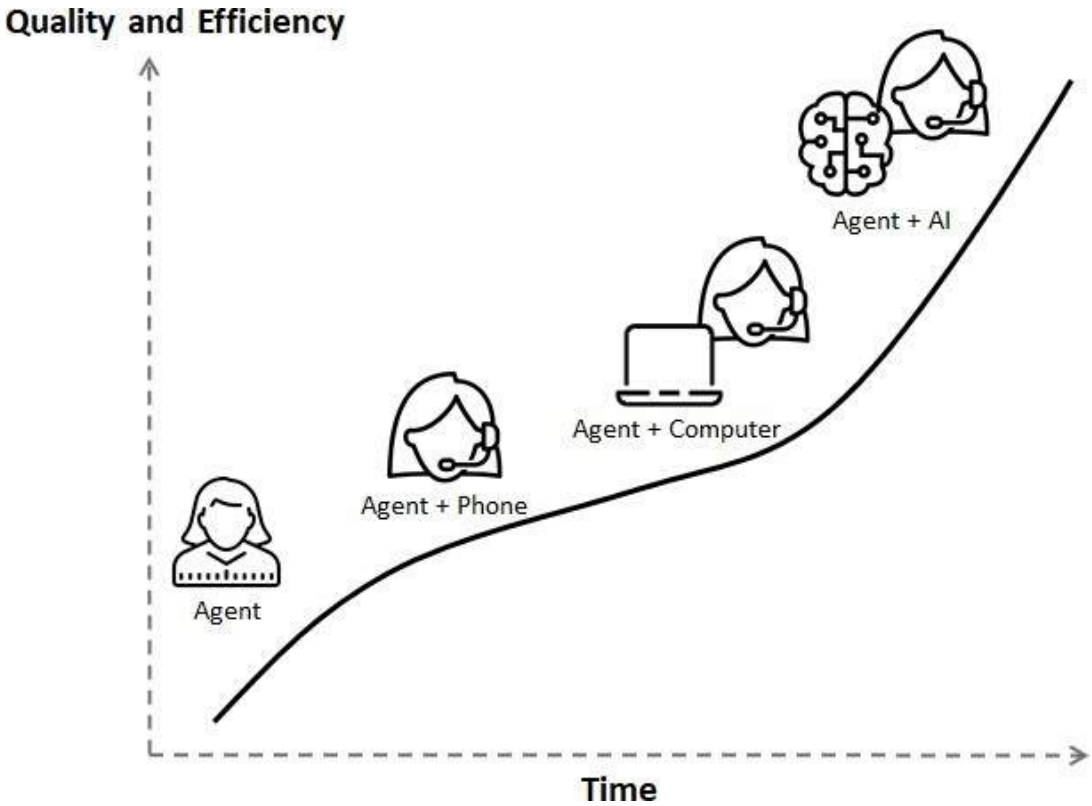
Third-level Chatbots use generative-based models, another subfield of machine learning. The main difference compared to retrieval-based models is that generative models don't rely on pre-defined responses and rather build up data from scratch. Generative models are therefore "smarter". They can refer back to entities in the input and give the impression that one is talking to a human. However, these models are hard to train, are quite likely to make grammatical mistakes (especially on longer sentences), and typically require huge amounts of training data.

# 04

# Hybrid Models: Leverage the Best of “Human and AI”

In a hybrid solution, Chatbots can leverage the advantage of retrieval-based models and combine it with a smart component of generative models. This is possible when the machine will not act on its own but uses human workforce for support instead. In case the Chatbot is not able to respond with a sufficiently high enough probability, it won’t just send a possibly wrong answer to the customer, but rather redirects the query to the most suitable available agent. The model would then provide the support agent with an AI-based suggestion based on the gathered data and probability. The support agents then review the suggestion, adapt or reject it, if necessary, and send the correct answer out to the customer.

Through this process the system incorporates that feedback and increase its intelligence after each human intervention. Next time the same questions is asked, the system remembers the intervention, and will act on it accordingly.



When you provide the system historical logs to train on, you're giving it a strong baseline of knowledge to start making useful suggestions, but the real learning happens when the agents start interacting with those suggestions by approving or rejecting, or by personalizing them. Only this joint approach ensures that the AI can be used effectively in the long run and continues improving at a rapid pace.

This ongoing improvement, referred to as continuous learning, is the process through which the algorithm improves and gets smarter around the topics it interacts with. The more often a topic comes up, the better equipped the AI becomes at handling it. The agents, simply by doing their job, are helping the model learn. The AI model, in turn, creates higher efficiency for the agents, helping them serve customers faster and more effectively.

AI is a robust and valuable solution, but it's not a robot that walks into the office and takes away all the jobs. AI in the contact center isn't scary, and it isn't going to take over the world. It's also not a magic bullet. It will not solve every problem overnight or make your customer service center disappear. AI is a tool — very powerful and effective, but still a tool. It makes human workers more efficient, companies more effective, and increases customer satisfaction.

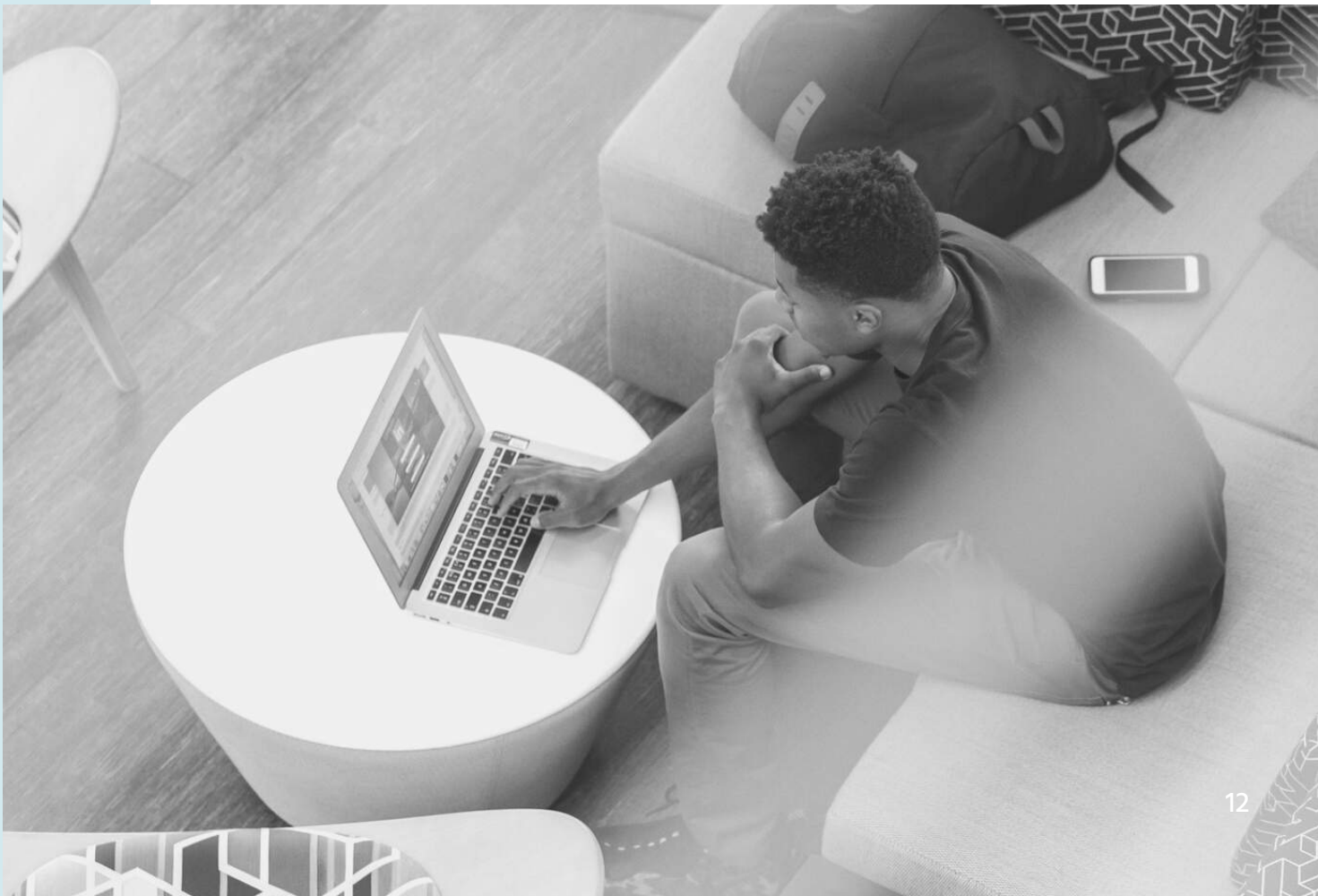
Most importantly, AI is not coming soon or in the near future. It is already here today.

# 05

# How AI Can Be Deployed in Contact Centers

A contact center manager's job is demanding. He is under constant pressure from an ever-increasing volume of messages, elevated customer expectations, balancing customer satisfaction (CSAT) scores, and the need to reduce costs, increase employee retention, and the constant demand to understand new communication channels. Customers now have more ways than ever to interact with a contact center, and they expect companies to respond faster, better, and more efficiently than ever before.

AI can help. It can improve business processes, save costs and create a unique touchpoint for customers or employees. Moreover, Customer Service supported by AI, offers an individual and convenient real-time communication channel without requiring unrealistic amounts of customer service agents.



The mistake people make is assuming that rule-based chatbots are the end-to-end solution for all customer service needs. Once a customer's need exceeds the narrowly scripted use case the Chatbot was intended for, failures and frustrations are inevitable. If you have a Chatbot that's programmed to tell you the weather, you'd better not try to order a pizza with it. It can't handle any issue that falls outside of its script and won't learn new things through customer interactions.

In a contact center, even though, customers ask repetitive questions where a chatbot might seem sufficient, the fact is that too many of these problems are varied or complex. Even simple questions in a contact center can often be surprisingly nuanced.

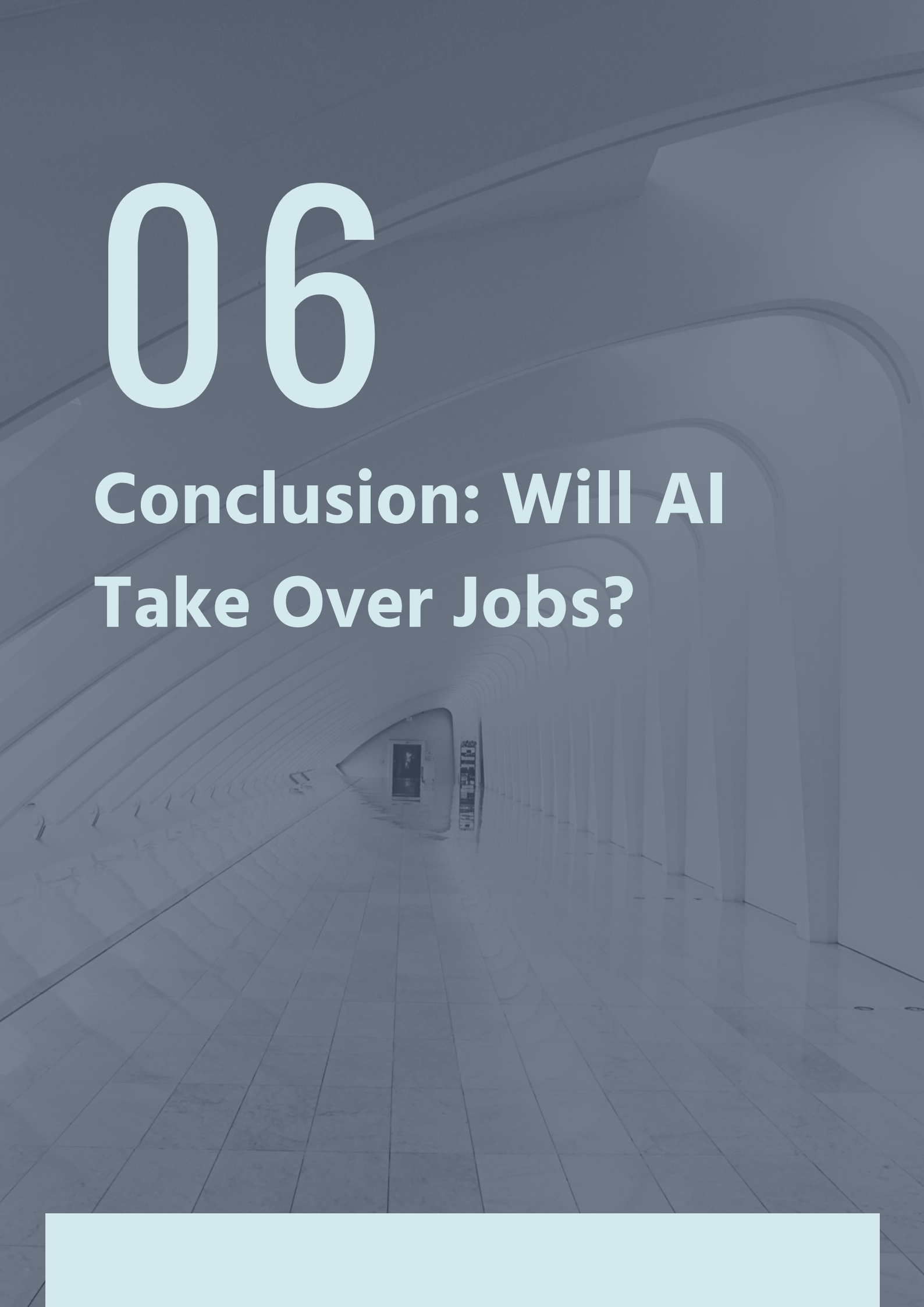
Hybrid AI models can be applied as a solution to this problem. The AI uses historical data to provide initial responses and then improves its accuracy through usage and experience.

**Human Agent**

- Complex tickets
- Human emotional intelligence
- Personalisation & humour
- Upselling opportunities
- Preventing churn
- Engaging customer

**Helpful AI**

- Answer suggestion
- Repetitive questions
- Process automation
- Case tagging
- Collective basic info
- Routing tasks



# 06

# Conclusion: Will AI Take Over Jobs?

There is a common fear that AI will replace human jobs, just as machines were able to take over manual labour tasks during the industrial revolution. However, studies have generated differing results on the estimated number of jobs at risk. A Pew Research study (2017) was nearly evenly split on those envisioning a future with more jobs created versus those predicting their loss. Other studies estimate anywhere from 14-54% of the U.S. workforce could see their jobs automated in the next two decades.

So yes, industries will be affected by AI and it will certainly change the structure of the workforce which we see today. However, many scientists agree that AI, in its current stage, is rather about empowering and helping humans to be able to focus on complex tasks and to be able to work more efficiently rather than being exposed to high volume repetition.

# 07

# About Us

e-bot7, was founded in 2016 by Xaver Lehmann, Fabian Beringer and Maximilian Gerer. e-bot7 is an AI SaaS platform to help companies engage and manage their digital customer service experience, providing real-time customer support pre and post-sale, via our hybrid Agent+AI solution. The technology can be used as a stand-alone platform (cloud & on-premise) or as an integration into existing CRM systems.

e-bot7 brings practical applications of deep learning and AI to customer service, helping agents to handle support requests more efficiently. The system analyses incoming messages, sends them to the right department, and provides agents with accurate response suggestions. This reduces processing time by up to 80%. Repetitive and recurring requests will furthermore be automated by the system. At the core of the e-bot7 system are complex NLP algorithms that have been trained on historical customer service scripts. Through the Agent+AI® solution, e-bot7 ensures that no wrong answers are being sent to the customers. Furthermore, the systems automatically train themselves whilst in operational use, resulting in an ever-increasing amount of automated answers. More information at www.e-bot7.com or contact us at info@e-bot7.com.

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