

Building chatbots without training with Neuro-Symbolic AI

Introduction

We live in a moment where business models must cater to customer demands to find their loyalty and remain competitive in a dog-eat-dog market. In this timeframe, [chatbots](#) have become key in customer service and lead conversion.

After a tumultuous couple of years with the COVID-19 pandemic, consumers who have seen how businesses have worked on improving their customer service to meet their demands during lockdowns now expect their favorite brands to excel in this field.

The way they communicate with brands and services has changed too. They no longer want to wait to interact with a human agent, but prefer more convenient, automated solutions. This is where chatbots have stepped into the fray, delivering instant support, on their favorite channels, whilst learning from experience and past conversations.

However, chatbots can be powered by different technologies and approaches. We often hear about machine learning and chatbots and how these bots can grow with the use of data. But with time-to-market being such an important factor to meet customer demands, the time it takes to train these chatbots can be an obstacle. There is also a need for transparency to ensure that the outcomes are up to standards or can be tweaked if necessary.

Neuro-Symbolic AI has stepped up as the best solution for deploying efficient chatbots swiftly by combining the progressive learning and personalization capabilities of Machine Learning, with transparent, contextual, and efficient lexicon and responses that can be launched in a matter of weeks. This guide will deliver insights into how chatbots work and how Neuro-Symbolic AI is the most innovative and efficient technology in the market to power a chatbot solution.

The various technologies powering chatbots

| Chatbots work in multiple ways. Different technologies have conditioned the success and behavior of these solutions. **But what are the key technologies behind the best chatbots?**



01. Machine Learning

Machine learning is one of the primary elements of artificial intelligence that characterize successful chatbots.

With machine learning, computer systems use algorithms and statistical models to perform tasks without instructions. Instead, they rely on patterns and build mathematical models based on sample data. With this “training data”, computers make predictions or decisions. In layman’s terms, machine learning technology uses algorithms to teach computers to solve problems.

This means that computers learn automatically without human assistance. They observe and look for patterns in vast amounts of data, using feedback loops to improve their predictions.

Automatically handling mass data that could often overwhelm humans is one of the clear advantages of machine learning, but it is not devoid of cons.

While computers learn freely from experience and data from conversations, biases can be introduced. There is restricted control over the output of conversations, which can lead to chatbots developing inappropriate behavior,

where it can be challenging to determine at what point things went awry. This can cause ethical and operational hazards.

Additionally, chatbots using only machine learning will only be able to answer a question if they have seen a similar question before. This is why bots need to be fed with data or trained to answer requests. Training and learning from patterns may require a lot of time and training data to launch [different types of conversational bots](#).

Chatbots powered by machine learning lack context and cannot respond to ambiguity without the available data. This can lead to unresolved requests.

When working with chatbots, machine learning can be applied with [Natural Language Processing](#) (NLP) to provide [AI-powered chatbots](#).

In this case, even with “Botmasters” available to review and correct the responses chatbots provide once it has been fed data, this can be time-consuming given the wide variety of terms or ways of formulating similar questions.



02. Symbolic AI

How can you explicitly embed human knowledge and behavior rules into computer programs? [Symbolic AI](#). When applying Symbolic AI to NLP, computers can learn the same way humans learn, for example, how to read and write. After learning the rules, [semantics](#), and [lexicon](#) designed by [computational linguists](#), Symbolic AI also gets smarter every day with every piece of collected data or improved knowledge base, in cooperation with human intervention.

When it comes to transparency, unlike the “black box” created by machine learning, everything is visible and understandable with symbolic AI. Botmasters subsequently have an easier job, where they can focus on developing new content or fine-tuning the engine rather than having to revise existing content consistently.

However, Symbolic AI also presents specific difficulties. As a rule-based system, the more rules added, the more knowledge the system receives. But, additional rules cannot undo old knowledge. While machine learning uses data to revise new parameters, it can adapt and grow and shift if it deems it necessary. Symbolic AI can be more rigid. This rigidity also poses restrictions when it comes to linking concepts and symbols.

Ideally, you would like to combine machine learning's growth and pattern detection capabilities with the lexicon and rule-based knowledge from symbolic AI. How can you do this?



I'd like to **travel** from **Paris** to **NY** in a **different date**

Can I **modify** the **date** of my **flight** **AE1234** from **NY**



Content Analysis

Object

Time

Destination

Transport

03. Neuro-Symbolic AI

We have seen that there is a need to combine the probabilistic and pattern-based capabilities of machine learning with basic common sense and without the need to waste valuable time waiting to accumulate the vast amounts of training data needed to produce decent results.

[Neuro-Symbolic AI](#) merges the best of existing technologies to produce better, transparent results with less data. By combining fewer layers of machine learning with symbolic AI, customers can create chatbots and [search experiences](#) that can be easily understood, controlled, and modified.

Neuro-Symbolic AI combines the best of both worlds. It leverages the advantages of Symbolic AI and combines it with machine learning's capabilities to learn from data. Consequently, chatbots that deploy Neuro-Symbolic AI provide several benefits:

Accurate responses

Machine learning can provide accurate responses in many cases, but there are exceptions where there is insufficient data or [machine bias](#) can affect the output.

Neuro-Symbolic AI can combine data analysis, identify stand-alone cases, and apply symbolic reasoning to provide substance to specific cases in a transparent and explicable way, resulting in more accurate responses.

Efficient data

Machine learning systems require vast amounts of data to function. Humans may need a few examples to understand a concept instead of the multiple data inputs AI algorithms require. Neuro-Symbolic AI systems require minimal training and can be quick to get up and running. This can allow businesses to get value for their money and ROIs more swiftly.

Transparency and control

How can you use machine learning capabilities without falling into the "black box" with opaque data processes? There are processes where it is essential to be transparent to justify how or why specific outcomes are determined. Neuro-Symbolic AI can make processes interpretable so that engineers can explain why an AI program does what it does. Neuro-Symbolic chatbots ultimately combine the transparency offered by symbolic reasoning with the processing power of machine learning.

On the whole, Neuro-Symbolic AI is a hybrid approach that uses semantic relationships to establish connections between a user's query and intent. While doing this, this process eliminates lengthy training and speeds up time-to-market for chatbots and other Conversational AI projects.



Steps to Launch a chatbot without training

| Deciding to look for chatbots that use Neuro-Symbolic AI is the first step. You then have to find a platform that delivers these automated solutions. Platforms like Inbenta's [Customer Interaction Management Platform](#) allow organizations to communicate seamlessly and manage customer engagements.

The combination of Neuro-Symbolic AI and NLP results in more intuitive customer interactions that are easy to deliver, manage and track. **But what steps should you take when launching these chatbots?**

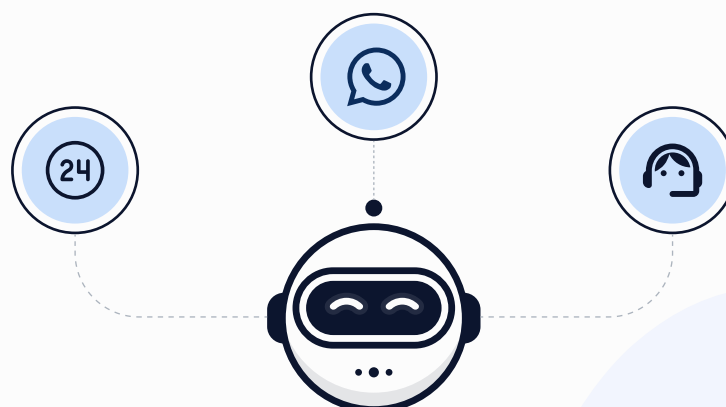
01. Define your needs

Businesses are increasingly aware of the benefits of chatbots, but when choosing what chatbot is best for you, you need to define your needs and objectives.

To do so, you need to visualize the best-case scenario for your target audience and what actions you want consumers to take to create this experience with the help of chatbots.

Whether you need chatbots to drive sales, generate leads, provide automated customer support or improve brand engagement, you will need to use a chatbot's strengths.

Features such as their instantaneity, 24/7 omnichannel capabilities, or their ability to qualify and direct potential leads to human agents, for example, can help you reach these objectives.



02. Design your interface with Neuro-Symbolic AI

Once you have defined your needs, you must design your ideal chatbot interface. You need to determine how your interface is going to look. The [most advanced chatbots](#) use natural [language processing and Neuro-Symbolic AI](#), such as Inbenta's conversational chatbots, to deliver the best possible user experience.

Your chatbot interface should be easy to integrate and deliver unique customer experiences supporting customers and agents alike. The use of Neuro-Symbolic AI, like will help them automatically detect user intent beyond a question while also leveraging context awareness.

By using Neuro-Symbolic AI instead of machine learning, implementation time will be reduced as your chatbots will not need to spend extensive data and periods of time being trained.

When designing your interface, consider [chatbot best practices](#), such as determining what personality you want to give your chatbot, how you are planning to present it, and how you break up your content to make it manageable and comprehensible. Additionally, each industry sector or business should have its own lexicon and tailor their chatbot's responses to their specific customer needs and context.

Inbenta's Neuro-Symbolic AI comes with a [pre-trained lexicon](#) that can match common, industry-specific and customer-specific knowledge and terms to contextualize interactions to each industry and provide depth to your chatbot without needing training.



03. Develop your knowledge base

With the interface design planned out, you need to create a thorough resource of knowledge to feed your chatbot. To do so, you must ensure that your chatbot can extract relevant information instantly and be able to present it seamlessly. This will require having a comprehensive knowledge base.

Inbenta's [knowledge management system](#) comes equipped with a Symbolic AI meaning-based search engine that is capable of interpreting human language and instantly answering queries.

A knowledge base should be able to swiftly derive accurate answers that are easy to understand and follow. When developing this knowledge base it is crucial to recognize the pain points customers have and regularly update it to make sure the information is always current.

An optimized knowledge base can help reduce human agent hours and handle a large number of customer requests round-the-clock. Additionally, a good knowledge base is the backbone of an efficient chatbot.

By combining a proficient knowledge base with contextualized pre-trained lexicon and semantic relationships, your chatbot can connect the user's query and intent to a rich knowledge base. To top it off, Neuro-Symbolic AI enriches this resource with a few layers of Machine Learning to learn from user behavior while already delivering results from day one.

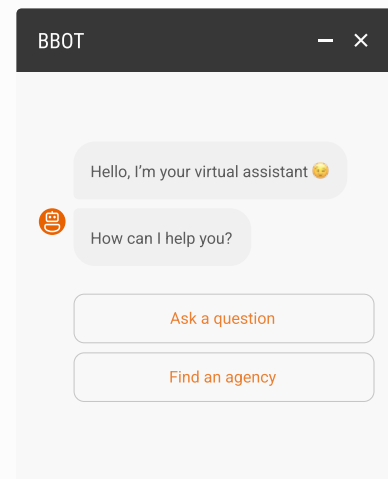
04. Implement your bot and beta-test it

With all the background checks in place, you then have to [implement your chatbot](#).

This phase is the moment to test its features, establish the chatbot metrics with staff and run it by the team to test the chatbot's responses, phrases and pre-defined texts. It is also the chance to discover any aspects that may hinder user experience and how to optimize your chatbot.

05. Launch your chatbot

When the building, learning, and testing of your chatbot are done and dusted, it is finally time to launch it in the market on the channels you have predetermined. However, the process isn't finished with the launch of a chatbot. From here, it is now vital to monitor its activity to see the results and add improvements.



Monitoring results and improving your chatbot

You should always look for ways to improve your customer experience. After launching your chatbot, it is crucial to monitor its activity and performance. In as little as a few days, there are already measurable results for your chatbot that you can use to monitor and improve performance.

By analyzing results and performing a gap analysis, you can set standards for which to measure your chatbot's efficiency. Metrics such as average handle time, mean time to resolve, completion rate, bounce rates, and return rates can help determine whether your chatbot is a success or not.

Additionally, this is the moment to persistently improve matching possibilities and add missing content that can help strengthen your chatbot and knowledge base to deliver an optimal chatbot experience.

Neuro-Symbolic AI is the missing piece of the chatbot experience

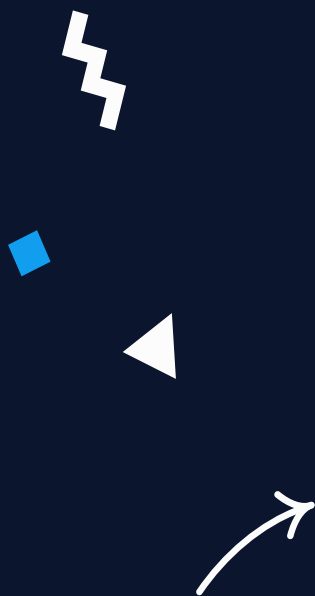
With AI increasingly appearing at the heart of customer service strategies, it is increasingly important to understand what consumers want and their very human queries and to respond to these in the best possible way.

Neuro-symbolic AI helps businesses keep customers happy by automating repetitive processes while maintaining contextual accuracy and getting results from day one.

If businesses, sales teams, or customer support teams are looking to boost customer satisfaction or deliver personalized interactions to generate leads while automating queries, this task is no longer an impossibility. Inbenta's Neuro-Symbolic AI can be a game changer.

By understanding human requests from the first attempt, customer support, sales or marketing teams can leverage the chatbot's capabilities by automating repetitive queries, engaging with potential customers, and providing support that will boost customer satisfaction and bring in prospects.

What's more, Inbenta's Neuro-Symbolic powered NLP combines exhaustive Lexicon and knowledge bases to ensure that chatbots can be up and running within weeks and without training, while still using AI to keep learning and delivering better personalization with each user interaction.



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Inbenta is a global leader in a new class of enterprise AI and semantic search technology for e-commerce and customer support.

Powered by natural language processing, Inbenta's products are used by over 250 companies to drastically boost self-service, enhance customer experience, increase conversions, and cut down on support costs by helping customers find exactly what they need.

Inbenta specializes in conversational chatbots, virtual assistants, e-commerce search, support ticketing, hybrid chat, and knowledge management.

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