

# DRIVING DIGITAL TRANSFORMATION

Conversational AI for Next-Generation  
Data Access & Analytics

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**CHATA**

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This guide is for business software developers and solution providers who are interested in monetizing and leveraging the data in their system, democratizing data access for all their users, and getting ahead of the curve with next-generation conversational AI technology for database access.



# Introduction

Today, businesses across every industry are constantly looking for new ways to evolve, expand, and drive revenue.

A fluctuating market and ever-present competition require organizations to employ powerful strategies and continual innovation to get ahead and stay ahead.

Over the last few decades, growth-minded leaders have capitalized on a powerful way to enable and support the decision-making processes that promote successful business endeavors: leveraging their data as a core resource.

Data has emerged as a key differentiating factor between businesses that stay agile and succeed, and those that struggle to find footing in a volatile economy. The ability to use data to make better decisions is increasingly vital at every level of an organization, from the C-suite to the sales floor.

Thanks to the widespread adoption of software, the tools and systems that businesses use are constantly creating and collecting massive amounts of data about customers, employees, product testing, supply chains, transport and warehousing, vendor relationships, and more.

The insights leaders and their teams can reap from their data is an invaluable resource for planning and improving business strategy.

This means that access to data is more important than ever.

With greater access to information, everyone is empowered to confidently make choices for the business based on the true story their data tells about what's really going on. Executives and front-line workers alike need to be able access and analyze their data on a regular basis to understand where things are at, why things are the way they are, and ultimately make the right calls about what steps to take next, as quickly and as easily as possible.

In a fast-moving market, rapid time-to-insights and even faster time-to-action are what separates exceptional businesses from the rest of the pack. The businesses that will come out on top are not only data-driven from a cultural standpoint, they are fully committed to making data-informed decisions at every step every process, in every department, on an ongoing basis.

To ensure that organizations can access detailed information and derive value from their data as efficiently as possible, they need access to solutions that empower them to discover insights on demand, facilitate deep exploration of the wealth of information in their databases, and weave data seamlessly into their everyday workflows.

Software developers have already caught on to the demand for better data access, often offering analytics and reporting capabilities within the software that is generating and collecting the data in the first place.

However, as the volume of data explodes, it's more important than ever for businesses to be able to find meaning—and therefore, value—in all that information. Ultimately, rich, detailed data needs to be available and accessible for it to be valuable to those who need to leverage it. We see two core ways software vendors can help every businesses make the data-driven decisions that shape and drive success, every day. Software systems need to offer:

- More flexible, on-demand access to the always-growing volume of business data.
- Tools and features that democratize access to detailed data and make insight discovery achievable for every user, regardless of individual technical aptitude or level of data literacy.

Conversational artificial intelligence (AI) built specifically for database access is the next step towards addressing these growing demands and meeting the needs of today's data-driven businesses, no matter where they are currently at in their digital transformation journey.

In this ebook, we'll present the case for conversational AI in the specific context of database access. Whether you build software or use software to improve your operations, this ebook will:

- Introduce conversational AI and how it can be used to democratize data access across user groups and entire industries, at every level of a business.
- Provide an overview of the business applications of conversational AI for database access and why this new approach to data access is vital to the success of tomorrow's businesses.
- Discuss the technological advances that lay the foundation for a powerful conversational AI system or feature that can integrate directly with any enterprise-grade database.

Let's get started!



# Chapter 1

## Our Vision for Conversational Technology & the Future of Data-Driven Business

We've seen it in science fiction for decades: the computer interface that responds when spoken to, sometimes in a [pleasant, yet robotic, female voice](#).

Now, Siri and Alexa are regular characters in our everyday lives. The science is no longer fiction, but this conversational technology is still seen as a novelty: virtual assistants that deliver the weather forecast and play your favorite song are relegated to the realm of leisure.

They're sold as experience enhancers for our everyday lives.

Brands seeking to bring greater personalization at scale are leveraging conversational technology to add this same sense of novel delight to their sales and customer engagement processes.

“ We believe that conversational AI will fundamentally transform human-to-computer interfacing.

Most of us have used or are familiar with chatbots and virtual assistants when it comes to digital customer service and online marketing interactions. However, as technology advances further, there are even more powerful applications for conversational systems that behave more “human”.

Here at Chata, we envision a world where it's not only possible to interact with computers the same way we interact with other humans, but that this becomes the new norm.

We see conversational technology extending far beyond its entertainment value: we believe that conversational AI will fundamentally transform human-to-computer interfacing.

Powerful and innovative conversational technology is the foundation of a new world where access to information is completely democratized.

It's a step towards a world where anyone can get what they need out of the systems and applications they already use, because interfacing with those systems will be as intuitive and as simple as having a conversation—the mode of communication that's second nature to all of us.

## Conversational Technology is Already Transforming Business

In the business realm, we've already seen exponential movement towards the implementation of conversational technologies and, in particular, an increasing demand for, and adoption of, conversational agents employed for a variety of business use cases.


[Oracle reports](#) that “[In 2020], 80% of businesses plan to utilize chatbots.” Less than a year prior, [Salesforce reported](#) that “58% of customers say emerging technologies such as chatbots and voice assistance have changed their expectations of companies.”

As business people and everyday users of various digital systems come to expect more straightforward interactions with online spaces like websites and apps, the pressure is on for more complex software to respond to users' increasing demand for greater accessibility.

“ By 2021, 50% of analytical queries will be generated via search, NLP or voice, or will be automatically generated. - [Gartner](#)

More and more of our work has moved onto computers, and our workflows increasingly rely on the use of applications and systems to store, access, share and use the data we need to do our jobs. Access to technology is becoming more widespread than ever.

In light of this, it's vital that computers and software solutions become increasingly intelligent not only to meet our evolving technological needs, but to simultaneously meet our evolving need for both ease and efficiency, too.



That means computers and software should be built to adapt to human capabilities so that it doesn't take specialized skills or training to leverage the power of digital innovation.

A democratization of access will inevitably lead to empowerment: more people will be able to get more value out of their software systems and the digital tools they use everyday.

This also means that software providers can open their systems to new user groups who need high-tech solutions, but don't necessarily have the specifically-skilled labor or resources that may otherwise have been necessary to operate them.

## **Conversational Technology Moves Data-Driven Culture Forward**

An area of profound opportunity? AI-driven business intelligence (BI), analytics, and data access.

Conversational agents made the ever-expanding world of e-commerce more navigable for all kinds of customers; conversational technology built to facilitate the difficult work of database exploration will make it easier for everyone to make the data-driven decisions that are necessary in today's shifting, competitive market.

[Gartner](#) predicts that “By 2021, 50% of analytical queries will be generated via search, NLP or voice, or will be automatically generated.”

Furthermore, Gartner's research shows that “By 2025, a scarcity of data scientists will no longer hinder the adoption of data science and machine learning in organizations.”

These statistics point towards a paradigm shift in the way businesses operate. With so much of our lives happening online, data capturing every action (from customers' buying habits, to salesperson success rates, to the real time status of frontline warehouse activities, and more), is abundant, and it's expanding every day.

Businesses know that information is a goldmine and they need access to all that data to sell better, invest smarter, and grow faster.

[Gartner also reports that](#) “Information as an asset is still in the ‘early adoption’ phase, which makes it a competitive differentiator for leading organizations as they focus on digital transformation,” and that “By 2022, 90% of corporate strategies will explicitly mention information as a critical enterprise asset and analytics as an essential competency.”

[McKinsey Global Institute](#) supports the observation that businesses are increasingly using data to improve, reporting that data-driven organizations are 23 times more likely to acquire customers. They’re also six times as likely to retain those customers and 19 times more likely to be profitable.

## Conversational Tech is at the Forefront of Digital Transformation Initiatives

We’re in the midst of massive digital transformation across industries.

To become increasingly data-driven, companies are catching on to the fact that it’s not just high-level executives who need access to information to make critical choices about the business. Employees at all levels of every enterprise need to be able to access and use the data contained in the systems they use every day to make strategic decisions and take informed action towards their goals.

“ To offer impactful solutions in this arena, conversational technology needs to be developed specifically for database access.

To serve every employee in every department, databases, and the tools that help humans draw meaning out of data (like BI and reporting and analytics software or in-app reporting and dashboard tools), need to be easy to access and simple to use. If not, the solutions are underused at best, and impossible to scale at worst.

To offer impactful solutions in this arena, conversational technology needs to be developed specifically for database access.

That’s where innovation in conversational AI enters to support the tasks that typically fall, and even end up restricted to, a software engineer, data analyst, or an in-house BI specialist.



This trend towards the empowerment and enablement of the everyday business person—the citizen data scientist—cannot be understated.

By 2021, automation of data science tasks will enable citizen data scientists to produce a higher volume of advanced analysis than specialized data scientists (Gartner).

## Improved AI will Take Current Technology to the Next Level

To achieve widespread adoption of data science and machine learning initiatives across organizations, conversational AI systems must not only advance to meet users where they are at, they must also be easy to introduce and maintain at scale for the businesses who implement them.

This type of conversational AI needs to offer a holistic user experience that puts exceptional communication first and ensures that understanding and translation is seamless, so users at any level of technical or data aptitude can get exactly what they need when it comes to accessing their data, simply by asking for it.



Every team member across today's leading businesses needs better data access than ever before.

Conversational AI built for database access will fundamentally transform the way people access and interact with their data.

As more businesses move towards a data-driven model and culture, conversational AI technologies will be in increasingly high demand from companies looking to arm their employees with the valuable information stored in their ever-growing databases.

At Chata, we believe that data is at the heart of the successful businesses of tomorrow.

Thanks to innovations in conversational AI and improved conversational interfaces, we see a future where everyone can access important information more easily and find insights in their data more intuitively.



# Chapter 2

## Why Today's Leading Businesses Need Better Data Access Than Ever Before

Businesses are constantly looking for new ways to differentiate themselves to get ahead and stay ahead of their competition.

In today's market, innovation, agility, and the ability to seize opportunities strategically are the cornerstones of the companies that are outstripping their competition and setting a high bar when it comes to digital transformation in their respective industries. Data has become a central pillar on which every business—from the global enterprise to the local coffee shop—are building their competitive advantage.

Data serves as a single source of truth about what's going on in a business, providing teams with the information they need to innovate with purpose, stay agile, and capitalize quickly on potentially lucrative opportunities as the global economy shifts around us.

## **Data is critical to business success today and scalable growth tomorrow**

Increasingly, access to business data is recognized as a critical part of every employee's job and, ultimately, [the success of an entire company](#). At every level of an organization, teams need to be able to access and analyze data before making decisions and moving forward with actions that have lasting impacts on the business.

Data is a vital resource across all industries, especially as technology advances and opportunities for capturing and leveraging data increase.

In a 2015 interview, GE's Jeff Immelt says: "A new jet engine might have a hundred sensors on it. These sensors have the capability to take continuous data about the heat of an engine, fuel consumption, the wear of the blades, the environment it's taking off in. And one flight between New York City and Chicago produces a terabyte of data. So industrial companies are in the information business whether they want to be or not."

This statement illustrates just how much data is generated in a brief amount of time thanks to advances in technology. And the ability to generate and collect complex data won't slow down.

“ By offering a window into the behind-the-scenes of every decision that's made, data sheds light on where improvements can be made going forward.

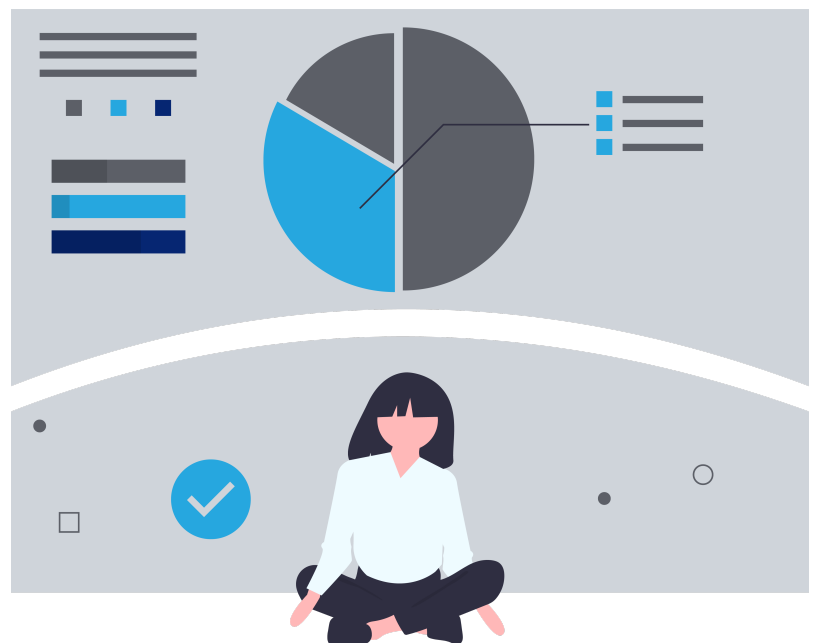
Today's companies know it's fundamentally necessary to leverage data to ensure things are running smoothly and to stay on track to reach their business objectives (in Immelt's case, information about the efficiency of an aircraft is invaluable under these high-cost, high-stakes circumstances).

With the volume of business data growing rapidly on a continuous basis, one of the roadblocks to wider adoption of data-driven processes and analytics is managing and accessing [all that information](#).

This data helps companies build better products, track customer behavior, offer better customer experiences, understand employee performance, and streamline operations. And that's just the tip of the iceberg.

Data is more than numbers and reports. It's a critical resource for every business across every industry.

By offering a window into the behind-the-scenes of every decision that's made, data sheds light on where improvements can be made going forward.



BI & analytics tools can employ conversational AI to expedite data access for users.



Through [our development of proprietary technologies aimed at enabling data access through natural language](#), we've seen a rise in the demand for business intelligence capabilities and embedded analytics in the digital solutions and software systems that today's businesses rely on.

While many of these software tools and systems offer powerful functionality, rigidity in the reporting that is made available, and the need to employ niche specialists to work with the data to effectively use these systems for data-related purposes, is still a predominant issue.

We need to continue to improve upon these solutions so that every business—and every individual employee—can access and leverage data more easily.

One of the emerging solutions to the issues that arise in the realm of data access and analysis is AI. Search-driven analytics and natural language solutions are cropping up in business software to help humans communicate more easily and intuitively with their data.

By employing the power of natural language (the words we use every day to communicate with one another) as a means of accessing databases and uncovering insights, business software systems will be able to provide users with the immediate and intuitive data access opportunities that are demanded in today's competitive business environment.

## **Conversational AI monetizes the data held in software applications**

Accessible data is the core resource that drives greater efficiencies in day-to-day workflows and enables the discovery of deep insights that can make or break the future of companies.

Data can tell us the underlying stories and details about everything from internal operations and product quality, to customer behavior, expenses, order statuses, and beyond.

Insights gleaned from business data help teams in every industry to identify opportunities, anticipate roadblocks, and stay agile as companies compete in a fluctuating market.

Data is also more prolific than ever before.

Thanks to the wide-ranging use of digital systems, data is captured at every step of every process: in the warehouse, on the sales floor, through advisory conversations or client meetings, within internal software or apps, through digital communications—the list goes on almost infinitely.

**"Businesses that successfully roll out and maintain AI initiatives are nearly three times more likely than those from other companies to report revenue gains of more than 10%."**

[McKinsey - Global AI Survey, 2019](#)

On top of providing the core functionality they are built for, business solutions must evolve to ensure that users have access to and can successfully leverage the wealth of data that's being collected and manipulated through these systems.

This evolution necessitates the adoption of AI technologies aimed at making data access and analytics tools simpler and more widespread, and therefore more lucrative and scalable for the business.

63% of [McKinsey's 2019 Global AI Survey](#) respondents reported revenue increases from the adoption of AI in some capacity within their businesses. Businesses that successfully roll out and maintain AI initiatives are nearly three times more likely than those from other companies to report revenue gains of more than 10%.

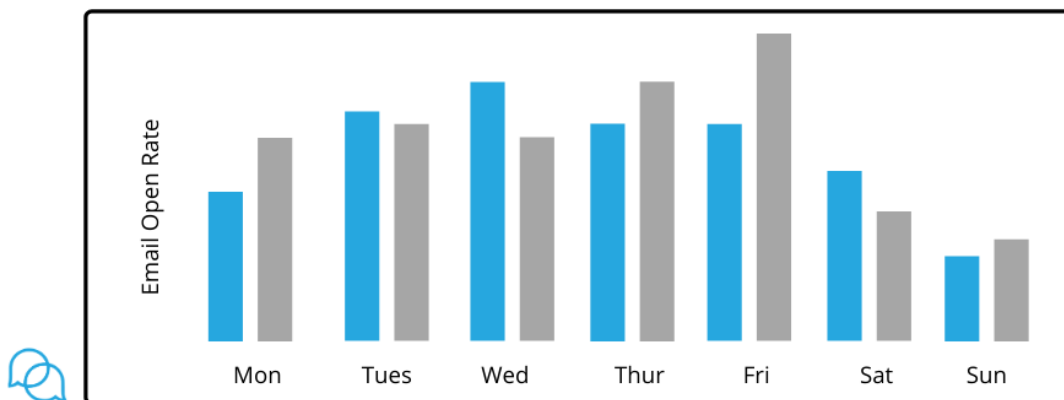
Say that a [marketing team member uses a CRM to plan, deliver, and analyze email campaigns](#). They trust the system to help them create engaging emails and distribute them to an aggregated contact list that has been identified and targeted for a specific purpose. At this point, the marketing professional already finds value in this software, but when the campaign is sent, they also need to know how well it's doing, what was successful, and what needs to be improved.

It's likely that this software is already collecting data points like open rates and click-through rates which the marketing team references to gauge the overall outcome of their campaign and discover insights that will help them send out increasingly successful campaigns in the future.

These reporting capabilities are a huge factor in determining why a marketing team would opt to use a powerful CRM: the more detailed data the system can deliver, combined with the overall ease involved in accessing this data, the more the team comes to rely on the system as an integral element of their everyday workflows.

If this system were to offer embedded conversational AI in its reporting and analytics toolkit, anyone on the marketing team would be able to find these meaningful insights just by asking questions in their own words.

Compare email open rates for campaign A and B each day last week.



Conversational AI makes it easy to explore data in real time and discover insights faster than ever before.

Where the team might have previously run full reports, set up detailed dashboards that needed to be monitored regularly, or called on the software provider's support team to help them discover game-changing insights about their campaign, they can simply ask questions as they come up and analyze results on an ad hoc basis.

The team can also benefit from increased flexibility and greater depth in their analytics process, which is something that's not typically afforded to those who don't have a data analysis or coding background.

With conversational AI, exploring data and getting answers to follow-up questions that arise is as easy as asking a question in natural language.

Instead of leaning on a software provider's team to write custom database query statements to slice and dice data to meet specific needs, any user is able to ask their own questions, seamlessly drill into underlying details, and explore tables in their database that may otherwise have been inaccessible or out of reach.

With elevated access to data, the marketing team can closely track details of their campaigns and unearth actionable insights on an ongoing basis, leading to greater optimization and higher potential for improved ROI on the next campaign they choose to launch.

## Conversational AI speeds up onboarding and adoption

In this era of digital transformation, a major hurdle faced by modern companies is scaling the ability to access and leverage data beyond those in leadership or specialist roles.

**McKinsey notes that:** "While hiring new talent can address immediate resource needs, such as those required to rapidly build out an organization's AI practice at the start, it sidesteps a critical need for most organizations: broad capability building across all levels. This is best accomplished by training current employees."

Employing top-tier data specialists can only become a lesser priority if emphasis shifts to training and empowering other existing employees to engage in analytical tasks that drive the business forward.



Agile teams demand rapid time-to-value, so they can adopt new technologies that drive better decisions for their business as quickly as possible.

But it's both expensive and labor-intensive to upskill employees to build data-driven culture and processes at scale in a sustainable way.

Companies not only need to keep up with the constantly shifting market, they also need to be able to seize opportunities to innovate and leverage rapidly changing technology to stay ahead.



The faster teams can onboard themselves to new software or features that offer the kind of accessible and flexible analytics capabilities today's competitive environment demands, the quicker an organization will see success.

“ In a data-driven organization, every team member at every level of the company needs to be able to leverage data to do their job well.

Selecting the right solutions that facilitate user-first experiences and intuitive onboarding process is crucial.

In a data-driven organization, every team member at every level of the company needs to be able to leverage data to do their job well. This includes “non-technical” employees who also need opportunities to access the valuable insights they require to perform at their best.

Traditionally, the ability to request reports or access data on an ad hoc basis may have been restricted to executives or leadership whose data needs are prioritized by constantly overwhelmed technical teams.

To offer the same level of data access capabilities across the organization at scale, seamless onboarding needs to be prioritized within software itself, and designed to cater to employees at all levels, particularly those without data-related technical skills.

When rolling out new AI and analytics initiatives company-wide, or introducing new feature functionality within an existing analytics solution, intuitive conversational AI technologies and easy-to-navigate interfaces can expedite employee onboarding, relieve pressure on internal resources within a company, and lead to increased user dependency on the software solution itself. Removing friction between users and their data is an undeniable win-win for every stakeholder involved on either end of a software-customer relationship.



With the help of conversational AI technology, individuals don't need to be explicitly trained to leverage a new tool or feature, they just need to ask questions in their own words to retrieve the data they're interested in.

With access to databases facilitated in this conversational manner, teams are free to focus on actually leveraging that data and digging into the critical details that lead to greater insights and better decision making, drastically reducing time-to-value and time-to-action.

## Enhancing functionality in software to drive better business

Software developers and business solution providers have a responsibility to build tools that help their users get work done efficiently. These tools should add value to existing workflows and empower users to produce impactful outputs for the businesses they work for.

“ Conversational AI can facilitate unparalleled data experiences within any software or application, democratizing data access across departments and entire businesses, and significantly reducing time-to-value.

It's no longer enough to help users get a job done: systems must also support the continual analysis and iterative improvement of the results of that work. Software systems need to enable users to uncover insights about the status and the impacts of the work they do, so teams can make informed decisions easily and efficiently, and continue to improve in the future.

The data, and the accessibility thereof, has to be a higher priority.

The real value of an embedded conversational AI system is how well the data feedback loop is integrated into the software itself, giving every user the opportunity to gain a holistic lens into their efforts from start to finish, all within the system they are already using.

Conversational AI can facilitate unparalleled data experiences within any software or application, democratizing data access across departments and entire businesses, and significantly reducing time-to-value when it comes to solution or feature adoption. With better tools for data access that integrate powerful conversational AI capabilities, anyone will be able to easily find the insights that they need to make an impact in their business.



# Chapter 3

## Introducing Intuitive Data Access to Business Intelligence with Conversational User Interfaces

Conversational user interfaces (UI) are rapidly taking over the digital landscape.

Thanks to messaging technology embedded in social media platforms and the proliferation of SMS-based communication, we're all more willing than ever to interact with our devices, and each other, through digital conversational mediums.

Voice assistants like Amazon Echo and Google Home enable us to quickly get answers to questions so we can get on with our day, fitting right into our routines as if they've always been there.

We've seen conversational technology reshape online customer service and digital marketing experiences, making it easier than ever for current and potential customers to get support, purchase items, and find the answers they need in seconds rather than standing by on the phone or waiting on an email.

[PSFK reports](#) that 74% of consumers prefer to use messenger-type systems such as chatbots or virtual assistants when they're looking for instant answers, with companies that use chatbots seen as efficient (47%), innovative (40%) and helpful (36%).

A conversational UI also makes these digital tasks as intuitive as having an interaction with another human, even though the experience is fully self-serve. Rather than navigating through a series of icons, buttons, or dropdown menus in a graphical user interface (GUI), conversational UIs enable users to reach their goal much faster, simply by stating or asking for what they need.

Subsequently, conversational interfaces have created the expectation of immediacy for all of us.

We want to order food at the drop of a hat, find tickets to concerts and book flights in a snap, and see if our friends are up for a camping trip this weekend, all within the hour.

We'd rather not learn the layout of a new app or tap through unfamiliar icons just to find what we're looking for.

We want immediate answers to our questions so that we can take action as soon as possible.

That means interface architecture needs to continue to evolve not only to meet practical needs, but also to facilitate the frictionless experiences users have come to expect of the apps, software, and digital systems they use all the time.

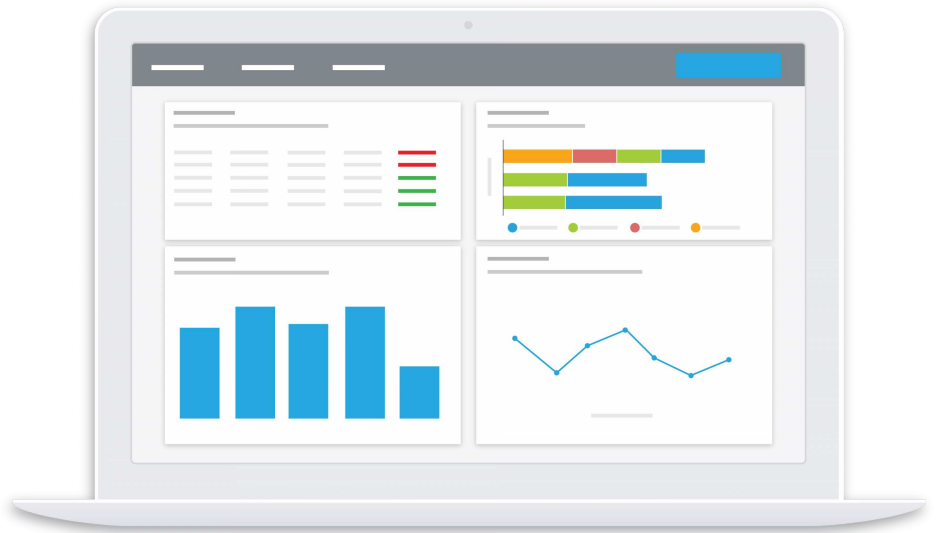
## Evolving the Graphical User Interface

GUIs have long been the status quo in the interface architecture landscape since decades ago when Apple and Microsoft made the personal computer a fixture in our everyday lives.


Most of us are comfortable using the GUIs we navigate on a regular basis, and that's no accident. It's the result of a learned competency, earned through years of navigating and understanding icons, menus, and keystrokes that were meticulously designed and improved upon to be easy for the everyday user to figure out.

While a GUI traditionally consists of visual elements that users interact with by clicking buttons or selecting menu items, a conversational UI allows users to perform these same actions more easily by making requests or asking questions in natural language (NL): the words they use in everyday conversation.

Conversational UIs make it possible for users to exercise greater control and personal preference through their digital experiences and find exactly what they are looking for in seconds, without needing to learn to navigate a complex (or simply new-to-them) interface.



Business Intelligence (BI) tools typically leverage a graphical user interface (GUI) to present data in meaningful visualizations.



“ A conversational UI can transform how people interact with digital spaces, eliminating the need for humans to learn within the system’s limitations.

GUIs still require an element of autonomous onboarding. We’ve all felt our muscle memory fail when we move from using a Mac to a PC or vice versa, or when attempting to access an app using a friend’s Android instead of our own iPhone.

As the tasks we need to do on a daily basis move to increasingly robust and complex digital platforms, the variety of GUIs that each of us are required to interact with is always expanding.

With each new GUI—a new software system at work or a new app on our phone—users have to learn the language of icons and the flow of menus all over again.

A conversational UI can transform how people interact with these digital spaces, eliminating the need for humans to learn within a system’s limitations and instead evolving the system’s capabilities to meet humans where they are at.

And humans always arrive, naturally, at conversation.

## **Driving Value in the Software You Build with Conversational Experiences**

When it comes to software, users are inundated with choice. Cost, reputability, and feature availability are just some of the aspects one might factor in when opting to use one particular software system over another.

But what makes one app or system ultimately stand out from the rest is overall ease of use and time to value (TTV).

With a traditional GUI, as noted prior, learning powerful yet complex software systems can create friction for users who just want to solve problems and complete tasks right away, without the extra step of learning how to navigate each element of that software's interface.

“ Conversational UIs matter in a digital space because conversational interactions are already second nature to humans.

A GUI augmented by a conversational UI can reduce time spent onboarding and significantly decrease TTV.

By implementing a conversational UI into an existing GUI, users have the option to completely bypass the GUI to streamline tasks and find what they are looking for, immediately.

An interface is a “space” that can be compared to a physical environment like a restaurant or a retail shop.

The UI is the architecture that users navigate digitally, just like customers move through a bistro or boutique, physically.



GUIs make it possible for users to easily find what they are looking for and get answers more efficiently.

Both of these customer service experiences combine elements of a GUI with elements of a conversational UI to maximize engagement and satisfaction. Conversational UIs matter in a digital space because conversational interactions are already second nature to humans.

A shop with a great layout, aesthetically pleasing displays, and clearly marked change rooms might be a good starting point in a customer's shopping experience, but these attributes aren't especially helpful when that customer needs to know if there's a size 7 shoe available in the back room.

That's where the conversational UI comes in: the customer approaches a staff member, asks for what they're looking for, and the staff member fetches it.

A powerful conversational UI added to an existing software interface works much the same way: giving users intuitive access to the features or information they're looking for by enabling them to simply ask for it in their own words.

## Humanizing GUIs for Loyalty & Engagement with Conversational User Interfaces

An effective conversational UI, when designed with the users' unique human motivations at its core, allows a product to conform to the needs of individuals, rather than the other way around.

“ Giving the user the power to get exactly what they want, when they want it, is the ultimate keystone for memorable, high-value experiences.

From onboarding and adoption to ongoing use and expansion, a great conversational UI supports a totally personalized experience because the system is responding to each individual and addressing their specific needs where they are already at, empowering the user as the driver of their own product experience. This contrasts the standard GUI-only model, which requires the user to conform to the rules and structures of the interface that is already in place.

Giving the user the power to get exactly what they want, when they want it, is the ultimate keystone for memorable, high-value experiences that ultimately lead to greater dependence on the software.

If users can complete tasks efficiently, answer questions immediately, and take action towards their goals (however ambitious or mundane) they're much less likely to churn and much more likely to continue to find value in the systems that offer such functionality.

We see conversational user interfaces becoming the norm across all digital platforms, spanning from app and software solutions to purpose-built web portals.

Conversational UIs applied to solve the problem of data accessibility will augment GUIs across existing BI and analytics tools (or improve built-in analytics features in software systems), and democratize access to insights and reporting for enterprise-grade operations.

We know that modern businesses rely on software that's designed with robust but often complex GUIs, and this is especially true in the context of tools that are built for data access, analysis, and reporting.

Though these systems are powerful, it often takes specialized training or niche expertise to get the most out of them. There's plenty of opportunity to make those systems easier to use so that anyone can get what they need when it comes to their data, but this requires a different approach.

“ Conversational user interface systems that act as “data messengers” offer a new way for companies to add value to their existing solutions.

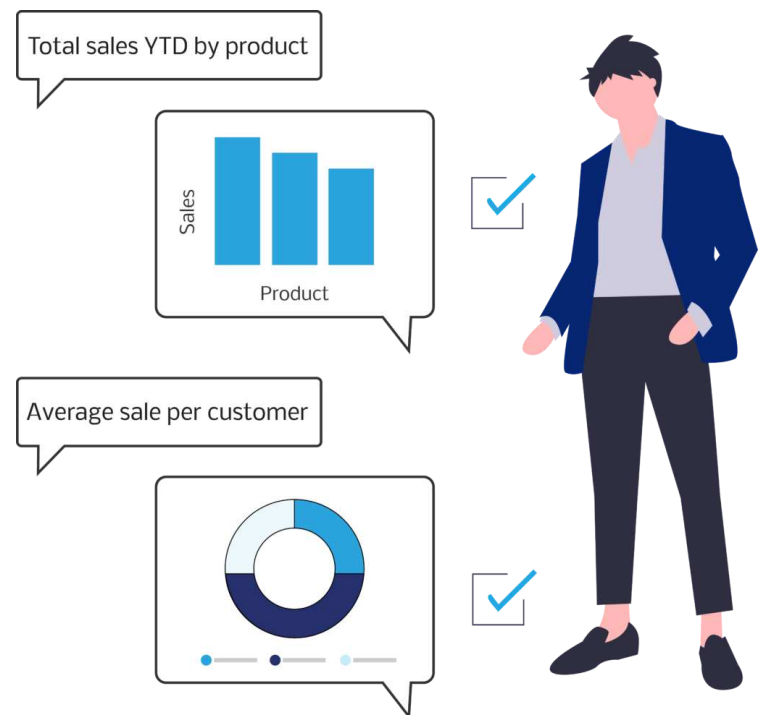
Integrating conversational UIs with software applications that store data or are used to perform analytics (such as business intelligence tools, inventory software, wealth management software, etc.) will not only supplement the power of a great GUI, it will profoundly increase the value users get from using the system as well.

In a data-rich world where users are reliant on information to make critical decisions, conversational UI systems that act as “data messengers” offer a new way for companies to add value to their existing solutions, boost the accessibility of their interfaces, and meaningfully improve their users' experiences.

## Conversational UI Increases Data Accessibility

The amount of data that systems are able to store has grown well beyond the real estate of the typical business user's screen. Large volumes of complex data displayed in an endless series of tables or charts isn't digestible, let alone helpful, for most users.

In the enterprise, specialists trained to write database query language can find particular pieces of information for other teams and initiate the process of transforming data points into useful insights. But demand for these insights is substantial, and reports can take days, if not weeks, to turn around.



Conversational user interfaces allow anyone to find instant answers in their data with self-serve capabilities.

Accessing data through code isn't available to everyone, and it's an intensive task that can't be easily done on the go or last minute.

BI and analytics tools have evolved to make visualizing data much easier, but the complex nature of data-related needs has resulted in equally complex GUIs that require a specialized skillset or, at minimum, some working knowledge of how to navigate these tools to be able to analyze the information and make meaning out of it.

Though many enterprise-level BI tools on the market enable data access and analysis using GUIs, there's another way to get more customers and users engaged with their data.

“ A conversational UI can act as a key touch point for those looking to access their database.

By leveraging conversational user interfaces backed by sophisticated conversational AI technologies, software and digital solution providers can add a powerful new dimension of data accessibility and functionality to the products they already build.

This kind of system is invaluable for users who want to access information and gain insights from their data without navigating complex systems or relying on skilled professionals to run and deliver ad hoc reports within their companies.

As the volume of valuable data grows, it needs to be made accessible for everyone. Conversational UIs are a solution to the need for seamless, low-learning curve database interactions.

## Offering the Data Access Users Demand

For platform solution providers and independent software vendors alike, especially those in the B2B space, offering some level of data reporting is part of most comprehensive offerings.

Behind the scenes at most of these companies, engineers or data administrators are managing databases and running ad hoc reports to make at least some of that data available and actionable for users. But this work is time consuming and expensive. For everyday users of software systems that store valuable business data, access to specialized resources like these is often limited or simply unavailable.

By using embedded conversational UIs designed for data access, users can simply ask for the data they need and get immediate answers. They can even analyze that data in exactly the way they accessed it: by asking directly, or querying, for that information. Workflows that would previously be interrupted because of a lack of access to data (or a lack of available personnel to immediately uncover that data) can be easily streamlined.



But not everyone who is interested in data is [trained in accessing it, let alone in leveraging it](#).

Let's return to the retail shop analogy. A customer might come into a store looking for a size 7 sneaker from a particular brand. While the customer is likely capable of going into the back room and looking for the shoe they want, they'd need to be versed in the shop's organizational system, granted permission to access that space, and be motivated enough by their potential purchase to do the work of sifting through the shelves of shoes themselves.

That's a big undertaking—especially if there's as many shoes in the store as there is data in a database!

The quicker option is to simply ask the salesperson, who is already well versed in the organization of the back room, to fetch the pair of sneakers and bring them back for the customer to try on.

**"Employees who identify as data-literate are at least 50 percent more likely to say they feel empowered to make better decisions and are trusted to make better decisions."**

[Accenture and Qlik - The Human Impact of Data Literacy, 2020](#)

## Powering Conversational User Interfaces for Database Access

Though conversational UI innovation has shifted the way we interact with many digital spaces, a common limitation of these systems is the technological power behind the interface.

Advanced conversational user interfaces that are designed for complex needs must be backed by powerful conversational artificial intelligence systems.

It's important to note that not all conversational UIs are driven by AI, but it's vital to understand that without a powerful conversational AI system working behind-the-scenes, any conversational UI intended to facilitate database interactions won't be able to provide the kind of seamless and efficient experiences we've been talking about.

Conversational AI built for database access needs to go a step beyond the technologies typically employed by chatbot builders, voice assistant developers, and conversational UI creators today.

# Chapter 4

## Building Conversational AI Technology that Supports Next-Generation Business Intelligence & Data Accessibility

Today, the most recognizable applications of conversational AI are undoubtedly chatbots and virtual assistants.

Across industries, chatbots have become a staple feature in customer service, sales, and marketing processes. Virtual assistants live on our smartphones or our countertops and are built to help answer simple questions and perform routine tasks like ordering groceries, setting calendar reminders, or messaging friends.

While the conversational technologies that are currently available have begun to reshape and enhance the way businesses and their customers approach many digital interactions, we believe that a new level of innovation is necessary to successfully bring the power and value of conversational AI and conversational UIs into the realm of data access.

### **Inside the Chatbots of Today**

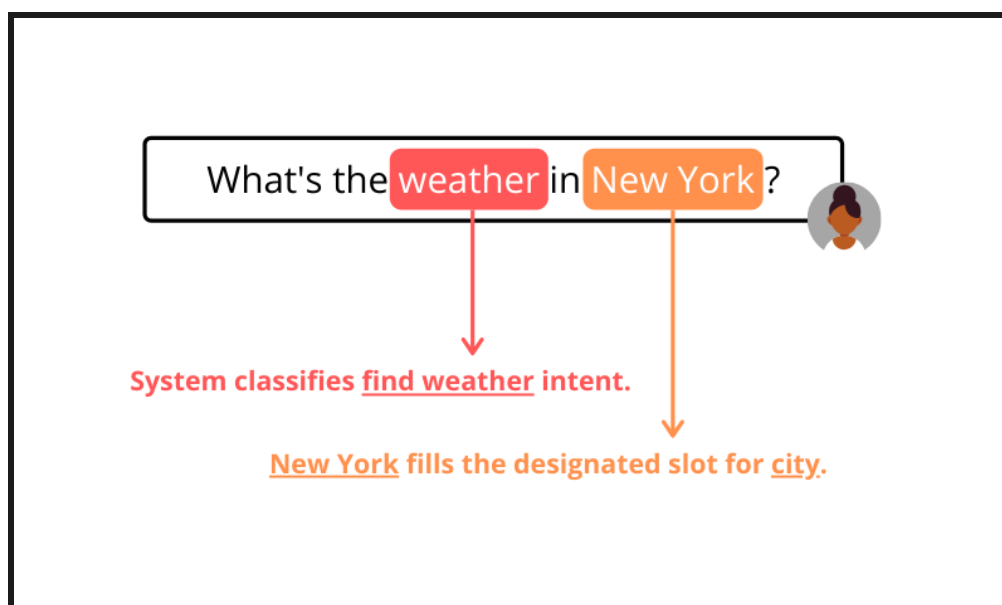
Most of us have experienced chatbots built into the apps, software, and web pages we use on a regular basis. Chatbots are typically available through a conversational user interface that was developed to mimic a messenger or SMS conversation with another human.

There are three common types of chatbots: rule-based chatbots, AI or machine learning-based chatbots, and hybrids of the two.

Rule-based chatbots typically leverage if/then rules that establish what kinds of problems a chatbot is programmed to be familiar with and match user inputs to pre-determined outputs. This requires building chatbot “scripts” that traditionally behave like a “choose your own adventure” story where users navigate through options in a series of decision trees.

While there’s no need for developers to train an AI system on a mass volume of data to set up a rule-based system, these chatbots require extremely specific inputs from users and often don’t provide a natural-feeling conversational experience, even though they may provide utility to an end user.

On the other hand, machine learning-based chatbots usually leverage intent classification methods which enable these systems to handle a much broader range of user queries, that is, questions or statements posed in the user’s own words, or natural language.




Intent classifiers match human words to a pre-determined intent and leverage slot-filling techniques to extract contextual details from user requests.

Natural language refers to human language, as opposed to “languages” that computer systems are programmed to understand. AI chatbots can provide a flow of dialogue that feels more human-like by processing users’ natural language to gain a level of understanding about what a user is asking or trying to achieve.

Along with intent classification, slot filling is another method that is leveraged by many AI-driven virtual assistants and chatbots of today.

When an intent is known (or classified) by a system but certain pieces of information are missing, a slot-filling system will direct the user to input these missing entities (words the machine is trained to recognize) to fill those pre-defined slots.



For example, if you ask: “What’s the weather in New York?”, the system uses machine learning to match [weather] to a predefined intent category like “find weather” and fills the entity [New York] into the slot designated for “city” or “location”.

Instead of creating a specific intent category that only allows a user to find the weather in New York City, the intent “find weather” can apply to other locations as well, thanks to the slot into which any city name entity can be filled.

Another example is making a reservation at a restaurant. “Make a reservation” would be classified as an intent — it’s the goal the user has or the action they wish to take — but entities like restaurant name [Joe’s Italian] and date and time [Friday, 7:00PM] must also be extracted from the user’s query and matched to their respective slots before the reservation can be processed by the AI system.

In the next section, we’ll provide a general explanation of how most intent classification systems work and why the limitations of this method prevent it from being a truly viable solution for facilitating conversational access to data.

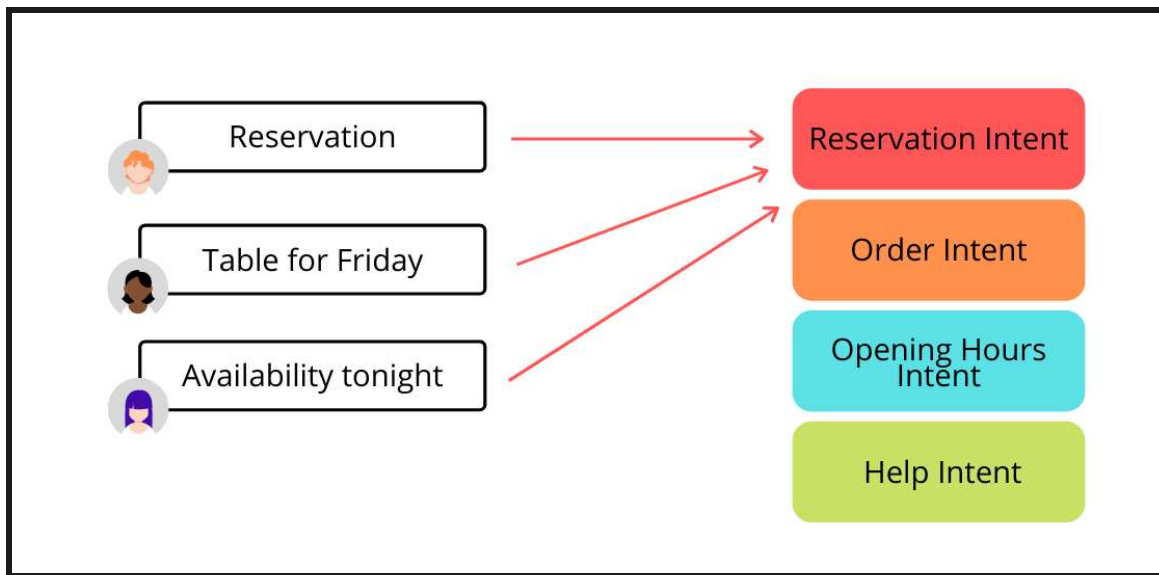
## **On Intent Classification in Conversational AI Technology**

Behind the scenes of most modern chatbots is an AI intent classifier. Intent classifiers perform the function of recognizing intent in a user’s natural language (NL) question or statement – again, the thing the user wants to do or accomplish – and categorizing that intent in order to return a relevant response.

AI intent classifiers can analyze statements like “How much does an annual Premium subscription cost?” These systems leverage both natural language processing (NLP) and natural language understanding (NLU) to deduce that words like “buy” or “subscription” are likely to indicate that the intent of this message is purchase-oriented.

The AI chatbot needs pre-defined intent categories in order to classify intent. These categories must be tailored to a specific subject matter or the unique purpose that the chatbot is built for.

If the chatbot is being employed for customer service at a SaaS company, intent categories might include [needs help], [demo request], [downgrade], [upgrade], or [card expired]. In the case of a hotel-booking chatbot, intents would be different and might include things like [make booking], [cancel booking], [change rooms], and [change travel dates].



Intent classification is most helpful when there is a limited range of intents expressed by users who typically interact with the system.

Once appropriate intents have been defined, the AI system is trained to correctly match or associate them with a variety of different words that a customer might use. This is where machine learning comes in.

A large volume of example data—known as training data—is needed to teach the intent classifier to learn how to match human words to predefined intent categories.

Intent classifiers can be combined with other machine learning methods that help facilitate an efficient and rewarding user experience, such as learning models that enable a system to understand some amount of context in natural language, or make predictions about what users may need.

But the ultimate goal of conversational AI technology is to close the gap between computers and humans, not to create a mediocre substitute for human-to-human interactions.

Considering that, intent classifiers are simply not a scalable solution for facilitating flexible, dynamic user experiences that feel as intuitive as a conversation with another person and yield the same results: namely, getting the exact information you've asked for instantly and easily.

In the next section, we'll talk more about why innovating beyond intent classification is a critical next step towards improving digital conversational experiences.

# Going Beyond Intent Classification

Let's look at an example of how humans might typically seek out information by considering the sentence "Who owes me?" This is the type of question that humans are equipped to answer, but difficult for computers to understand.

"Who owes me?" is a question asked in context and, though it might refer to a specific answer, there's a lot of ambiguity around what that answer might be.

“ Humans can deduce intent by factoring in real-life context.

In other words, the person asking the question has an idea of the information they're looking for, but they haven't clearly stated what exactly is owed. Maybe they're asking you to tell them who hasn't paid them back for dinner last night, or maybe they're asking which of their clients currently have outstanding invoices.

In this example, the entities that would be needed in order to classify the intent of the statement are not present.

Humans can deduce intent by factoring in real-life context (what the intention might be while talking to a friend versus speaking with the accountant).

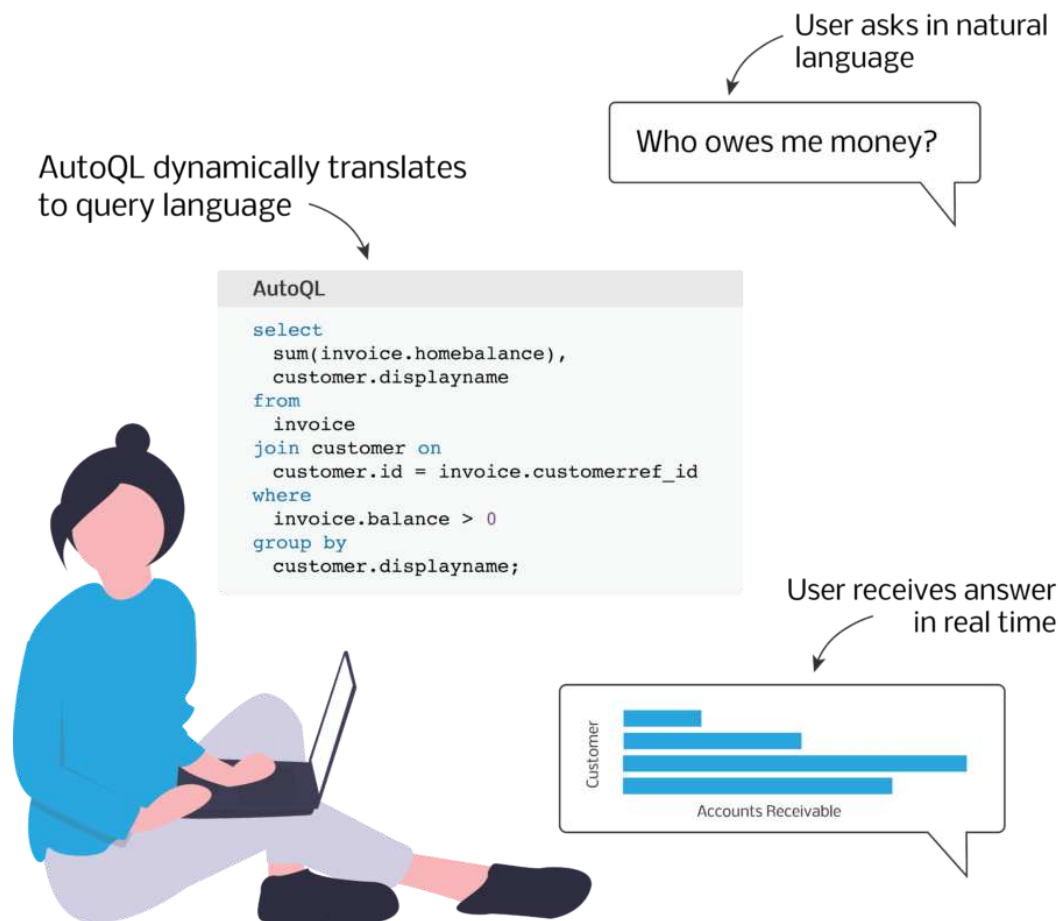
While an intent classifier might have some level of context if it's built for a specific purpose, say, consumer banking, it can only match a phrase to an intent that it already knows exists, thereby limiting its flexibility.

Unless every single possible intent is built and trained into a given intent classification system, there will always be gaps in the machine's ability to understand what a human is really saying.

Another drawback of intent classifiers is limited NLU power.

The AI system only has to understand human language insofar as it can apply an intent category to words that match, or can be associated with, its pre-defined list of intents. That means users frequently need to adapt the way they ask questions—their natural language—so that the AI is more likely to understand their objective.

This can sometimes feel like a tedious, even frustrating, game as users attempt to guess the words that the computer might know, while the system continuously returns the old refrain: "I'm sorry, I don't understand what you're asking for."



Our flagship solution, AutoQL, goes beyond intent classification: our system understands full natural language statements and dynamically generates database query language.

Here at Chata, we see a gap in AI technology aimed at making enterprise-grade database access faster and more intuitive. While intent classifiers have been built to provide better experiences in customer service and marketing channels, they don't offer the flexibility and level of intelligent understanding that users need to access and successfully leverage their data through conversation.

This is because [conversational AI technology built specifically for database access](#) requires a level of complexity that can't be achieved through the limited application of intent classifiers: it's simply too labor intensive to create and train the massive volume of intents that database users are interested in exploring.

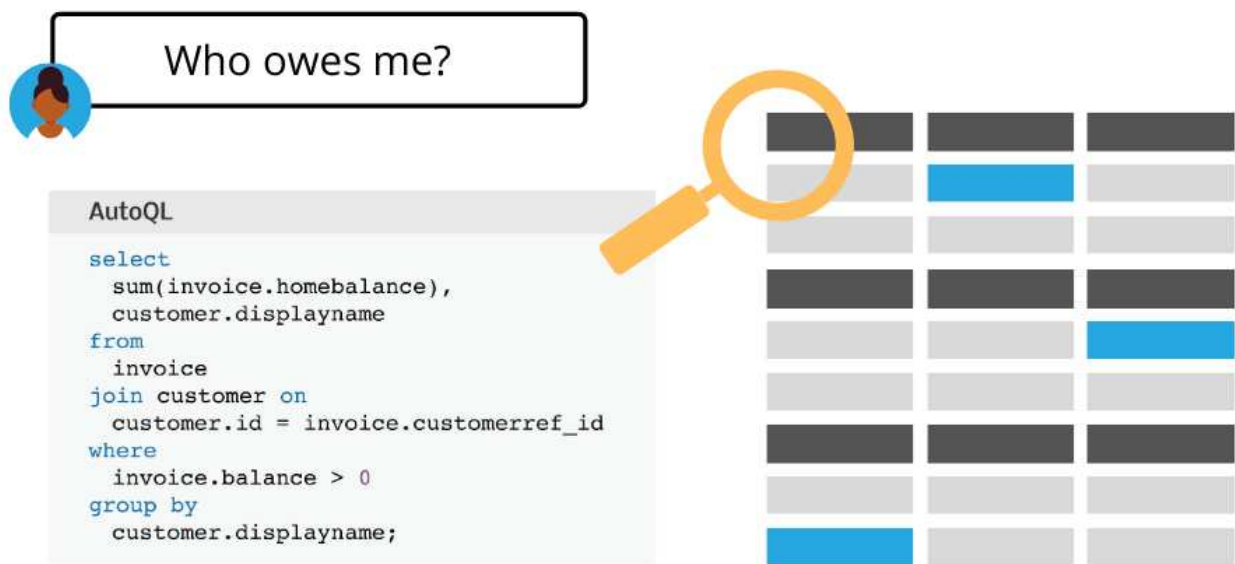
Behind this limitation is the sheer volume of training data that would be needed to encapsulate the scope of an entire database, understand the business logic tied to that database, and handle every type of question a user might ask about their data.

To fill this gap, it's necessary to go beyond intent classification and instead, develop AI specifically for conversational data experiences. In the next section, we'll discuss what it takes to build robust conversational AI technology for database access.

The next step forward is going beyond intent classification, and creating a system that can learn to understand meaning, not just intent, in entire human phrases.

Machine learning models that are trained not only to understand individual words, but that are also capable of reasoning through the relationships between those words to decipher the meaning of an entire natural language query, can make using a conversational system an even more human experience.

This means the computer begins to recognize that “Who owes me?” is synonymous with other questions like “Who’s in debt to me?” and that these statements mean the querent is asking for information about outstanding invoices (as opposed to who hasn’t e-transferred their share of the dinner bill, which might be an equally relevant question in a different context).



Typically, database query language statements are used to search for specific information in a database when users are looking for answers to their questions.

Teaching a machine to fully understand meaning and decipher context in natural language isn't easy.

Computers much prefer structured data, like programming language (code), to natural language, which is completely unstructured data: it doesn't fit nicely into boxes and its rules are somewhat arbitrary.

In the following section, we'll discuss Chata's approach to building proprietary technologies that enable unparallel data access with a conversational AI system that dynamically translates that unstructured natural language into the language the computer prefers: database query language.





# Translating Natural Language to Database Query Language

To a computer, the meaning behind natural language is irrelevant: it understands structured, precise commands and there's no room for nuance or ambiguity.

Computers run on rules, but the rules of human language are difficult for humans to fully understand or consistently abide by.

What computers do understand is how to execute algorithms and code. They can execute actions based on the instructions given in this particular, structured format.

So to get a computer system to do what you want it to do, you need to speak its language.

Because computers can't synthesize natural language the way humans can, when it comes to querying conversationally (using natural language), an intermediary step needs to occur between a computer's receipt of the human phrase and the subsequent action that can take place based on that request or query command.

Put simply, human language needs to be dynamically translated into the computer's language.

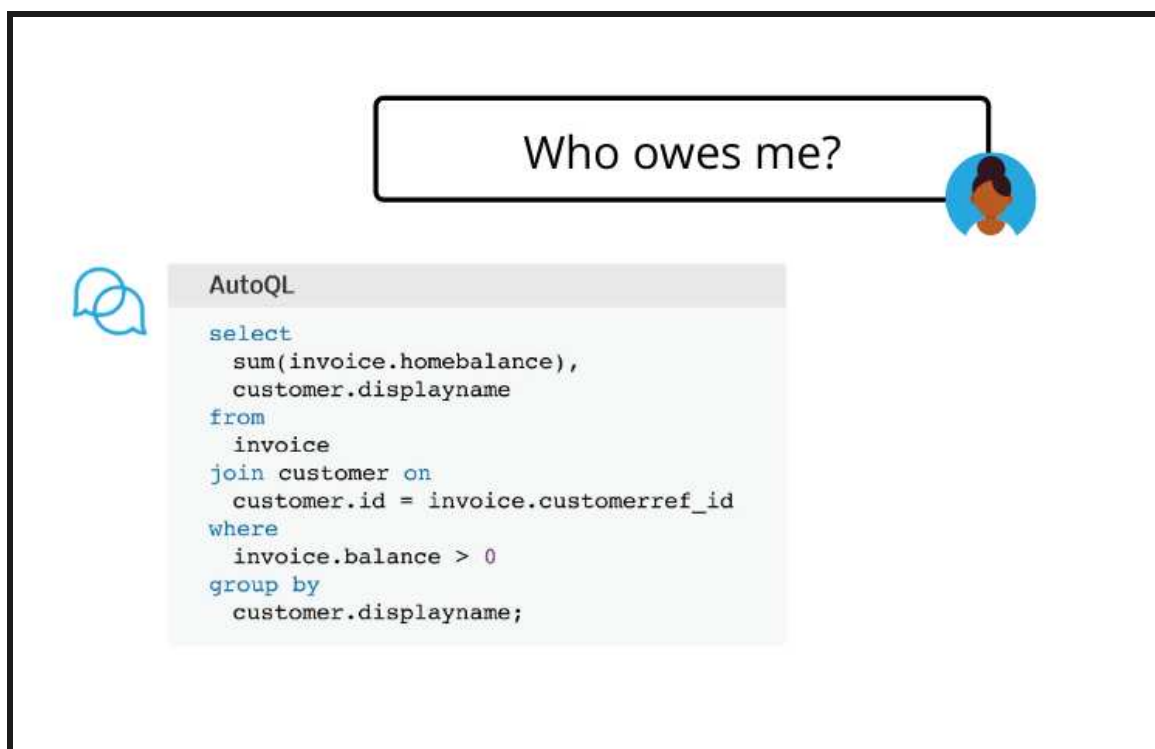
“ Any user can simply enter a natural language query—or ask a question in their own words—to receive information from their database.

When it comes to finding information in databases, specifically relational databases, computer systems are already equipped to respond to “languages” that enable them to carry out the process of searching through data and returning what the user wants to know.

A relational database can be searched and managed using a database query language like Structured Query Language (SQL). SQL statements are written and run to identify and retrieve data from tables, columns, and rows in a database so that a user doesn't have to hypothetically scroll through massive volumes of information in a single spreadsheet to find out, to return to our previous example, who owes them money.

Even though database query languages exist, humans are required to learn how these languages work in order to access data. Writing database query language like SQL is a specialized skill that the average employee doesn't necessarily possess. This means access to data is often restricted within organizations, and reporting bottlenecks develop as data demands grow well beyond the capacity of those employed to cater to them.

To bridge this skill gap and democratize the information contained in databases, we can make data more readily accessible to far more people by employing conversational AI technologies that translate natural language to database query language.



AutoQL dynamically translates natural language questions into database query language statements in real time.

This is where the need for improved Natural Language Understanding (NLU) and advanced machine learning come in: once the machine can understand the meaning (not just classify the intent) of a user's phrase, it should be able to dynamically create a SQL statement that reflects exactly what the user is requesting from the database.

With this kind of AI in place, any user can simply enter a natural language query—or ask a question in their own words—to receive information from their database.

This makes database exploration intuitive and accessible rather than exclusive or restricted to developers or other team members who have been trained in writing database query language.

It's a major step towards the true democratization of data, making it possible for anyone, regardless of skillset, to search and analyze an aggregation of data via natural language queries and commands.

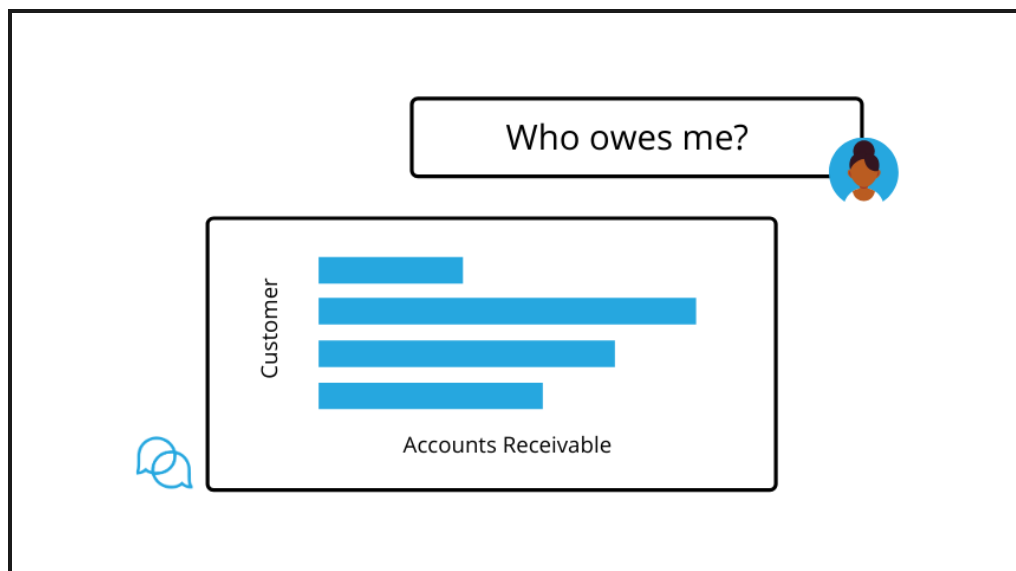
## Understanding NL, Understanding SQL

To be effective in meeting the needs of users, a conversational AI system for database access needs to deliver the outcomes that the user is expecting, every time.

While intent classification uses keywords in a user's query to classify specific intents and then matches these intents to predefined SQL statements, the user has to use very specific words that the system knows and has been trained to respond to.

In response, the machine may or may not run the SQL statement that most accurately reflected the user's intent, since the system would only be designed to have a single SQL option associated with that particular intent. This can result in a negative user experience, one that is likely to yield mistrust of the system.

Translating natural language to database query language allows for the same kind of flexibility and adaptability to nuance that humans expect from one another when asking for information. In returning to our earlier example, there are many ways to ask: "Who owes me?" but in the context the question is being asked, there's probably only one very specific desired output.



AutoQL takes into account the context of each query, understanding that the user is looking for information about their AR in this specific context.

To return an accurate answer, the AI needs to understand how to reconcile all the variables of the natural language query with the limited, but still extensive, variables of database query language.

So when a user asks: “Who owes me?” the AI system understands what the entire queried phrase means both in whole and in part, and dynamically generates a corresponding SQL statement based on that understanding. This means multiple unique SQL statements could be generated from natural language queries that vary only slightly in how they are asked by the user.

Much like a Paris city guide fluent in English and French, the machine can interpret natural language and translate that statement to an equivalent statement in database query language to return a meaningful result.

Importantly, the way the user asked for that information might be unique and be framed in a way that the translator hasn’t experienced before. But this is irrelevant because the system is designed for this purpose exactly: to decipher meaning by reasoning through the entire natural language input, dynamically generating a relevant SQL statement, and surfacing or returning the desired result.


A system that understands both human language and database query language acts like an intelligent interpreter so that no matter how a human chooses to ask for the information they want to access in their data, the computer can dynamically generate a SQL statement that will retrieve the relevant information that user meant to ask for.

## Conclusion: Business Intelligence in 2020 & Beyond

Conversational AI has the potential to revolutionize the way businesses use data to reach their goals. With increasingly innovative solutions for data access, every user can take advantage of the insights that their data can reveal to them in order to make decisions that drive revenue and positively influence the long-term success of the businesses they work for.

We see a future where everyone can get the data they need out of the systems they use every day, just by asking questions in their own words. Data will become the know-it-all colleague that everyone relies on for details about how campaigns are performing, which customers are churning, how quickly shipments are being delivered, the status of paid or unpaid invoices, and anything else they need to know to understand their current state and do their jobs better.

According to Gartner, [by 2022, 70% of white-collar workers will interact with conversational platforms daily](#). Conversational AI for database access will undoubtedly play a major part in this movement towards the widespread adoption of search- and NLU-powered analytics. This shift will help businesses move faster, make decisions quicker, and, ultimately, stay agile as our economy continues to evolve.



As we move into a new era of remote work, automation, and total adoption of cloud-based systems, the need for digital transformation across every aspect of every business is more urgent than ever.

Conversational AI for database access is a solution that's not only easy to incorporate into existing software, it facilitates zero-learning-curve onboarding, empowering everyone in an organization to easily bring data into their everyday workflows.

“ By 2025, global AI software revenue will grow to \$118.6 billion.

In 2019, Accenture reported that [three out of four C-suite executives believe that if they don't scale AI in the next five years, they risk going out of business entirely](#). They also note that those companies that scale their AI investments strategically will see three times the ROI compared to organizations that stagnate at a proof of concept or earlier stage.

An integral part of scaling AI successfully is ensuring a company-wide investment in, and commitment to, leveraging real-time insights to drive better business decisions.

When a newly introduced AI solution provides immediate and meaningful value by democratizing and speeding up access to critical insights, efforts to scale that solution across the organization will happen faster and promise greater staying power in the long run.

As more and more businesses begin to reach the zenith of their digital transformation process over the next several years, AI will prove to be a critical player in the game of bettering business overall. Adoption of AI technologies will enable these businesses to set a new bar when it comes to the expectations they have of the solutions they invest in, and simultaneously set a heightened standard for operational excellence across every industry.

Tractica predicts that [by 2025, global AI software revenue will grow to \\$118.6 billion](#). Moving into the future, conversational AI built for database access will activate the value of the ever-expanding supply of business data, becoming an invaluable tool for enterprises and mom-and-pop shops alike.

# AutoQL Provides Exceptional Conversational AI Solutions for Database Access

As a research-forward company, Chata's methods for providing the best AI solutions for database access are constantly evolving.

Our flagship solution, AutoQL, is built to facilitate unprecedented user experiences for people who increasingly require seamless access to data to make impactful decisions that benefit the businesses they work for.

The output of every natural language query is data returned directly from the source, enabling users to confidently leverage the information for further reporting and analysis.

A great way to employ the power of conversational AI is to make it accessible through a robust conversational user interface. We've built embeddable frontend components like the chat window-inspired Data Messenger for instant data on demand, and BI-grade Dashboards designed for total flexibility and rapid deployment, enabling users to set up comprehensive overviews of the metrics that matter most, simply by using natural language.

Thanks to our cutting-edge NLP and NLU technologies, automated training data generation techniques, and proprietary machine-learning models that enable dynamic NL to SQL translation, we're equipped to enable conversational data accessibility for even the most complex of enterprise-grade databases.

The technology we're building is our part to play in transforming the digital landscape of today and working towards a future where humans can interact with computers—and more specifically, their data—as intuitively and seamlessly as they interact with each other.

**Embed conversational AI built for the effortless, self-serve data interactions your users demand, in the software you already build.**

**REQUEST AUTOQL DEMO**