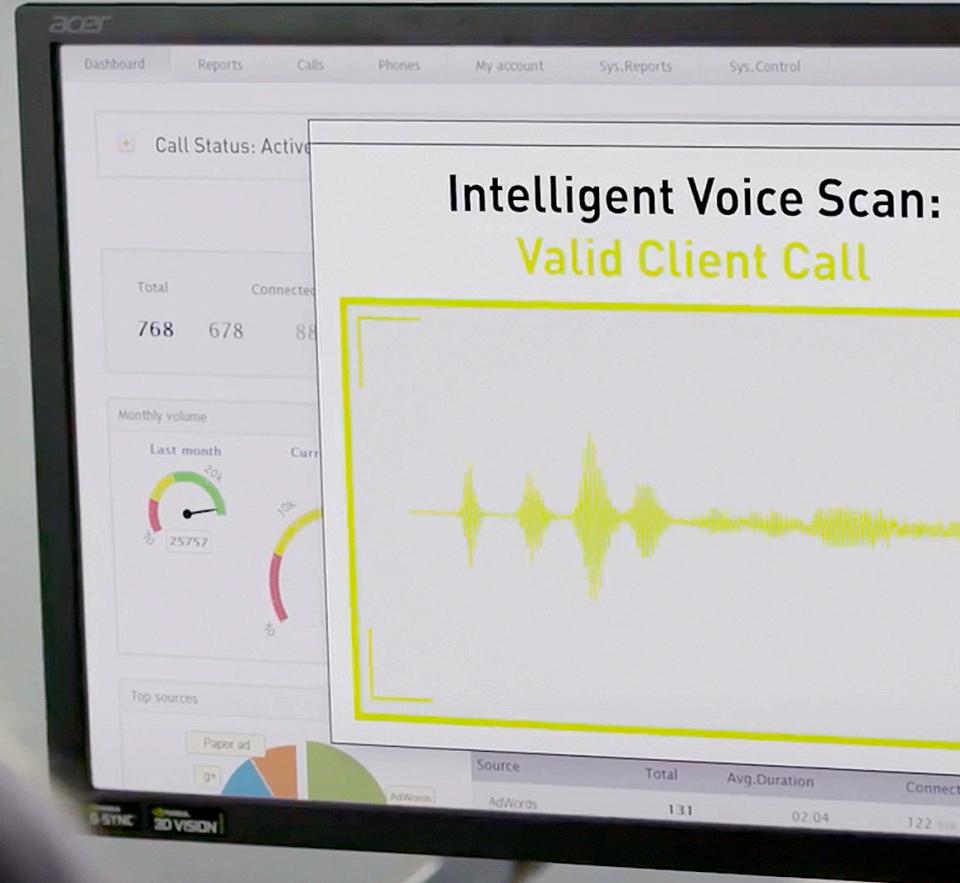




AI REDEFINING FINANCIAL SERVICES

Natural Language Processing
for the Customer Experience



CUSTOMER CENTRICITY CALLING FOR AI-POWERED NLP

A one-point decline in a customer experience score can result in a \$124 million loss in revenue for multi-channel banks, yet optimizing the customer experience (CX) has never been more complicated. Pre-COVID, customers were already trying to navigate within frustrating, rules-based automated systems and waited in lengthy queues to reach a customer service agent. Financial service providers were already struggling to meet customers' expectations and provide the transparency and support required by the onslaught of new digital services and apps.

Enter the pandemic, and both call centers and customers have been pushed beyond their limits. The influx of calls increased by 300 percent in just days, and as the pandemic went on, some reached an overall increase of more than 800 percent while agent capacity dropped by 20 percent, according to a report by Pindrop. The same report states that the median call duration has doubled to three minutes and the maximum call duration increased by 62 percent to 55 minutes as a result of high volume and low capacity.

All of this has been compounded by a closure of call centers and a need to allow customer service agents to work remotely, which raises additional concerns about data privacy and client confidentiality. Despite best efforts to restore lost efficiency, capacity is still 7.6 percent lower than pre-COVID levels. The data shows it's not possible to scale, let alone ensure the quality of customer experience, with humans alone.

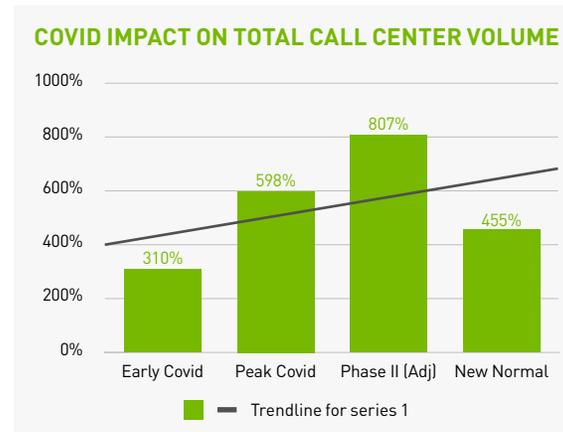


Figure 1: Pindrop, an enterprise voice security company, works with eight of the top 10 banks, three of the top five brokerages, and five of the top seven life insurers

Natural language processing (NLP) is a form of artificial intelligence that enables computers to process text and speech, interpret the meaning of words, sentences, and paragraphs in context, and respond in kind. When integrated with deep neural networks, NLP serves as the foundation of conversational AI applications, which aim to make conversations with machines virtually indistinguishable from those with a human.

NLP—ANSWERING THE CUSTOMER EXPERIENCE NEEDS OF TODAY

In 2021 alone, artificial intelligence augmentation will create \$2.9 trillion of business value and 6.2 billion hours of worker productivity globally, according to **Gartner**, yet in consumer banking, **58 percent** of digital journeys are still broken and require physical or off-line efforts to complete banking interactions. The sharp escalation in demand for customer service has brought about an unprecedented opportunity for financial services to use AI-powered NLP to build operational resilience while consistently delivering the personalized and frictionless experiences customers expect across channels.

Recent research from IDC shows that AI is already proving to be a powerful tool that enables businesses to transform CX delivery. Early adopters report around a 25 percent improvement in CX, improved margins, and enhanced competitiveness. In fact, banks that had previously invested in their digital transformation collectively experienced **better than expected earnings** in the first two quarters of 2021.

Banking and insurance transactions generate enormous amounts of data and interactivity, creating an advantage for those who quickly leverage it to develop uniquely competitive, customized, and scalable

AI-enabled interactions. As customer engagement becomes increasingly digital-first, this is essential, because the same services driving greater earnings are also driving the most competition. In a survey of 56,000 consumers by **Bain & Company**, as many as half of all financial product purchases were made at a firm other than the respondent's primary bank.

Getting the Most out of the Conversation

The digital transformation of conversational AI goes beyond better earnings. Once AI solutions are deployed, the operational cost of customer interactions drops dramatically. This translates into impressive savings and less measurable but equally critical benefits: By augmenting call center, IVR, and live chat engagements with AI, interactions are sped up and workloads are reduced, so agents can focus on high-quality customer service that meets individual customer's needs. They're also empowered with real-time insights that let them deliver more personalized attention.

At the same time, because these AI solutions are capable of measuring customer sentiment and making

context-aware analyses of interactions, businesses see a boost in quality control, issue resolution, and overall customer satisfaction.

Additionally, AI-powered NLP in the customer experience presents a unique opportunity to help close the digital divide for small businesses, senior citizens, and the unbanked. **McKinsey** said that "banks can help limit the impact of the likely downturn by building new experiences to help their customers manage debt, adjust budgets, and make full use of new government programs," forging strong post-pandemic ties.

Contact Channel	Legacy Cost per Event	AI Cost per Event	Savings
Call Center	\$6.00	\$0.20	97%
Interactive Voice Response (IVR)	\$1.00	\$0.20	80%
Live Chat	\$2.50	\$0.20	92%

DELIVERING THE CUSTOMER EXPERIENCE OF THE FUTURE WITH NLP

A Change of Topic

The pandemic has drastically moved the bar, not only in the scale of demand, but also around customers' expectations and the customer service agents who serve them. AI-powered NLP has become a critical component to scale, optimize, and compete as customers increasingly prefer digital self-serve and personalized, high-touch, automated services.

A recent report from Capgemini indicated that 54 percent of customers said they have daily AI-enabled interactions with businesses, including chatbots, digital assistants, and biometric scanners, and 49 percent of those customers found AI interactions to be trustworthy, up from only 30 percent in 2018. In fact, it's estimated that, by 2025, 95 percent of customer interactions are expected to be AI-enabled, and Gartner predicts that customers will soon manage most of their relationships with companies without human intervention.

However, as customers become more comfortable with and move toward fully AI-enabled experiences, the data shows that for a while to come most will experience a hybrid of digital and live assistance. AI-powered NLP

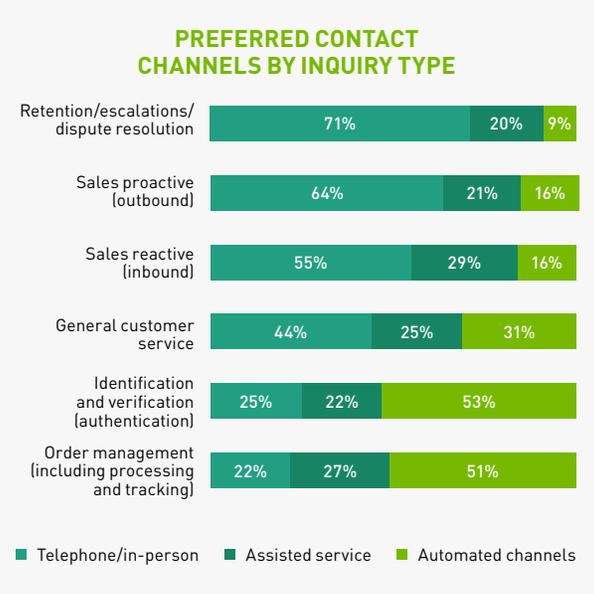


Figure 2: Forrester: The Three Customer Service Megatrends in 2021: Post-Pandemic Customer Service Excellence, January 25, 2021
 Note: Percentages may not total 100 because of rounding.
 Base: 748 respondents to NTT's annual global research study.
 Source: 2020 Global Customer Experience Benchmarking Report, NTT

applications are continually learning and improving, unlike traditional data analytics software. As the AI applications become more advanced, customer service agents are left with increasingly complex cases and often emotionally charged customers—requiring high levels of engagement and empathy. Eighty percent of service decision makers believe AI is most effective when deployed with, rather than in place of, humans.

The speed and quality of AI integration into the customer journey and overall business will define the service team and customer experiences of the future. Those who invest in enterprise AI capabilities and transform customer experiences will improve customer loyalty and increase new customer acquisition, driving profitability and market share at the expense of competitors.



Figure 3: Forrester: The Three Customer Service Megatrends in 2021: Post-Pandemic Customer Service Excellence, January 25, 2021

An Exchange at the Edge

Natural language processing has made simple queries that rely on complex data easy for users. Therefore, most customers engage with AI-enabled interactive voice, chat, messaging, and other applications well before the agent-to-customer interaction. By understanding the customer's topic, feedback, sentiment, and more, AI reduces friction (e.g., forcing customers to repeat information they've already shared) and ensures they're properly routed to a service agent who is set up for success with the customer's history, intent, and other data before the connection is made.

As customer cases requiring live assistance become more complex, service agents will require access to insights and advice in real time. While AI offloads routine tasks, it allows the agent to focus on what can only be solved by a human, while NLP simultaneously provides alerts to things like keywords, emotions, behaviors, and intent. Speech and text analytics score customer interactions, which can prompt coaching in real time by serving directions to the agent's desktop or tying in the supervisor for guidance.

Better still, AI and predictive analytics go beyond historical data, taking into consideration things like unified customer data and real-time market dynamics when providing the agent with recommendations for the best next response or action. All of this allows service agents to move from being solely reactive to delivering hyper-personalized, data-driven customer experiences with confidence.

According to a [report by ZDNet](#), 84 percent of service organizations with AI report improved prioritization of agents' work, 82 percent have increased first-contact resolution rates, nearly 79 percent have increased customer satisfaction or Net Promoter Scores, and 75 percent report having happier agents.

A Bigger Conversation

AI-powered NLP integrated throughout the stack allows the customer experience to be measured from end to end, moving engagement and empathy from the abstract to actual metrics with enterprise-wide impact. It can transcribe millions of calls per day and analyze data from multiple sources, including reviews, chats, and support tickets, providing service and product teams with previously unattainable insights at scale.

NLP will increasingly become embedded in every model, shifting the way decisions are made by the financial services industry.



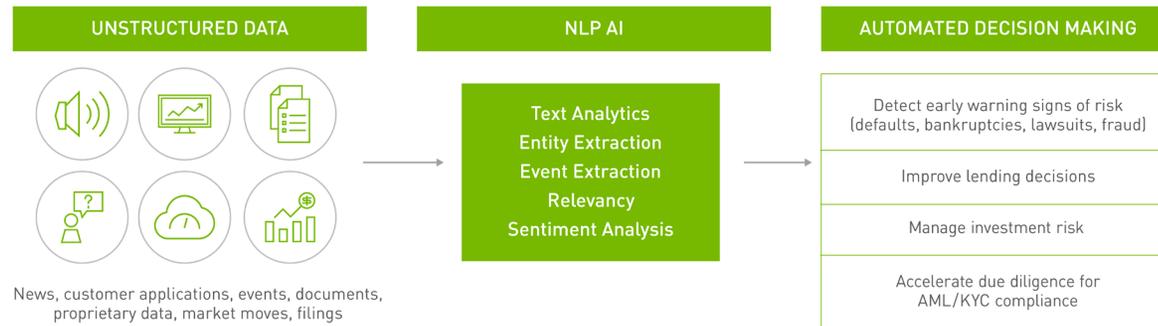
Figure 4: Service Professionals with AI Who Report the Following Benefits
Source: [ZDnet](#)

A SYNTHESIS OF NLP IN FINANCIAL SERVICES

Multimodal conversational AI takes multi-domain queries (speech, text, or computer vision) and determines which of the linked applications or bots to utilize when replying. This eliminates the need for users to interact with different virtual assistants for different tasks—improving standardizations for fraud

detection and creating an optimal experience for both customers and employees. GPUs provide the compute power required for multiple deep learning models to work in parallel, delivering high-quality results within a low-latency budget.

SYNTHESIS OF MULTIMODAL DATA FOR COMPLEX DECISION MAKING



HOW NLP POWERS THE MODERN CUSTOMER EXPERIENCE

NLP extracts signals from chat, voice, and IVR interactions and uses them for fraud detection.

Know Your Customer (KYC) and Anti-Money Laundering (AML)

This consists of three core components:

1. customer acceptance and identification procedures
2. transaction monitoring
3. risk management

Knowing a customer's personal details (including voice and behavioral biometrics), spending habits, financial history, and unique risk factors can reduce the risk of money laundering, terrorism funding, and other types of fraudulent activities. AI-powered KYC leverages big data in real time at scale to monitor larger datasets and better identify larger crime rings by reviewing data holistically.

Virtual Assistants and Chatbots

The integration of AI chatbots in the financial sector is expected to deliver a savings of \$2.3 billion by 2023, according to Juniper Research. Automated systems powered by AI can deliver highly personalized experiences while detecting the hacking of cards or accounts and helping with fraud detection. A quick verification message or call made by the chatbot can verify identity. It can also analyze details and patterns of transactions within an account to identify anomalies and potential fraudulent activity—quickly resolving the matter by communicating with the customer to confirm a transaction. Customers can also file fraud complaints quickly for better and faster resolution. AI chatbots are also available 24/7 and able to protect customers by blocking transactions and issuing alerts at any time. When paired with voice and/or facial recognition technology, the chatbot can compare it with the user's voiceprint and, if there's a failure to match, can notify both the bank and user in real time.

- > According to a [2020 MIT Technology Review](#) survey of 1,004 business leaders, customer service via chatbots is the leading application of AI being deployed today. 73 percent of respondents indicated that, by 2022, it will still be the leading use of AI in companies.
- > [Research](#) shows that chatbots are able to accelerate the handling of queries regarding invoice management by 2-3X.

Robotic Process Automation

Document processing utilizing optical character recognition (OCR) enables computers to read documents. It detects potential fraud by identifying exaggeration of claims, illegitimate claims, application fraud, font switching, and tampering of processed documents.

NVIDIA GPU-ACCELERATED NLP SOLUTIONS FOR AN ACCELERATED MARKET

Square Assistant

Square Assistant can understand and provide help for 75 percent of customers' questions, but training it to handle thousands of new tasks means its neural network models are growing and requiring more training. Square is using NVIDIA GPUs to speed up training and inference. Inference on average-size models run 2X faster on GPUs than CPUs, and inference on large NLP models such as **RoBERTa** run 10X faster on the AWS GPU service than on CPUs. Faster training also helps Square's AI developers iterate more often, resulting in even better models.

Cash App

Digital payment has gone from a financial services outlier to an everyday payment method. Whether making a digital purchase at a retailer or sending money to friends and family, the demand for digital

payments is increasing. To handle this growing demand, data processing time must be reduced to be more efficient. Cash App is able to train a model in about one-third of the time, using 3.5X more data—a total improvement of 10X using NVIDIA A100 Tensor Core GPUs on Google Cloud's AI Platform.

Floatbot

Floatbot, a software-as-a-service (SaaS)-based conversational AI platform, is helping fintechs and insurance companies increase digital sales, automate customer support, and facilitate renewals through AI-powered chatbots and voicebots they can build themselves. With their engines hosted on AWS and their models trained on NVIDIA V100 virtual GPUs (vGPUs), their ability to access deep tech, AI research, and the NVIDIA community has allowed them to develop a DIY bot-builder that deploys 90 percent faster—complete with chat- and voice-based

multilingual AI that's been pretrained with over 1,000 contextual AI rules customized for the insurance sales journey. Floatbot has increased their customers' qualified leads by 500 percent, reduced their customer support costs by 60 percent, and increased their sales by as much as 150 percent.

Clic

Clic's conversational AI platform, built in native Turkish, delivers a personal financial assistant that uses GPU-powered AI to deliver exceptional customer experiences. Turkey's İsbank utilizes Clic to deliver Maxi, an AI-powered digital personal assistant, to its 6 million mobile customers—freeing customer service agents' time to focus on more complex issues.



Learn more about **NVIDIA AI solutions for financial services** and **NVIDIA's Conversational AI Platform**, the GPU-accelerated SDK for building speech AI applications.

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