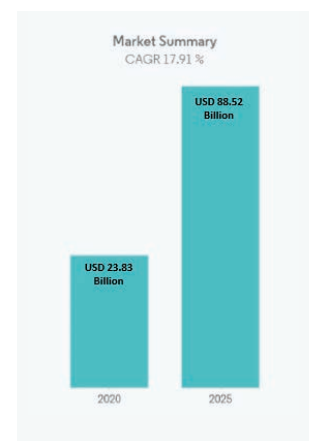


Powering Contact Center Transformation by using **Intel AI**

Executive Summary

Market Perspective

- According to the research published by Microsoft³ on Global Customer Service, 58% of customers feel the importance of Customer Experience (CX), and 61% stopped doing business with a brand due to poor CX and go for different brands.
- “Customer service and support leaders face increased pressure from the leadership on the role of the service function in improving operational excellence and growing the business. Given this environment, it’s unsurprising that customer service and support leaders’ top 2020 priorities are rooted in customer experience (CX), managing talent and data.”
- The global contact center transformation market was valued at USD 23.83 billion in 2019 and is expected to reach USD 88.52 billion by 2027, registering a CAGR of 17.91% during 2020-2027.¹



Allegra Ubbes
Senior Specialist, Advisory, Gartner

Consumer Expectations

The consumers now expect

- More flexibility like choosing their own medium - How, when and where to communicate
- Contextual interaction
- Faster issue resolution
- Proactive service
- Greater personalization

Hence, a successful contact center needs to have customer experience at its pinnacle.



Enterprise Perspective

- In the wake of the pandemic, employees are more likely to want flexible working conditions. According to Gartner, 45% of the global knowledge workforce will be working from home two to three days per week by 2022. Nearly one in five will work remotely all the time.⁶ This aligns with the findings from our Evolution of the Contact Centre research initiative with the Call Centre Management Association (CCMA), which show more contact centres moving to hybrid working models after the pandemic.⁷
- While hybrid working will bring in benefits for contact centres, it also has its share of new challenges. This includes keeping agents engaged, motivated, and connected with their teams and the wider organization.
- According to market research by McKinsey, agents who are engaged and regularly monitored are 3.3x more likely to feel empowered to resolve customer issue. So, providing them the best possible tools can in turn increase an organization's CX rating.⁴
- A survey on over more than 2,000 agents conducted by Gartner in 2018 found that contact center agents use an average of 8.2 different systems and tools to resolve a customer issue. Not surprisingly, just 16 per cent said their tools helped them handle customer issues.⁵
- In the recent past, multiple organizations have publicly stated that there is an increasing gap in handling the surging volume of calls. The key then is to arm and enable agents with effective tools to deliver this experience.
- Providing a smooth and stimulating agent experience will become critical to maintaining productivity and retaining talent. Agents and supervisors need to be provided with a modern digital ecosystem, and equipped with better tools and frameworks to realize these experiences.

Contact Center Modernization – Mindtree Point of View

The evolution of a contact center involves two broad approaches:

1. Core ecosystem modernization
2. Disruptive innovation tools using emerging technology like Artificial Intelligence



Core Ecosystem Modernization:

An enterprise's current ecosystem should evolve to create a harmonized, modernized, and integrated ecosystem blueprint as depicted in the figure below. If not, the below problems may arise:

1. Supporting remote/ hybrid model of working
2. Disparate systems with dissimilar processing, infusing potentially damaging experiences and inefficiencies
3. Systems not being able to respond or adapt to new age digital experiences
4. Increasing cost and burden of legacy systems

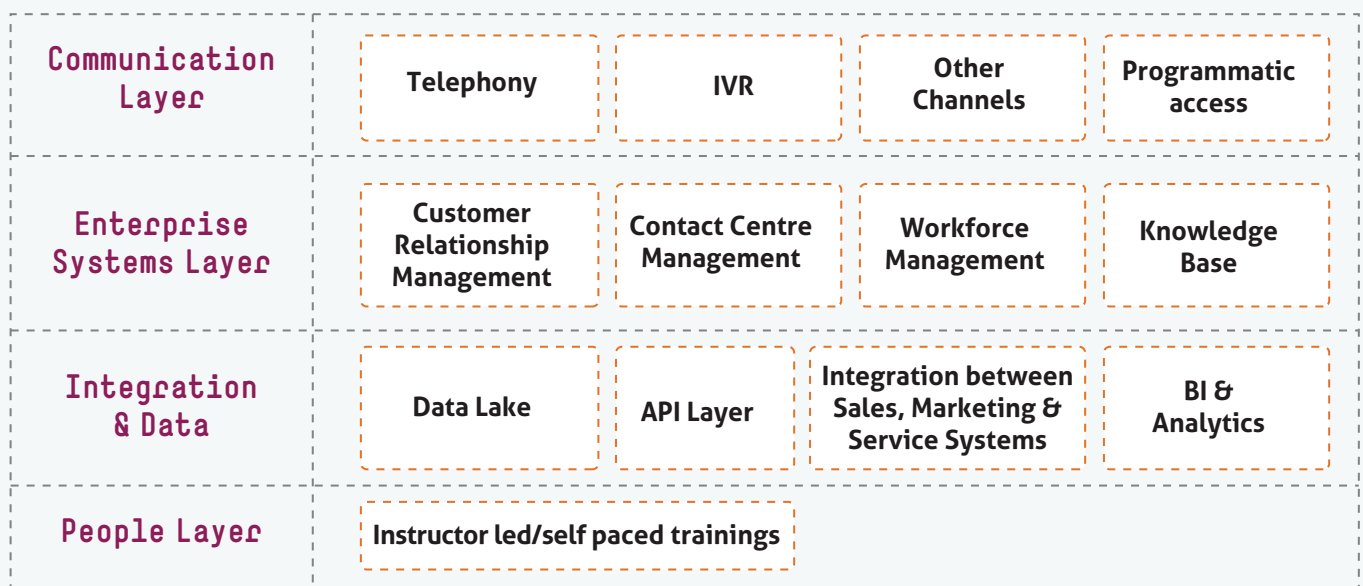


Figure 1: Modernized Contact Center Blueprint

Disruptive Innovation – Led by Artificial Intelligence:

With the evolution of emerging technologies and state-of-the-art Artificial Intelligence (AI) models, we can unlock significant opportunities to assist the agents in delivering a better customer experience.

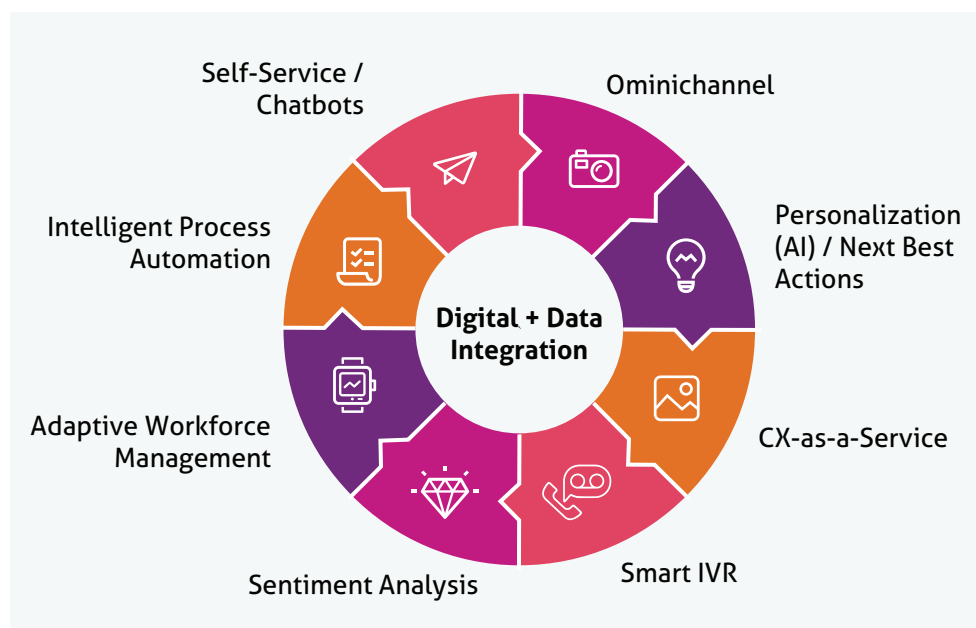


Figure 2: Pillars of AI-driven Contact Center Innovation



There are several areas where AI can help contact centers:

- **Omni Channel Self-service**

Virtual Assistance and Smart IVR are on the rise to help customers with the flexibility of choosing their medium of communication anytime and anywhere they want

- **Agent Assist**

Assisting agents in pre-call training to in-call cues to post-call analytics - Powered by a set of dashboards driven by applied AI pipelines

- **Intelligent Automation**

Including in-call intelligent routing to post-call summarization

- **Insights and Analytics**

Including post-call omnichannel quality dashboards to mining conversational insights - To drive appropriate interventions as well as improvements in products and services

Example of use cases and benefits

Let us talk about couple of use case examples and how some of our customers are realizing benefits.

- First example is of a brand servicing 1M+ consumers with 800+ agents.
 - From a consumer standpoint, the repeated feedback was long wait times and once they reach an agent, the customer had to repeat their issue every single time. We all have faced it. Both experience killers.
 - Why did this happen? We found that on an average, an agent spends up to 10 minutes after every call just to summarize, create a disposition, and finalize the next action steps before they can take another call. Many times, the summaries were found to be not consistent.
 - The brand is a perfect candidate for our Cognitive Customer Service. With our Intelligent Automation, it now takes a mere 10 seconds. With a more consistent summary!
- The second example is for a client who wanted to monitor, track and improve the quality of all their touchpoints
 - This was done manually based on random sampling.
 - For eg. every 10-minute call would require more than 10 minutes of reviewing. This is not factoring in the longer calls.
 - Not scalable. Also, random samples can misrepresent the picture.
 - Another perfect candidate for our Cognitive Customer Service Suite.
 - Our insights dashboard now delivers this for 100% calls covering all channels.
 - A more accurate and easy way to view CSAT, drill down and develop the right interventions.

The below figure shows many more such possibilities and opportunities waiting to be unlocked. In the following sections, we will discuss on how the Intel framework helped in the realization of an AI driven Contact Center Innovation.



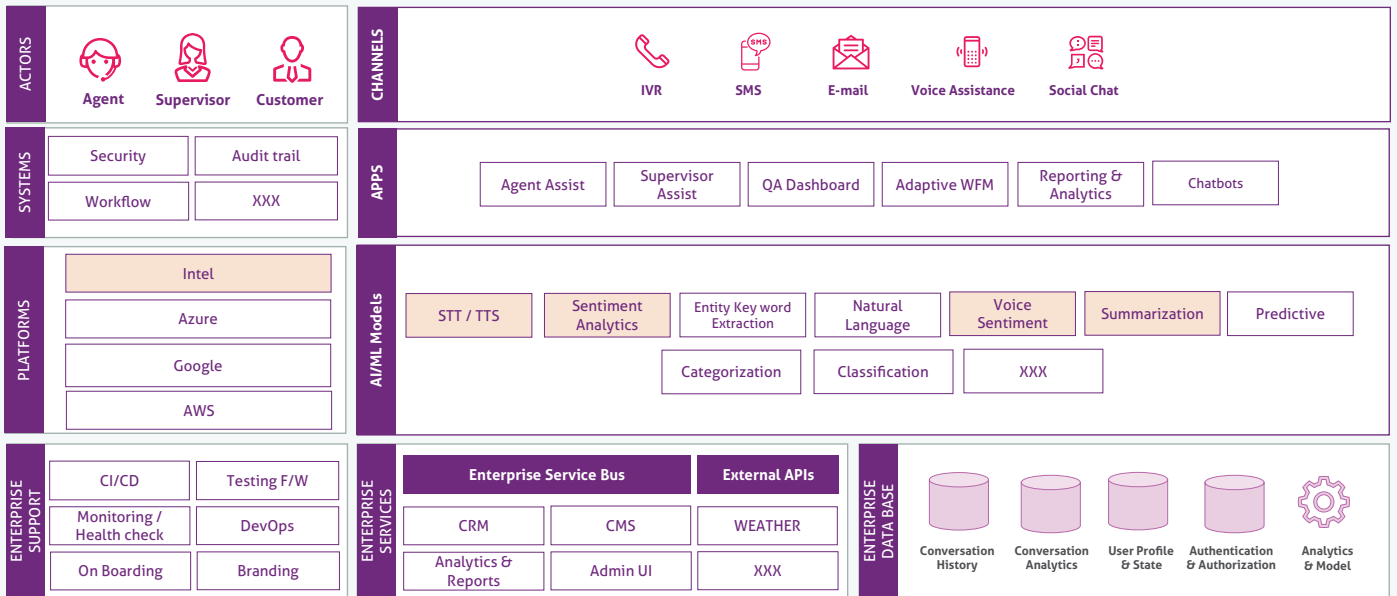


Figure 3: Building Blocks of a Cognitive Contact Center

Mindtree AI Solution

The combination of state-of-the-art AI models, powerful hardware and software have evolved significantly over the years, which has positioned AI at the forefront to assist agents in delivering the best experience.

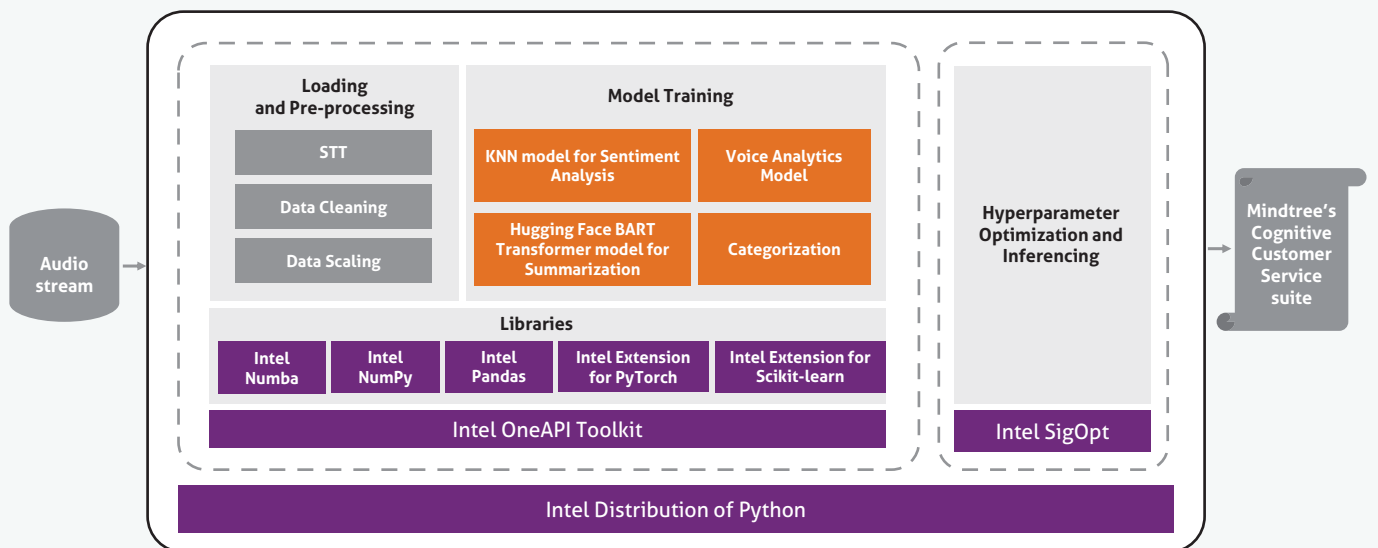


Figure 4: AI blocks that are optimized with Intel's software components

The above figure illustrates the various AI blocks optimized with Intel's software components. More details will be discussed in the following section.



Optimization using Intel OneAPI Toolkit and SigOpt

Intel Distribution for Python⁸

Intel Distribution for Python is included as part of the Intel[®] OneAPI AI Analytics Toolkit, which provides accelerated machine learning and data analytics pipelines with optimized deep-learning frameworks and high-performing Python libraries.

The Intel[®] OneAPI Toolkit assists agents with faster and more accurate sentiment/emotion cues by using Intel Distribution of Python in speech-to-text models and text/voice sentiment analysis models. This leads to better customer insights and improvements in products and services.

SigOpt⁹

SigOpt optimizes models through a combination of Bayesian and global optimization algorithms to boost the performance of models while cutting costs and saving the time that might have been previously spent on more tedious, conventional tuning methods like grid and random search.

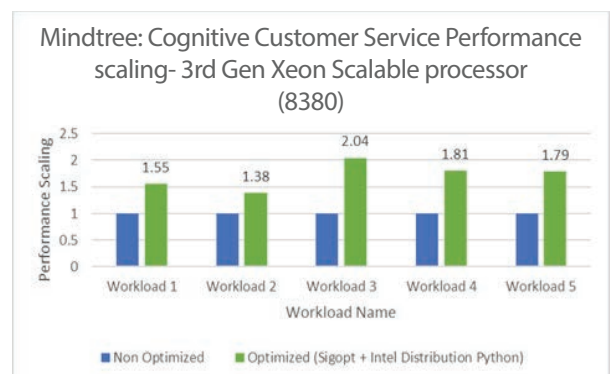
Method	Number of evaluations	Max value achieved (Eggholder function)
Bayesian optimization by SigOpt tool	40	158.55
Grid search	80	138.22
Random search	70	145.95

For summarization of the call conversation, a pre-trained Facebook/Bart-large-Xsum model was used as the base model. The model was fine-tuned by training with the Samsun dataset (A human-annotated dialogue dataset for abstractive summarization). Hyperparameter optimization was carried out using SigOpt, considering Rouge Score as the performance metric. Multimetric optimization was also carried out to maximize Rouge Score.

SigOpt not only automates the task of post call summarization, but also provides text summaries that are consistent and accurate, thereby improving productivity and performance.

Application:

- Improved performance on 3rd Gen Xeon (Codename Ice Lake), Inference speed up of 1.55x to 2.04x
- The accuracy of the summarization model, measured by Rouge Score increased from 54.23% to 54.91%
- Works on cloud as well as on-premise infrastructure
- Model trained with 15000 conversations along with custom data





Customer Impact:

- Manual quality assessment replaced by AI-based quality assessment
- Lesser time for inference translates to \$ savings for Mindtree as well as its customers on public cloud or on-premise infrastructure
- Increased throughput and ability to do more with same or lesser resources

Performance Drivers:

- SigOpt helped with optimal hyperparameters to be used for training, and Intel Distribution of Python improved the overall inference throughput.

Note: The following combinations were tested: 1) Without both Intel® Distribution of Python and SigOpt 2) With Intel® Distribution of Python and without SigOpt 3) With SigOpt and without Intel® Distribution of Python 4) With both Intel® Distribution of Python and SigOpt

Mindtree as a Partner in the Contact Center Transformation Journey

The sophistication and complexity of contact center digital transformation necessitates the support of an experienced team of consultants.

They should have the below qualities to deliver a self-served omnichannel contact center experience:

- Customer contact strategy and roadmap: Guide and help in strategic enterprise decisions
- Solution design: Provide architectural blueprints for voice call, WFM, CRM, customer 360, QA, reporting, and all the other components in the enterprise eco-system
- Implementation and integration: Deploy leading platforms (on-premises, cloud, hybrid) and integrate best-of-breed models
- Enterprise optimization: Optimize people, processes, and technology

Mindtree Accelerators to Support Contact Center Transformation

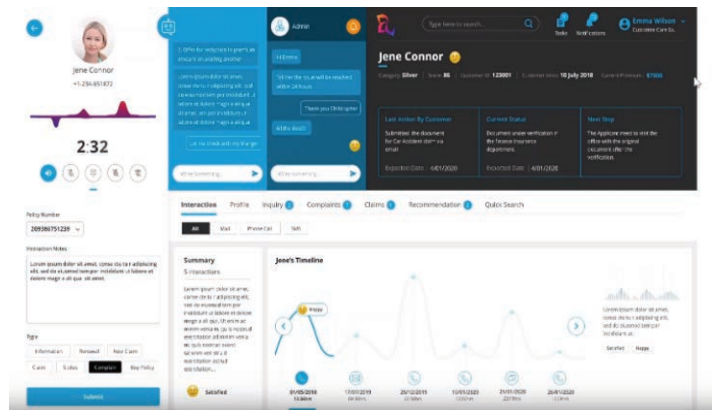
- **Agent unified dashboard**
 - Agent assist
 - Supervisor assist
 - Intelligent Process Automation
 - AutoML pipeline to train SOTA model
 - SigOPT model evaluation & hyper parameter tuning
- Model benchmarking workbench
- **Applied AI Methodology and the accelerators**
 - Data Annotation Tool
- **Model Release pipeline**



Agent unified dashboard

Agent Assist

- Single screen with 360 degree customer context
- Real-time advisory (cross-sell recommendations, upcoming renewals, etc.)
- Call summarization
- Sentiment analysis
- Next-best action recommendations
- Agent bot
- Social listening tools integration



Supervisor Assist

- AI-based call quality analytics to derive holistic CSAT and improve agent performance
- Access to customer ratings, feedback provided and cross sell effectiveness
- Omnichannel view of risky conversations
- Real-time call review and feedback mechanism



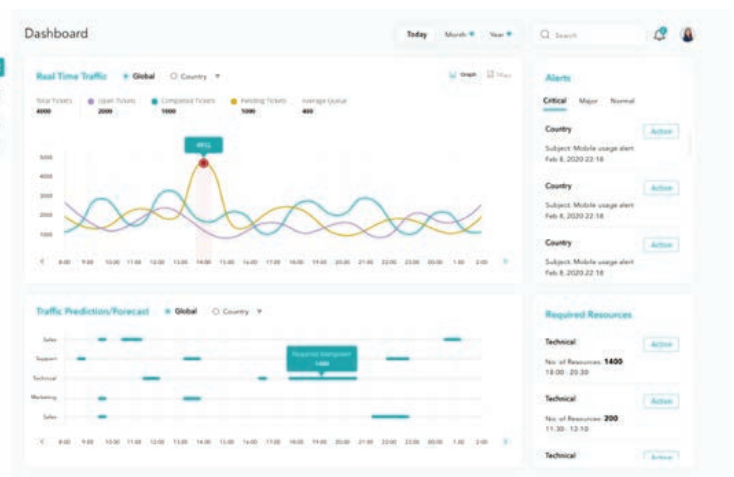
Intelligent Process Automation

Call Triaging/ Intelligent Routing

Machine Learning algorithms are used to identify the best possible agent to address the query based on an analysis of the agent's past resolution history and other data points.

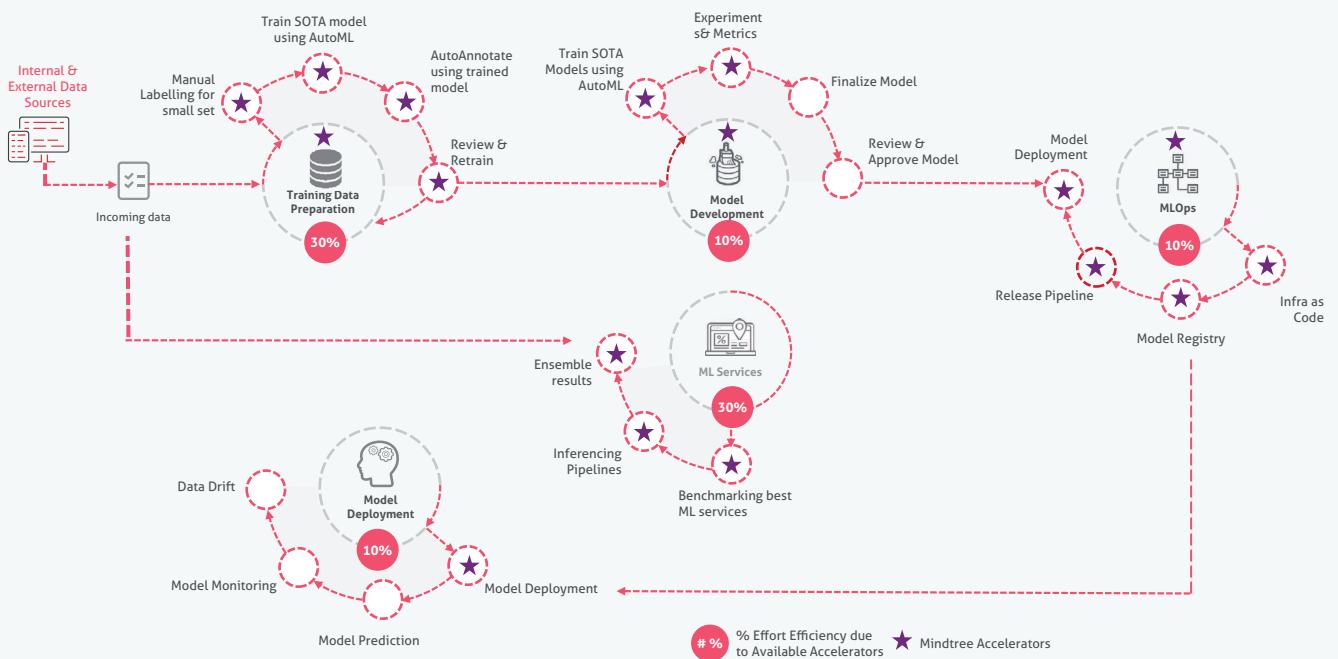
Adaptive Workforce

- Dashboard to get visibility into call and ticket volumes
- Forecasting of expected call volumes
- Recommendations for required manpower to manage the volumes
- Machine Learning algorithm to identify the best possible agent to address the query based on an analysis of the agent's past resolution history and other data points



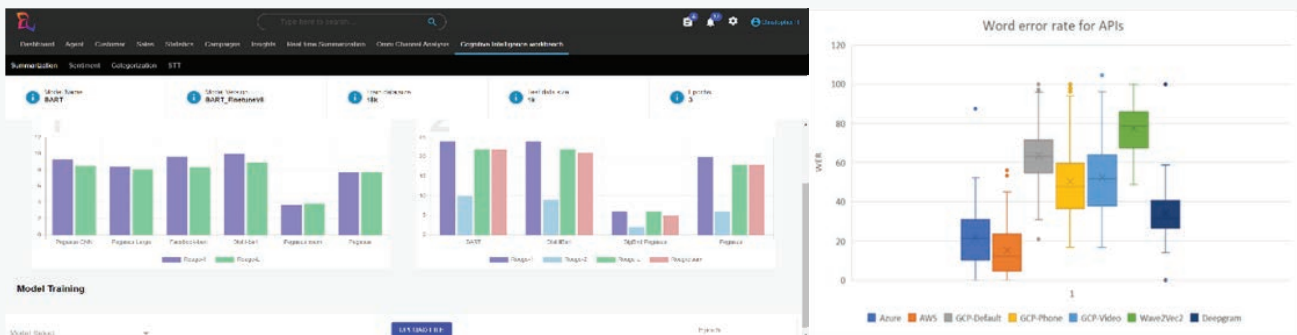
Mindtree's Applied AI Methodology and the accelerators

At Mindtree, we have created accelerators in each step of the applied AI pipeline to speed up model building, benchmarking, and deployment.



Mindtree's Model Training and Benchmarking Workbench

Mindtree provides a unified platform where the enterprise can benchmark, train, and choose the best-of-breed models without any technical supervision.



Model Training Workbench

Conclusion

Intel Distribution for Python and Intel optimized Libraries are performing better in terms of execution and inference time when compared to non-optimized Python and non-optimized libraries, with accuracy remaining the same.

Thus, this paper shows how AI-powered implementation of contact centers using Intel Distribution of Python and SigOpt deliver better performance and productivity of the entire conversational AI pipeline.

Mindtree, as an Intel AI Builders partner, can facilitate contact center transformation journeys for different global clients with our 'bolt-in' automated digital solutions by:

1. Using automation tools to reduce overall operating costs
2. Ensuring process consistency
3. Improving quality and productivity
4. Reducing turnaround time

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About the authors

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Bhanu is an accomplished program architect with over 20 years of experience in the consumer electronics, semiconductor, and automotive industries. He has extensive experience with short-range wireless networks, Linux, firmware, machine learning and deep learning. Currently, Bhanu draws on this expertise to address a variety of problems in ML/DL at Mindtree. Within Mindtree, he is the go-to person for the most difficult and pressing technical challenges that require data science and optimization solutions. He is passionate about fostering the next generation of technical architects, serving as a mentor and advisor to emerging engineers across these domains.

Bikartana Panigraphy

Bikartana brings 21+ years of experience in IT industry, helping clients achieve their intended business outcome. He is specialized in innovation, incubating ideas, and building digital solutions to unlock value for customers using emerging technologies. Currently, he is leading the Conversational AI and Cognitive Contact Service practice at Mindtree. His core focus is to drive automation, self-service and omni experience across customer touch points, thereby improving customer experience and reducing operational efficiency. Having worked with multiple customers in their digital journey, re-imaging of the enterprise business using cognitive sciences and service and automation using AI/ML are his key area of interest.

Sakya Maiti

Sakya is a data scientist for Applied AI in Conversational AI at Mindtree. He has implemented automated AI modules for a large US-based FMCG company. His core expertise includes deep learning, AI/ML, cognitive solutions, reusable components, and automation for a conversational AI ecosystem.

Akshay Bulbule

Akshay is a Technical Lead at the Data & Intelligence Industry group in Mindtree. He has completed his PGP in Data Analytics and Optimization from the International School of Engineering (INSOFE), certified by Carnegie Mellon University. He has completed a Executive Development Programme in Strategic Management from the Indian Institute of Management - Kashipur. While at Mindtree, he has been involved in identifying and developing analytics use cases and is passionate about mentoring data science enthusiasts.

About Mindtree

Mindtree [NSE: MINDTREE] is a global technology consulting and services company that enables enterprises across industries to drive superior competitive advantage, customer experiences and business outcomes by harnessing digital and cloud technologies. A digital transformation partner to more than 275 of the world's most pioneering enterprises, Mindtree brings extensive domain, technology and consulting expertise to help reimagine business models, accelerate innovation and maximize growth. As a socially and environmentally responsible business, Mindtree is focused on growth as well as sustainability in building long-term stakeholder value. Powered by more than 35,000 talented and entrepreneurial professionals across 24 countries, Mindtree — a Larsen & Toubro Group company — is consistently recognized among the best places to work.