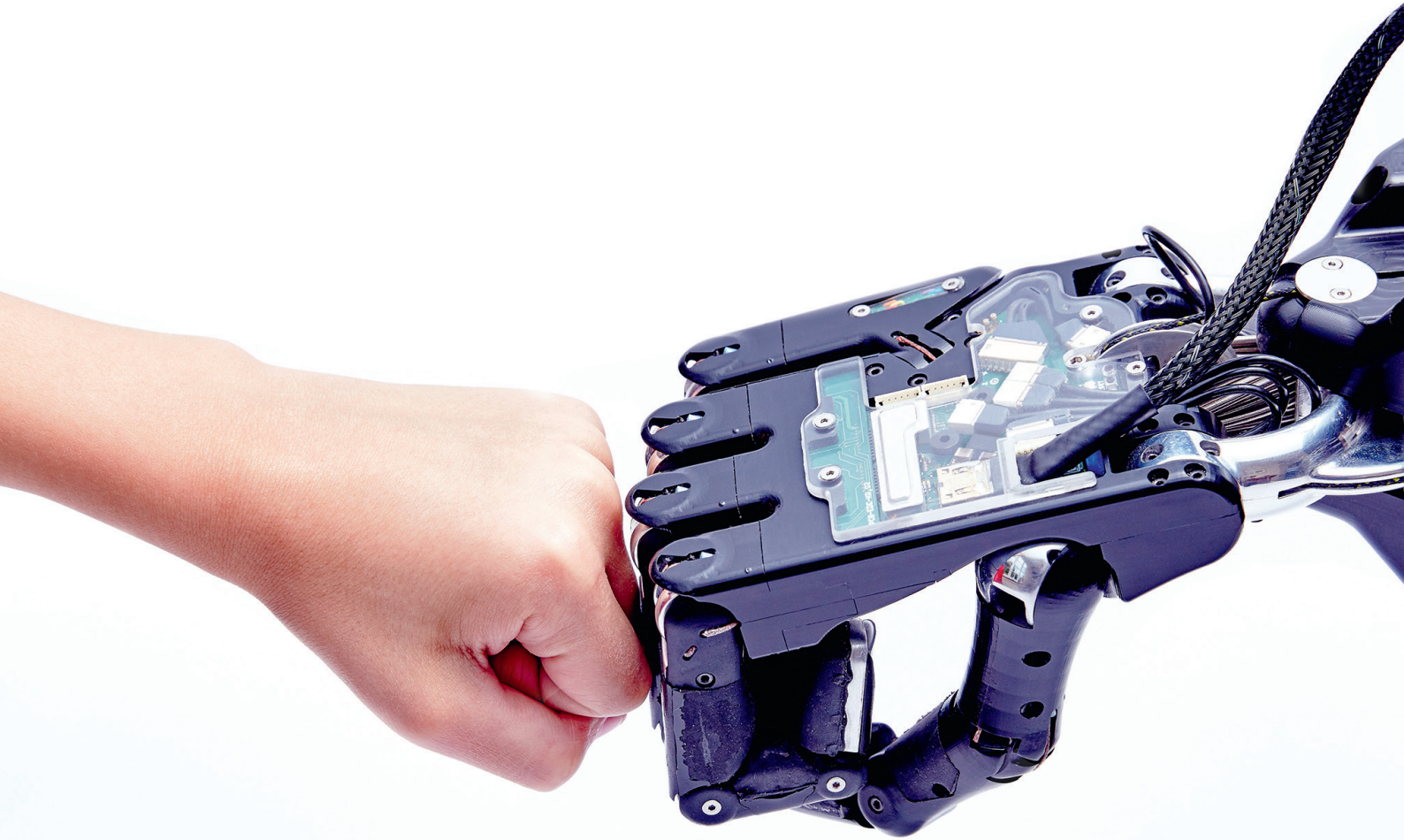




Using AI to augment humans and redesign operations

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1. Abstract

Machine Learning and Artificial Intelligence (AI) mean we can now automate boring, repetitive tasks, leading many people to speculate that we're on the verge of a shift in working practices that could lead to mass unemployment.

But it's also true that machine learning and AI can be used to make human jobs more meaningful. Using technology to solve complex problems by thinking critically and creatively can help us design systems to give us the speed, scale, choice, customisation and ease of use possible with AI.

This paper looks at how machine learning and AI can be used to improve human performance and help redesign operations in a contact centre; a workplace which relies on human empathy as well as data management systems to deliver memorable customer experiences.



2. Seeking meaning in work

We all know that work can be dull. Monotonous. Routine. Ever since mass production techniques moved from the factory floor into the office, workers have had their creativity organised out of them. In the outside world, the same people are imaginative and inventive: creating amazing garden spaces, cooking up a storm, painting, writing, teaching, making music together – the list goes on.

Yet a Gallup¹ study covering millions of workers from 142 countries found that 87 per cent of workers were either 'not engaged or 'actively disengaged' from their jobs. Elsewhere, Deloitte² report that only one in five workers are fully engaged in their work.

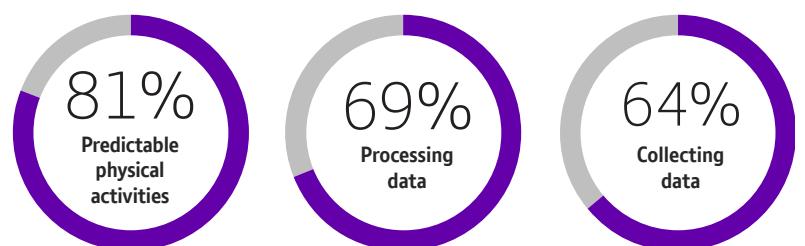
MIT economists Erik Brynjolfsson and Andrew McAfee report³ that we're undergoing 'a great restructuring' and explain: 'Our technologies are racing ahead, but many of our skills and organisations are lagging behind.' As a result machines are becoming smarter, but human beings can't develop at the same rate. Brynjolfsson and McAfee say that this is segregating tasks – repetitive work will be automated, but jobs requiring the ability to work with intelligent machines will become more prized.

Machine learning and AI make it possible for mundane tasks to be automated, leading many to speculate we're on the cusp of mass unemployment. A wave of innovation has led economists to predict a hollowing-out of middle level, white collar jobs⁴. Deep machine learning, breakthroughs in the performance, miniaturisation, and energy efficiency of sensors and batteries, low-cost computer processing power and data storage, cheap connectivity, big data analytics and a new IPv6 internet registration system opening up trillions of new internet addresses make the prospect of 'technological unemployment'⁵ more likely as we enter the era of mass automation.

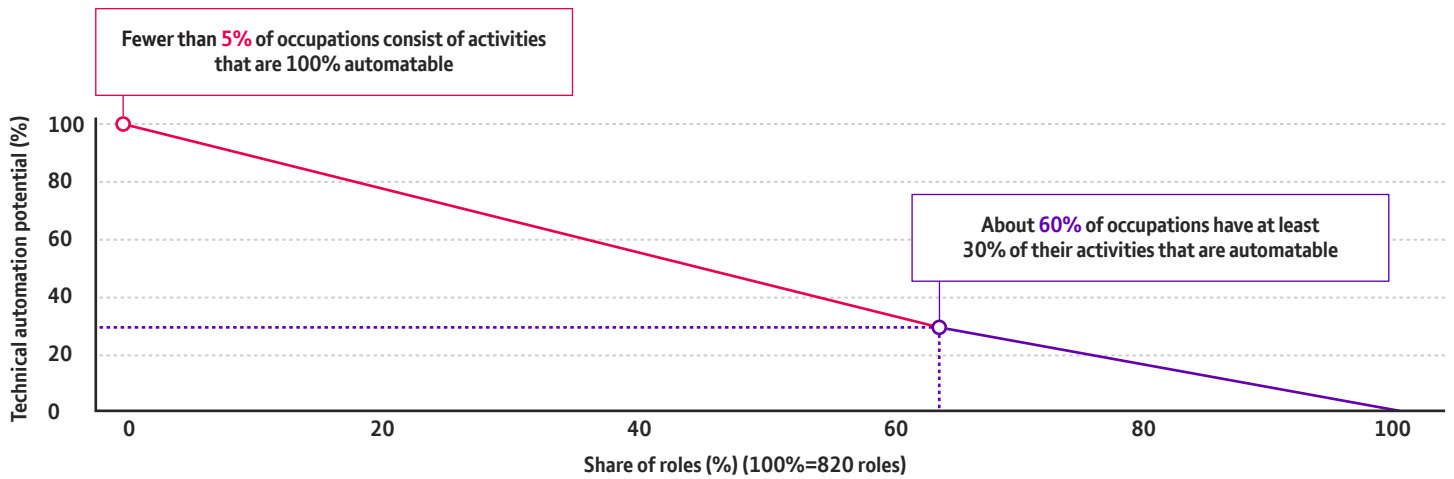


A study by the McKinsey Global Institute⁶ suggested that every job has aspects that can be automated. McKinsey estimate that 5 per cent of jobs will be fully automated in the next ten years, and that 60 per cent of jobs could have 30 per cent of their activities automated – work is more likely to change than to be automated out of existence. Tasks that limit creativity in knowledge workers – managing inboxes, booking timesheets, rekeying data into multiple systems – can be automated to allow workers to do more challenging and interesting work whilst increasing productivity.

Activities with the highest automation potential:



While few occupations are fully automatable, 60 percent of all occupations have at least 30 percent technically automatable activities:

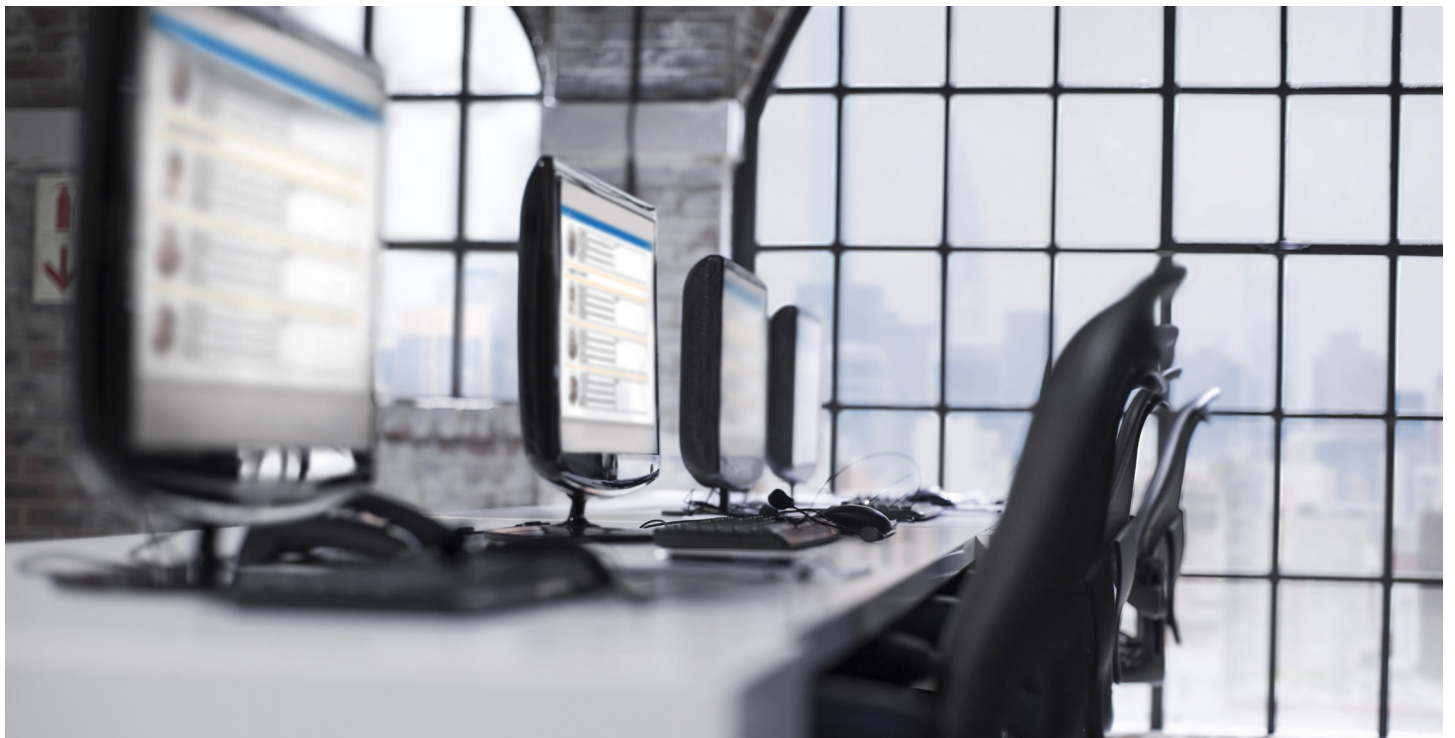


This is a watershed moment. With only 13 per cent of workers fully engaged in their jobs, we need to look at what skills will be crucial in the future. Chief human resource and strategy officers identify the top three future job skills⁷ as: complex problem solving, critical thinking, and creativity. What if we look at how machine learning and AI can be used to develop the skills needed by human workers, rather than looking at the possible negatives?

What if machine learning and AI can be used to improve work? What if we can make jobs more meaningful by using technology to solve complex problems and develop critical, creative thinking? What if it can help us redesign our systems to deliver the potential we've been promised?

This approach may appear counter-intuitive as machine learning and AI automate routine tasks, but let's look at a specific work environment – the contact centre.

Running a successful contact centre requires a lot of human empathy as well as detailed back-end processes and technical integration. It's a place where workers engage with technology and deal with millions of customer interactions via phone, email, social, and mobile. As a model of a larger system, it lets us test this theory in practice.



3. Using AI to augment humans and make work more meaningful

3.1 Amplifying the ability to solve complex problems

An example of complex problem solving:

An agent working in an airline contact centre (which also organises holidays) has just taken a complex booking from a customer arranging a reunion of ten families at a wedding in Dubai. The agent gives the AI

Virtual Assistant the travel requirements:

- Multiple flight origination points with connecting flights
- Three families want to hire cars
- Other families want to hire mini buses
- Two couples prefer a high-end beach hotel
- Others are happy with mid-market accommodation next to the metro
- Two families need visas to visit Dubai
- Four of the families will be leaving on a cruise ship after the reunion.

The virtual assistant delivers a number of options, adding details of other service providers based on the customer requirements. The agent can guide the software, adjusting the itinerary based on conversations with the customer. The process means the agent can manage this complex set of requirements, all amplified by AI. This allows the agent to use human skills such as empathy to close the transaction.

AI Virtual Assistant: used by call centre agents to solve complex cognitive problems



For any company, understanding the customer journey and what the obstacles are can be hard to work out. One European bank wanted to improve the customer experience in branch and online for two key business areas – mortgages and personal banking. They wanted to simplify mortgage and line-of-credit application and approval processes. To do this, they used journey analytics to provide a 360-degree view of the application process, including visibility into marketing campaigns. The bank used a **Customer Journey Analytics**⁷ tool used to predict whether a customer will achieve a specific milestone on their journey.

The milestone can be anything – asking for a flight quote or buying an insurance product. Real-time visualisation means you can see what's happening on the customer journey, so any barriers can be identified and remedied.

AI enabled tools such as these mean that customers can be routed to human agents where required, based on their real-time behaviours.

The bank saw an increase in customer satisfaction ratings to 4.43 out of 5, and 11 per cent of chats resulted in a positive outcome such as booking a branch appointment or a call back.

Customer Journey Analytics can answer questions such as:

- Where are my customers getting stuck in their journey?
- How are the obstacles they face impacting my NPS scores?
- How can I make it easier for my customers to interact with my brand?

3.2 Enabling critical and creative thinking

Thinking on our feet can be difficult, and it doesn't get any easier when there's a stressed-out customer to deal with. It's demanding for a customer service agent who's already juggling other customer requests as well as balancing internal company metrics that need to be hit. In this environment, providing real-time support to the agent will help them and improve the customer experience.

Real-Time Speech Analytics: monitors the agent's speech and sentiment, helping them to adjust their approach in a live call



Real-Time Speech Analytics (RTSA) monitors the customer's and the agent's speech, providing live feedback to agents as well as supervisors. Where an agent needs support, a supervisor can quickly provide them with help or intervene on the call if needed. RTSA can also monitor stress levels and speech clarity on the call. One debt recovery company⁸ used RTSA to indicate when vital or mandatory information had been missed by their agents. Agents were prompted to include the missing information, and this helped the company meet their compliance requirements and avoid misunderstandings with customers in the future.

As well as real-time speech analytics, companies can benefit from analysing calls after the event.

Admiral Group PLC, one of the UK's largest car insurance providers, used a **Speech Analytics** solution to better understand customer needs and their reasons for contacting the company⁹.

What calls could be avoided and what were the customer pain points? The solution transcribes, categorises, and analyses calls from three of Admiral's largest service departments, pinpointing insights quickly and accurately. Admiral centrally collates the findings, and shares them with the respective departments on an ongoing basis.

Speech Analytics can answer questions such as:

- What are the top five products customers are calling about?
- What products or services do they dislike?
- Do agents have the appropriate training in the product as well as the necessary sales skills?
- How can I make it easier for my customers to interact with my brand?

4. Harnessing AI to redesign operations

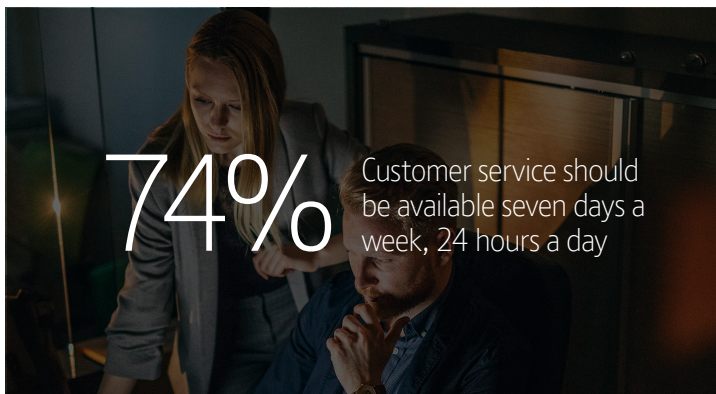
One of the major value drivers of machine learning and AI is the ability to redesign existing procedures by adding in speed, range, choice, customisation and ease of use.

4.1 Improving clock-time and spotting emerging trends

Anyone who has run or worked in a contact centre will know that customers expect the service desk to be available 24 / 7. Research by BT and Cisco¹⁰ found that 74 per cent of customers wanted this, and 83 per cent said that organisations should make it easier to be contacted by phone, web chat, email or social media.

Service agents often have seconds to make a decision when a customer is on the line. In a crisis, 52 per cent of customers wanted immediate access to a well-trained employee, i.e. someone to talk to on the phone or face to face.

Voice Biometrics can improve security and cut fraud-related losses in contact centres, and reduce the average call handling time



74%

Customer service should be available seven days a week, 24 hours a day

83%

Organisations should make it easier to contact them by phone, webchat, email and social media

Speed of response is critical, especially when organisations are trying to identify and authenticate genuine customers. Organisations need to prevent fraud, but not deny genuine transactions. Citibank in Asia Pacific¹¹, for example, has been using **Voice Biometrics** to identify and verify customers. Since the launch in 2016, more than one million customers have subscribed to the service. Identification takes 15 seconds, a marked reduction on the 45 seconds it took previously. Customers enrol in the service by recording their voices to generate voice prints to match on subsequent calls to Citibank. Each voice print is uniquely tagged and, according to Citibank, can't be reverse engineered once stored.

By using recorded voice prints, callers can be authenticated faster and more securely

than before. Voice biometrics allows calls to be screened against a dynamically updated database of customer and fraudster voice prints in real-time, improving genuine customers' experiences. At the same time it frustrates fraudsters and deters them from calling the contact centre.

Fraudsters also use machine learning to deceive financial institutions. Human-written 'rules engines' identify a percentage of cheats but also result in a higher level of false positives. At Danske Bank¹², fraud detection rates were at 40 per cent and they were returning 1,200 false positives per day. With 99.5 per cent of all fraud cases the bank was examining not being fraudulent, Danske Bank decided to deploy AI to better identify fraud and reduce false positives.

They implemented **Deep Learning Software** with a graphic processing unit, moving operational decisions from humans to AI. The deep learning systems used contrasting models to determine effectiveness and employ a champion-challenger methodology – comparing two or more strategies and promoting the one that performed better – to build a successful fraud detection roadmap. Champion-challenger methods apply logic similar to the AB testing used by marketers to measure the effectiveness of advertising. The AI implemented by Danske Bank improved fraud detection by 50 per cent and reduced false positives by 60 per cent. This freed up investigators to focus their time on the unclear transactions that AI had flagged up and where human judgement was required.

4.2 Widening the talent pool available for contact centre managers

Processes which require intense human effort are often difficult to scale. Let's take the example of hiring into a contact centre. Many organisations are faced with high churn rates from employee dissatisfaction or a poor organisation–employee fit. Either way, recruitment is constantly on the mind of every contact centre manager. Every recruiter will tell you that the hardest part of their job is shortlisting suitable candidates.



The HR team at Unilever¹³ wanted to diversify the workforce and widen the pool of those who applied for entry-level roles. To achieve this, they implemented a new recruitment process where candidates were asked to play online neuroscience games in the first interview to assess personality traits such as risk aversion. In the second round, candidates were videoed answering specific role-based questions. AI examined the recording, assessing content, intonation and body language. The AI selected the best candidates from the second round and they were invited to attend an interview at Unilever offices with humans who made the final decision. As

prospective candidates could easily access the system, even via a smartphone, applications in the US alone rose from 15,000 in the previous year to 30,000, with an associated broadening of employee diversity. In addition the average hiring time went down from four months to four weeks. Recruiters who no longer had to sift through the first round freed up 75 per cent of their time in the hiring process, time they were able to use elsewhere, such as with helping the new hires settle into Unilever.

Aside from hiring the right agents, the other ongoing challenge for contact centre leaders is to manage a limited pool of

human resources. Service agents are often over-worked by routine mind-numbing tasks which could easily be handled by AI. For instance, answers to customer questions can often be found on the FAQ page of the website. A **Virtual Agent** can locate and provide the customer with the correct information through links on their phone or via an automated voice. If the customer is still not satisfied, then the digital assistant can route them to a human advisor who has clear knowledge of what has already been provided to the customer.

4.3 Providing agents with real-time information

With better information, employees make better choices – particularly when under pressure. Let's look at how the **Internet of Things** (IoT) is reaching into homes through consumer white goods, such as washing machines, fridges and cookers.

Whirlpool¹⁴ is experimenting with its business model by shifting to selling washes as opposed to washing machines. This approach mirrors the circular economy by using fewer materials in the manufacturing process and changing what customers buy. Rather than buying a washing machine which may need replacing in three years, manufacturers are looking to sell customers a set number of washes as it's the wash, not the machine, which the customer is interested in. The washing machine is installed with its operating system and sensors connected to the Internet. This means it can send real-time data back to the product database and an analytics engine in the manufacturer's cloud.

This real-time collection, assimilation and analysis of data enables Whirlpool to use predictive analytics to determine when a washing machine might need maintenance, as well as making suggestions to the service agent about any other issues flagged up. As a result, the advisor is able to proactively call the consumer with evidence-based information to make an appointment for a technician to visit. Equally, if the consumer calls, the service agent has a real-time machine-status dashboard available. Machine learning and AI run in the background, helping the agent make informed decisions, saving the customer money and time by fixing problems before they happen, rather than afterwards.

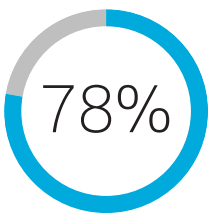
The same principles apply in the B2B market. General Electric use predictive analytics for its industrial machinery, modelling past data to predict future outcomes for design and price offers accordingly. For example, GE measures, monitors, and models the performance of its aircraft engines to predict when they need to be serviced, to forecast future costs, and to structure its service system efficiently. As a result they are able to waive standard fees or costs if certain metrics aren't achieved, but receive gains when they are. Engines are priced and guaranteed by the flight hour – which means that if an engine goes offline unexpectedly, GE bears the cost and not the customer. By the same token, if costs are lower than expected, GE benefits from that margin.



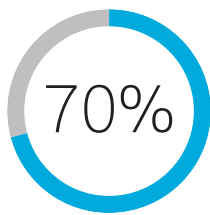


In both the Whirlpool and GE examples, service advisors are given timely information made possible through machine learning and AI. Their role is not routine, mundane or dull. In order to do it well, the service agent needs to work with intelligent machines and solve complex problems by thinking critically and creatively.

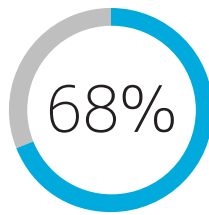
The ability to access real-time data comes at a time when customers seem more willing to share their context-sensitive data. Research from BT and Cisco¹⁵ showed that 68 per cent of customers said they like organisations to use the internet to monitor the condition of the products and services they're using.



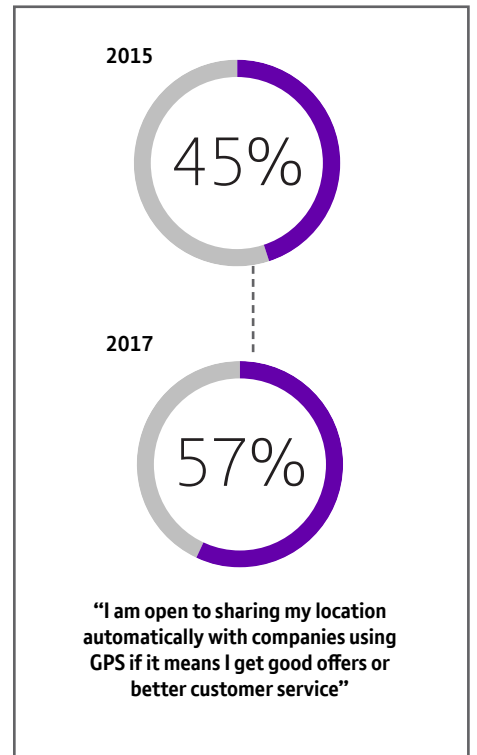
“I like it when organisations notice I have been having difficulty with a website / completing an order and contact me directly to try and help”



“I like personalisation of pages depending on the preferences, behaviours, location and device being used by the customer”



“I like organisations using the internet to monitor the condition of products and services I use”



“I am open to sharing my location automatically with companies using GPS if it means I get good offers or better customer service”

4.4 Offering customers a more personalised service

By linking historical data and constantly-learning algorithms, customers receive a much more personalised service in their brand encounters. AI can obtain detailed data around each customer interaction, helping optimise the next brand touchpoint. This reduces the effort customers and employees need to put in to record, analyse, and share information. Additionally, sentiments can be analysed to determine the current mood of the customer, compare it with previous occasions, and notify the service agent about any sensitivities which may exist.

Virtual Agents are ideally suited to deal with: (1) Customer requests which don't require backend enterprise data or need authentication (e.g. office location, opening times). (2) Searches needing backend enterprise data where the user is anonymous (e.g. hotel rates, inventory availability, price queries). (3) Requests needing backend data and authentication for highly customised interactions (e.g. bank balance; health records).



Today it's normal to keep voice recordings of conversations between agents and customers, particularly in financial services and other highly regulated businesses. In addition, AI can transcribe entire conversations between agents and customers. This makes querying millions of customer conversations across PBX, VoIP, webchat, email, mobile and SMS far more effective. The organisation can analyse the information, drawing insight and learning how to improve their levels of service.

Aida is a Virtual Agent for the Swedish bank SEB. It can understand natural language conversations, respond to frequently asked questions by probing databases and even has a sentiment analysis meter which picks up whether the caller is frustrated or appreciative. When Aida can't resolve a matter, it redirects the query to a human agent, but continues to listen in so it learns for the future. This allows

human agents to focus on more complex problem-solving activities. Agents that thrive and are highly sought after will be curious, prepared to meet unexpected challenges, and empowered with extra information provided by machines.

Singaporean bank DBS launched a virtual agent in Singapore, India and Indonesia across a number of channels – mobile, web and Facebook Messenger¹⁶. The agent can handle 82 per cent of customer queries.

Elsewhere, the Spanish bank, BBVA, has also deployed a virtual agent¹⁷ in its Turkish operation, Garanti. Of its 6.2 million Turkish customers, 5.4 million are mobile users. Customers can speak to the virtual agent, ask it about their latest account activity, undertake transfers, and buy and sell foreign currency.

1.3 million customers subscribe to the service. A feature of the service is how the virtual agent deals with a customer in crisis. If a customer has lost their credit cards, the virtual agent asks them whether they would like to speak with a human agent in the contact centre and arrange for their card to be cancelled. Customers can do this without having to log in and authenticate themselves again.

In the retail space Sephora¹⁸, owned by LVMH, is using augmented reality (AR) and AI. Sephora offers shoppers the chance to personalise their experience by trying makeup on with the help of augmented reality, with AI suggesting foundation to match their skin tone.



Sephora’s Virtual Artist (or Agent), is an AR tool that allows customers to try thousands of shades of lipstick, eyeshadow, false lashes, and cosmetic products. It lets users try digital beauty tutorials to learn how to achieve different looks. Colour Match uses AI to find the right colour shade to suit the customer’s skin tone from an uploaded photo. The core of the service is its ability to track facial features accurately. According to Sephora, Virtual Artist has seen 200 million shades tried on over 8.5 million visits.

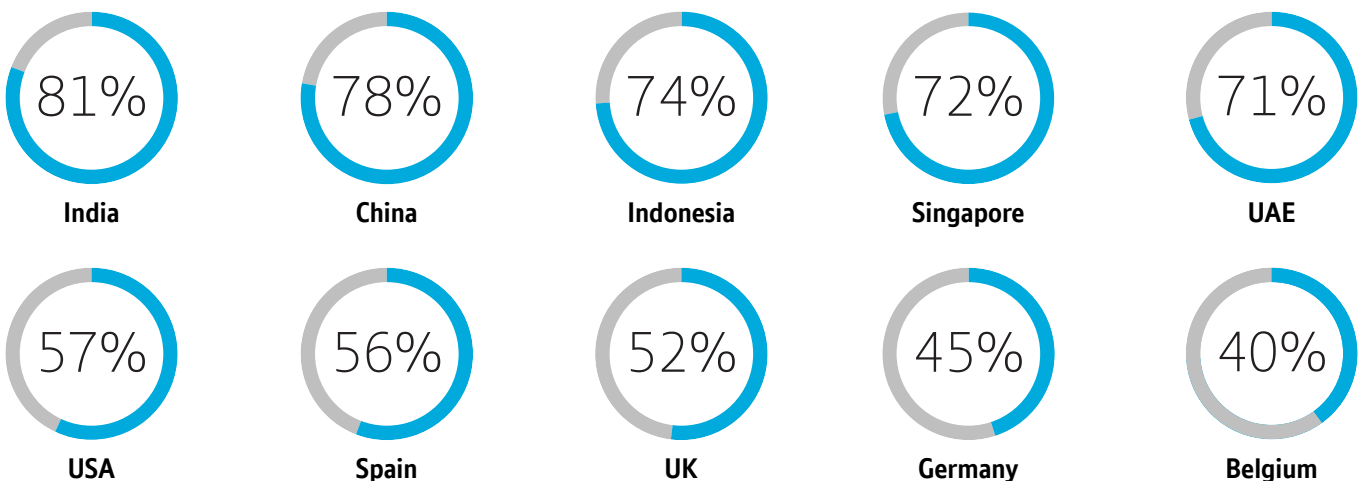
As video becomes a regular part of daily life, there is growing interest in video-chat for customer service and engagement. There has

been a remarkable increase in the amount of time consumers spend every day watching or making videos. One in three consumers say they use YouTube to research a new product or service instead of a traditional search engine. When it comes to communicating with colleagues, friends and family, 25 per cent are using FaceTime and Skype two to three times a week or even more. Some 63 per cent of consumers say they want to use video-chat to communicate with organisations. 81 per cent of Indian consumers and 78 per cent of Chinese consumers would like the option of video-chat to have a product demonstrated by an advisor²⁹.

With video and the ability to track facial features, there’s an opportunity to leverage machine learning and AI to capture sentiment and support the customer service agent both before and during the customer video call.

This is particularly important for luxury brands where customers are looking for a discreet, customised, and personal offering. When a brand is serving millions of customers around the world, it wants to make each brand interaction feel unique for the consumer. Leveraging AI makes this possible.

Would like video chat to have a product demonstrated by an agent:



4.5 Making things easier for customers



The desire to make things easier for customers is not new. An article in the Harvard Business Review²⁰ demonstrated that reducing customer effort – the work customers do to get their problems solved – was a better predictor of customer loyalty than trying to wow them. The research showed that ‘making it easy’ meant removing obstacles, and some recurring complaints about the customer journey were identified. Three things that customers resent are:

Having to contact the company repeatedly (or being transferred) to get an issue resolved

Having to repeat information

Having to switch from one service channel to another (e.g. having to call after trying unsuccessfully to solve a problem through the website)

Research by BT and Cisco²¹ found that what customers everywhere really want is for life to be less complicated, and they’re prepared to pay for it. More than half say that they value convenience over price, and three out of four people would buy more from companies that make it easier to do business.



79% “I am more loyal to organisations that are easy and simple to contact”

76% “I buy from companies that make it easier for me to do business with them”

To make matters easier for customers, an organisation can see what is happening in real-time with its customer base – what demand is there for the service now, how much of this can be fulfilled, who is available to undertake the work, and do they have the resources needed to deliver a great customer experience.

Careem²² is a chauffeured car service based in Dubai and with operations in 85 cities across the Middle East, North Africa, and South Asia. They've been using a **Social Collaboration** service for day-to-day crisis management and real-time problem-solving. Every 15 minutes, the tool alerts them as to how many cars are on the road compared with the number of customer requests.

When ratios are out of balance, Careem can quickly reorganise, offering incentives to drivers and customers. Social collaboration tools integrate chat, voice, video, and file sharing, talking to the right people on the right channels, spreading the work load collaboratively, and making booking rides as easy as possible for customers.

At Ford Motor Company, they have been using a self-service knowledge management tool with a **Chatbot**²³, which processes natural language, understands user intent and provisions relevant content and/or answers. For example the customer may be having difficulty connecting their mobile phone to their car via Bluetooth. In response to posing this question the tool can respond back with

a video which demonstrates how to connect their phone. Or they may have a question about whether two mobile phones can be connected at the same time. Once more they receive an automated response which can show the driver how to manage this through the Settings option in the car.

Interactive Automated Text Response can provide asynchronous character limited dialogue with a customer for an inbound or outbound communication. It's ideal for noisy as well as quiet environments, and provides a history of the conversation



When an airline wanted to offer alternative flight options to passengers grounded by bad weather, they turned to technology. By understanding customer travel plans, the airline suggested a new itinerary using **Interactive Automated Text Response (IATR)**. If the customer agreed with the recommendation, they simply replied to the text by pressing '1' on their mobile.

If customers had queries they could ask the system to suggest other options. If they still weren't happy then a human agent could take over. If the customer was connected to

the internet, the session could be run by a chatbot. By being proactive the airline was able to deflect thousands of calls which would otherwise have flooded their contact centre.

WeChat in China supports 10 million businesses, including Nike, Burberry, and Pizza Hut. WeChat allows people to call a taxi, order food, pay a bill, or book a doctor's appointment. **Chatbots** on WeChat take advantage of **Application Programming Interfaces (APIs)** with over 100 types of 'bubble message' including text, voice, video and speech. They also have APIs that allow the

integration of multiple data sources, including access to direct messages, voice messages, user IDs, and customer location data.

Machine learning and AI use natural language processing to provide deeper comprehension of what's being said by the customer. According to Dr Nicola Millard, Head of Customer Insight and Futures at BT: "The best bots act as 'Interactive Voice Response for digital' and can direct the customer to an advisor with the most appropriate skills"²⁴.

Glossary of technology enablers

Application Programming Interfaces	A collection of rules and processes that allow different digital systems to interact.
Artificial intelligence	An intelligent machine designed to work and react like a human.
Chatbots	An AI program designed to respond (and sometimes prompt) text or voice queries.
Customer Journey Analytics	Tracking how customers interface with a business to spot opportunities.
Deep Learning Software	Programmes used for pattern analysis or classification of complex data.
Interactive Automated Text Response	Automatic solution-focused inbound and outbound text dialogue with a customer.
Internet of Things	The network of everyday items that can connect to the internet / each other.
Machine Learning	The ability of a computer to analyse and improve its performance by itself.
Real-Time Speech Analytics	Identifying keywords and sentiments in live speech to guide conversations in real-time.
Social Collaboration	Communication tools that help employees work together.
Speech Analytics	Improving future communication by looking at content and sentiment of existing calls.
Virtual Agent	AI that can answer customer queries or route to a human operator as needed.
Virtual Assistant	Software that helps human agents perform a variety of tasks.
Voice Biometrics	Identifying an individual by comparing their speech against a voice print.



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