THREE PRACTICAL ARTIFICIAL INTELLIGENCE (AI) APPROACHES FOR FIELD SERVICE MANAGEMENT

KEY QUESTIONS:

IFS WHITE PAPER

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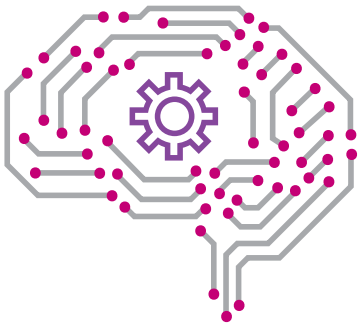

Artificial Intelligence (AI) will impact every industry and every business discipline—including field service management. But how quickly will practical solutions be available that enable the typical medium to large field service organization to take advantage of AI? And by practical solutions, I mean AI that delivers knowledge efficiently, processes solutions to complex data sets, and automates repetitive activities to allow human workers to focus on personalized service, solving complex problems and escalations, i.e. what people do best.

In some cases, these easily applied solutions are still on their way to market. In three specific areas, however, practical AI applications for field service are already commercially available as proven, commercial-off-the-shelf software delivering real business value.

AI FOR CUSTOMER INTERACTION

First impressions matter. And unfortunately, the first interaction a customer has with your service organization often involves several missteps. Chief among these are long wait times on hold due to high call volumes. And then, as a customer attempts to reach out through multiple channels including email, chat and phone, the resulting data stream goes into separate siloes that are disconnected from each other, resulting in disjointed communication.

Today, AI solutions can solve both these problems, but it requires more than “just” chatbots. Commercially available AI software that ties into chatbots is capable of learning which answers posed in a chat are appropriate for each question and automating a significant majority of chat interactions. A chatbot can be taught to answer commonly-encountered questions, like inquiries about when a technician is scheduled to arrive. Of course, at some point, the AI chatbot may get stuck when personalized service is required, and a human agent takes over the discussion thread without missing a beat. This should be seamless not only to the customer, but for the internal customer service, ticketing and support systems as well. The chatbot—regardless of

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whether driven at a given moment by AI or a human agent—should update the same customer record as other channels including social media, phone and email.

And from interactions, the AI functionality learns from answers provided by human agents and gets better and better at answering questions through learning processes. A truly advanced AI chatbot will also seamlessly hand off the chat to a human agent when the extent of its learning is overtaken. Only then can the entire customer experience be unified and consistent, even with a static number of agents handling a rapidly growing fluctuating volume of customer interactions.

AI-based chatbots, for instance, can enable a good agent to handle up to five or more chats at a time. It can capture Facebook messages and tweets and direct them to an agent or to AI for intervention. AI alone can handle, typically, between 50 and 60 percent of requests, freeing up human capacity or lowering staffing levels required to handle a given volume of activity.

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ENABLES MANAGEMENT BY EXCEPTION

In the case of AI applications for the service organization, a primary driver for ROI is that it enables humans to manage by exception. A high volume of activity can be automated, and humans intervene primarily when a situation falls outside the business rules or logic built into service management software. AI doesn't eliminate the need for human interaction—it makes the human interaction more focused on what humans do best—handle escalations and complex decision making for unique cases.

At one IFS customer, an AI chatbot handles about 50 percent of interactions—primarily those reaching out to cancel their service after a free three-month trial period. Interactions canceling a free subscription are handled entirely through automation. But if a longer-standing customer is canceling their service, the interaction gets routed to an agent dedicated to saving the account.

Some interactions are by default easily handled by AI. If 30 percent of inbound contacts are requesting information on the arrival time of a field service technician, it may be possible to automate 90 percent of that 30 percent of contacts. But it is also important to consider the demographics of the customer base. Millennials are more likely to communicate via chat or social media, so if a significant percentage of customers are under 40, heavier reliance on chatbots and AI may help you increase engagement by streamlining your customers' preferred method of interaction.

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Management by exception is also more successful when an AI application has access to extensive information about each customer. So full integration with enterprise resource planning, field service management and other enterprise tools is essential. AI tools can be more effective if they have more rather than less information on the status of the customer's account, including their maintenance or service history and warranty or service level agreement entitlements.

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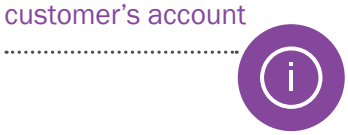
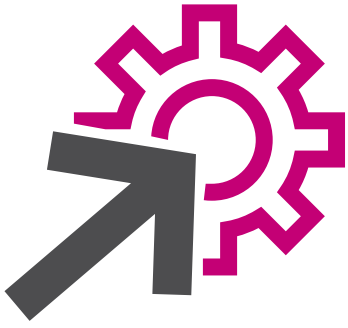


Integration between an AI chatbot, email, voice, social and enterprise applications is important for another reason. It enables one version of the customer record. Lacking this, a customer can send an email, and get no response. They send a direct message through Twitter. Then call and sit on hold. Then initiate a chat. All these interactions may not appear in a central customer record, but there have been three attempts to contact the company. Right from the first contact by email, the clock started ticking on a service level agreement.

Full integration can also enable a customer service team, once a customer request is resolved, to close off all queuing activations at the same time for the various contact methods associated with a customer case. Failing this, a service organization may spend a significant amount of time chasing customer requests that have already been resolved.

Planning and optimizing a field service schedule in real time is too complex a task for the human mind. It is best to leave this to AI.



SOLVING PROBLEMS WHEN ONE ISN'T ALBERT EINSTEIN

Human agents are capable of optimally dealing with a customer, and AI can free them up for the most interesting and demanding tasks. In the case of scheduling technicians in the field, humans are just not up to the numerical challenge of adjusting a schedule in an optimal fashion as

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humans typically focus in on an aspect of a problem to solve rather than finding the best solution overall.

A dynamic scheduling engine (DSE) driven by AI algorithms is designed to solve complex scheduling problems in real time—problems much too complex for any human dispatcher or customer service agent to handle, especially when at times individuals will act myopically based on their area rather than for the greater good of the company and its customers. Even a static service schedule can be handled in myriad different ways, and decisions regarding which technician to send to which of several jobs in what order are often made based on suboptimal heuristics. "Steve's son is in day care in this part of town, so I will schedule this appointment last, so he will be close by." Sometimes jobs are scheduled based on first-in, first scheduled, regardless of the actual urgency of requests that come later.

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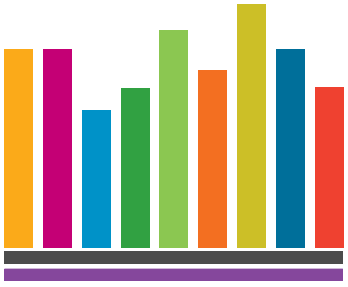

Manual or traditional software-based scheduling may be a workable solution for service organizations with a very small number of technicians each engaged in a small number of jobs during a day. But it does not take many technicians or jobs for the number of possible solutions to outstrip human computation capabilities either individually or as a group.

Even at the low end of the spectrum, a human dispatcher cannot quickly identify all the possible solutions and pick the best one. With two technicians and four service calls there are already 120 possible solutions—different combinations of technician, job and order. Two technicians, and five service calls yields 720 possible solutions. Four technicians and 10 service calls present a dispatcher with 1,037,836,800 possible solutions. But the time you get to five technicians that must complete six calls each—a total of 30 calls, you have 12,301,367,000,000,000,000,000, 000,000,000,000,000 possible solutions.

Finding the optimal solution becomes even more complex as additional and rapidly-changing factors are added into the mix:

- Emergent jobs come in that must take precedent over those already scheduled
- SLAs and other contractual requirements demand that some jobs be completed within a given timeframe
- Technician skill sets that influence which tech is sent to which job
- Tools and materials currently in stock on each service vehicle
- The current location of a technician in proximity to each job and to drop locations for inventory that may be required for a job

- The duration of each service call, both in terms of estimated time required to complete the call and whether a current job is running over the estimated time, resulting in knock-on effect on subsequent jobs

Former world chess champion Garry Kasparov, in his book Deep Thinking: Where Machine Intelligence Ends and Human Creativity Begins, makes clear that even his mind is not capable of computing possible solutions and outcomes as rapidly or effectively as an AI algorithm.

"The human mind isn't a computer; it cannot progress in an orderly fashion down a list of candidate moves and rank them by a score down to the hundredth of a pawn the way a chess machine does," Kasparov writes. "Even the most disciplined human mind wanders in the heat of competition. This is both a weakness and a strength of human cognition. Sometimes these undisciplined wanderings only weaken your analysis. Other times they lead to inspiration, to beautiful or paradoxical moves that were not on your initial list of candidates."

Automating the schedule through AI not only enables a much higher level of service but frees up dispatchers to handle those "beautiful or paradoxical moves" that may delight a customer or solve a tough problem.

In the end, collaborating with intelligent machines will get us further faster than going it alone. According to Kasparov, the best chess is now played as grandmasters use computers to analyze positions, opponents' games and their own games—elevating the level of play. In an interview with the Financial Times, Kasparov, who famously had matches against an early chess supercomputer, described how the best chess is now played by combining "human intuition and understanding of the game of chess with a computer's brute force of calculation and memory."

"I introduced what is called advanced chess; human plus machine against another human plus machine," Kasparov said. "A human plus machine will always beat a super machine. The computer will compensate for our human weaknesses and guarantee we are not making mistakes under pressure … the most important thing is not the strengths of the human player. It is not the power of the computer. But it is the interface. It is the corporation."

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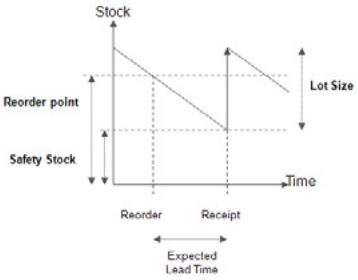
LEGACY APPROACH TO INVENTORY LOGISTICS

Service management for many businesses relies on inventory … if completion of a service call requires inventory and you are out of stock, you cannot meet your commitment to the customer. When a service

request cannot be closed on the first visit, it is often because the right part is not on the truck or immediately available.

So, service management software should encompass inventory management functionality, and that functionality should include automated reorder points for each part. The ability to take parts availability into consideration is a critical data set for AI to work on as parts are a critical determinant in first-time fix and job completion where parts are a factor. It also is a key aspect to successful SLA and outcomes-based commercial relationships.

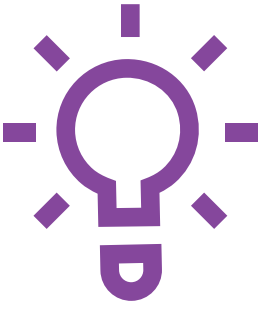


Once inventory data is available and integrated, a powerful DSE may also be configured to influence inventory logistics so parts and materials are housed in warehouses, satellite offices or inventory drop locations closer to anticipated demand, with inventory matched to jobs in a forward or current day schedule. In one very large implementation of IFS Planning and Scheduling™ Optimization—in the London underground transit system—inventory and tools are dropped ahead of each service visit so technicians who ride the subway to the service site can pick them up. This is only possible with a high degree of coordination between the service schedule, inventory logistics and an AI-driven scheduling tool.

When software automatically sets an inventory reorder point based on changing demand, this can technically be considered an AI approach.

CONCLUSION

Service organizations should recognize the tremendous potential AI holds—they can harness it to transform their operations, outflank their competitors and disrupt their markets. We are only starting to tap into the different ways AI can be used to better solve the problem of delivering optimal service in a rapidly changing environment as adoption is still lagging despite the real benefits AI brings. The good news is there are several straightforward and easily accessible ways service executives can harness AI technology right now, today.



MARNE MARTIN

As both President of IFS Service Management and CEO of Work Wave, Marne's focus is to continue to elevate the strategic importance of service management to the success of the overall IFS business. Marne works strategically to ensure the entire portfolio of IFS's service management solutions provide customers with the business value they expect from a global industry leader in field service management (FSM). Prior to IFS, Marne served as CEO and led the executive leadership team at ServicePower Plc and CFO of Norcon, Plc., a UK-based telecom and defense consulting firm.

ABOUT IFS

IFS develops and delivers enterprise software for customers around the world who manufacture and distribute goods, maintain assets, and manage service-focused operations. The industry expertise of our people and solutions, together with commitment to our customers, has made us a recognized leader and the most recommended supplier in our sector. Our team of 3,500 employees supports more than 10,000 customers worldwide from a network of local offices and through our growing ecosystem of partners.

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