

# AI FOR ROUTE PLANNING AND NAVIGATION

## WHY IS THIS TOPIC IMPORTANT?

Planning routes and travel paths to customers requires significant coordination effort. Numerous factors must be considered, including employee availability, vehicle readiness, the number of customers to be visited, the respective travel distances and their optimal sequence, as well as weather conditions and the current traffic situation. AI-powered route planning and navigation can support companies in calculating more efficient, personalized, and dynamic routes. This enables better workforce planning, reduces travel times, fuel consumption, and vehicle maintenance costs, and ensures more reliable delivery time estimates. Ultimately, the use of AI-based route planning leads to higher customer satisfaction, lower costs, and supports companies' sustainability efforts.



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## WHAT ARE THE POTENTIAL USE CASES?

The implementation of AI for route planning and navigation offers numerous applications for reducing fleet costs and optimizing customer visits. Based on real-time AI data - such as traffic, weather, and road conditions - the most efficient delivery routes are identified, minimizing fuel consumption. AI also reduces operating and vehicle maintenance costs. Furthermore, it improves delivery accuracy by providing precise estimated times of arrival (ETAs) and adjusting schedules to current conditions, which enhances customer satisfaction. In resource management, AI optimizes the allocation of vehicles and drivers based on capacity and availability. It also uses predictive analytics to forecast potential disruptions, allowing companies to address issues proactively. Route personalization ensures that priority deliveries are handled efficiently. Moreover, integration with IoT devices improves route decisions by supplying real-time data from GPS systems.

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## AI IMPLEMENTATION: PRACTICAL EXAMPLE

A company specializing in refrigeration technology, cold rooms, air conditioning, and chilled water systems was already using mfr® craft software to organize and automate many business processes. Initially, this software was used only for administrative and office tasks, but the idea later arose to extend its use to intelligent workforce planning. Through a digital planning board with travel time displays and real-time status updates, all appointments, orders, vacations, sick leave, employees, vehicles, and tools can be planned accurately and cost-efficiently. With additional GPS tracking, the company can monitor the locations of its service technicians in real time. The program also records which technicians are available and what qualifications they have, enabling the AI to suggest the most suitable technician and the optimal route for each customer visit. This system is supported by live data from Google Maps, ensuring that the right technician is dispatched to the right service call - for example, apprentices are not sent to handle complex tasks. Overall, integrating the MFR software has significantly reduced the time required to find qualified technicians and has made the company's service processes more efficient. It was important for the company to source AI solutions from a single provider to avoid interface problems. While the company emphasizes benefits such as cost savings and time gains, it also points out that these solutions are costly and require a certain level of technical affinity within the company to successfully drive such projects.



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## WHAT NEEDS TO BE CONSIDERED?

When implementing AI for route planning and navigation, several key factors must be taken into account. First, the scope and quality of data are critical. The company must determine which data the AI should use in order to solve complex routing challenges by simultaneously optimizing multiple objectives (e.g., weather, traffic conditions, fuel consumption, employee qualifications and availability, customer prioritization, etc.). Since the conditions under which optimization occurs are constantly changing, the system must be designed to continuously adapt to real-time conditions. Finally, incorporating user feedback allows for ongoing improvement of routing decisions. Successful AI integration therefore requires careful attention to data compliance, algorithm selection, dynamic route planning, optimization, adaptation, and feedback loops. As with all AI-powered applications, compliance with data protection and ethical standards is essential. In particular, when handling personal data, adherence to GDPR and the use of anonymized and aggregated datasets are indispensable.