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# AI THINK TANK

## 2024 Report

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# Starting Your Automotive Aftermarket AI Journey

The automotive aftermarket is at a pivotal point of transformation. Artificial Intelligence (AI) is being recognized as the next explosive innovation cycle—similar to adoption of the internet 30 years ago.

Use cases are many and varied. As the industry faces a shortage of experienced technicians while vehicles become increasingly complex, integrating AI is no longer a futuristic concept—it's a necessary evolution. Applications are being uncovered in product development, marketing, customer support and e-commerce as well.

There is so much written today about AI capabilities, risks, opportunities and challenges. This document aims to provide at least a "beginners" roadmap for automotive aftermarket businesses to understand, explore, and implement AI-driven solutions to stay competitive, improve operational efficiency, and meet evolving customer demands.

The information is separated into three sections:

1. **An AI Overview** – Providing a summary of the terminology and various key aspects of artificial intelligence that are important for a general understanding of the technology
2. **Key Use Cases** – Understanding how to start incorporating AI into your company's strategic plans
3. **Getting Started with AI** – Tips and steps for beginning one's AI journey

# An AI Overview

AI stands for artificial intelligence—programs or algorithms which train themselves on provided data to achieve desired results. The most popular AI-related programs include machine learning, natural language processing (NLP), deep learning and large language models (LLMs), as well as computer vision or image recognition. For example, one can improve image quality using deep learning models, predict the "next word" and generate text using LLMs, and create predictive models using NLP and machine learning techniques.

Specifically for the automotive industry, AI is being used for predictive maintenance, content generation and improvement, advanced analytics, and much more. Image recognition is being used in the collision segment to provide estimates with pictures instead of in-person claims adjusters.

# KEY TYPES OF AI

Key aspects of artificial intelligence that are important for a general understanding of the technology.

## 01 Machine Learning:

Machine learning is like teaching a computer to learn from experience and see patterns in data much the way humans learn from experience. Instead of programming specific rules, the computer is exposed to lots of data (text, pictures, etc). It uses programs or algorithms to learn and adapt without following explicit programmer instructions.

Over time, the machine learns to recognize patterns in the data and make decisions and predictions based on those trends by leveraging the following:

- **Data:** Machine learning starts with data. The more data you have, the better the computer can learn.
- **Learning:** The computer uses special programs called algorithms to look for patterns in the data.
- **Models:** After studying the data, the computer creates a model, which is like its own set of rules or patterns it has learned. Models help computers make decisions much like humans use their memories.
- **Prediction:** Once the model is created, one can show the computer new data it has not been exposed to before and the computer will use its model to make decisions or predictions based on the new data.

## 02 Deep Learning:

A more advanced version of machine learning is where the computer tries to learn in a way similar to how our brains work by identifying specific objects in pictures or videos as well as recognize complex patterns and trends in text. It can make predictions based on the data or images provided as training data.

The reason it is called "deep" learning is because it uses many layers of understanding and leverages something called a neural network, which is a computer system inspired by the human brain. Just as our brains have neurons that connect and pass information, AI neural networks have "artificial neurons" that work together to make sense of data.

Just like how humans learn something new by building on what one already knows, deep learning builds knowledge layer by layer, getting more detailed and accurate with each step and additional data that it encounters.

## 03 Natural Language Processing (NLP):

A type of technology that helps computers understand, interpret, and respond to human language. This can include things like data normalization and standardization as well as recognizing speech intent.

It is how your smartphone understands what you mean when you ask **"What's the weather like today?"** or how a chatbot can help answer your questions online.

First, NLP helps the computer break down the words in a sentence. It figures out what each word means. Next, the computer looks at how the words fit together. It understands the intent and purpose of the text or request. Once the computer understands what you are saying, NLP helps it figure out how to respond and give you a relevant answer.

In summary, NLP helps the computer understand what we say, figure out what we mean, and respond in a way that makes sense.

## 04 Large Language Models (LLMs):

A type of AI that can understand and generate human language in a very advanced way.

Imagine a really smart robot that has read millions of books, articles, and websites. This robot has learned a lot about how people write and talk, so it can predict what words should come next in a sentence, write essays, answer questions, and even hold conversations like a human.

That is what a large language model is: a computer program that has been trained on a huge amount of text so it can understand and generate language or even artwork. More about how it works:

- **Fine-tuning:** The model is "trained" by being fed tons of data from any type of source. It learns patterns, grammar, facts, and even some reasoning by analyzing this data.

The model doesn't memorize the text; however, it learns how words and sentences are structured and how different ideas are related to each other.

- **Prediction:** Once trained, the model can take a piece of text and predict what comes next.

For example, if you type "The brake pad material is," the model might predict "ceramic" as the next word based on what it has learned.

- **Generation:** The model can also generate new text by continuing from a prompt you give it.

For example, if you start with "Find me the water pump for a 2015 Ford F-150" it can recognize your intent, locate the appropriate database and present the requested fitment information.

# DATA COLLECTION & PREPARATION

Data is critical to AI and can be used in various ways. There are two key types of models based on the required task.

## 01 Supervised Model:

Where the computer learns from examples that are already labeled with the correct answer. It is like teaching a student by giving them a bunch of practice problems with the solutions provided so they can learn how to solve similar problems on their own. It is a powerful way to teach AI systems to perform specific tasks like recognizing images, understanding speech, or detecting spam, by learning from labeled examples.

## 02 Unsupervised Model:

This type of machine learning is where the computer learns from data that is not labeled. Unlike supervised learning where the computer is told the correct answer, in unsupervised learning, the computer tries to figure out the patterns and structure in the data on its own.

The AI uses algorithms to explore the data and find patterns or groupings. Since it is not guided by predefined labels, the AI looks for relationships, similarities, or structures in the data. One common technique in unsupervised learning is clustering, where the AI groups similar data points together. For instance, it might group customers who buy related products or have similar buying habits.

The AI then tries to find hidden patterns or structures in the data. These patterns might reveal interesting insights, like groups of customers with similar behavior or products that are often bought together. Instead of providing a clear answer, unsupervised learning gives you insights, such as clusters or patterns, that one can interpret.

The AI might show that there are several distinct groups in one's customer base, but it will not label them—it's up to the user to decide what those groups represent.

# AI USE CASES FOR AUTO PARTS MANUFACTURERS

Incorporating AI into your company's business strategies requires careful consideration of what specific problems you are trying to solve.

While AI is undoubtedly going to be one of the most significant evolutions in how we do business since the internet, the excitement around an "AI strategy" can sometimes distract from what its use actually looks like in the field.

**The truth is, AI's real value lies in how it integrates with your broader business strategy, enhancing efficiency for many time-consuming tasks that take valuable time from top employees.**

For auto parts manufacturers aiming to increase e-commerce sales, the focus should shift from **"Do we need AI?"** to **"How can AI enhance our current operations?"** This involves pinpointing areas like customer service, product data management, and supply chain logistics where AI can significantly improve efficiency.

In this paper, we explore how AI can address two key industry questions in multiple functional areas. We will examine AI solutions ranging from basic implementations to advanced applications that, while requiring significant setup, offer considerable benefits.

These tools are essential for companies beginning to integrate AI into their daily operations, promising enhanced sales efficiency and improved customer satisfaction.

**Our focus is on practical AI applications that solve everyday business challenges and drive substantial improvements.**

# "How can I increase e-commerce sales using AI?"

This question applies to companies engaged in e-commerce, including direct-to-consumer sales, B2B portals, and first-party relationships with platforms like Amazon.

Additionally, for businesses that view e-commerce as a channel their customers use, it's crucial to adopt solutions that enhance brand sales over competitors. This can be achieved by improving data accuracy, inventory availability, and insights into market demands and performance.

## Crawl: Initial Steps

### Chatbots for Customer Service

- **Function**

  AI-powered chatbots provide instant, 24/7 customer support, handling inquiries about product availability, pricing, and specifications, and guiding customers through the purchasing process.

- **Benefits**

  Enhances customer satisfaction and increases average order value by offering personalized recommendations and promotions, freeing human agents to tackle more complex issues.

### Examples

**Zendesk:** Automates natural language responses to common inquiries, reducing the workload on human agents and providing instant support for FAQs, order tracking, and basic troubleshooting.

**Drift:** Engages visitors with automated messages based on their behavior on the website, improving customer interaction and satisfaction.

## Product Data Management

### Function

AI streamlines the management of product data through automated enrichment, classification, and health analysis, ensuring products are accurately categorized and displayed.

### Benefits

Speeds up product onboarding, enhances data accuracy, and maintains high-quality data across platforms.

### Examples

**Pivotree:** Uses AI to identify opportunities in your attribution, bringing back enriched data to fill missing product data points, which are essential for customer trust.

**PDM:** Uses AI to optimize and manage product data for the automotive industry, ensuring accuracy and consistency across platforms while enhancing search and product discoverability.

# Walk: Intermediate Applications

## Supply Chain Optimization

### Function

AI optimizes the supply chain by forecasting disruptions and improving inventory management through enhanced data analysis.

### Benefits

Reduces excess inventory, minimizes stockouts, and improves cash flow.

### Examples

**Llamasoft:** Supply chain analytics and decision-making tools to optimize logistics, demand forecasting, and production planning using advanced algorithms.

**Epicor's Kinetic:** Automates demand forecasting, optimizes production schedules, and enhances supply chain efficiency by predicting disruptions and managing inventory in real time.

## Customer Segmentation and Feedback Analysis

### Function

AI improves how an auto parts manufacturer targets customers by leveraging sentiment analysis, customer segmentation, and feedback analysis.

### Benefits

Allows for tailored marketing campaigns that resonate more effectively with each group, enhancing customer satisfaction and driving data-driven decisions.

### Examples

**Surecritic:** Analyzes and filters customer reviews, ensuring that feedback is genuine, relevant, and actionable, helping businesses improve their services based on trustworthy insights.

**Segment:** Analyzes customer data to create detailed segments, enabling targeted marketing campaigns that increase engagement and conversion rates.

## AI-driven Analytics/Business Intelligence

### Function

AI in analytics revolutionizes how businesses uncover trends and patterns, generate reports, forecast future trends, and continuously improve through machine learning.

### Benefits

Enables rapid insight generation, accurate forecasting, and continuous improvement, keeping businesses ahead of the curve.

### Examples

**Tromml:** Uses AI to provide real-time insights into opportunities and issues while facilitating rapid report generation via a chat (LLM) interface.

**Tableau:** Provides advanced data visualization and predictive analytics, uncovering insights and trends through automated reports and dashboards.

# Run: Advanced Implementations

## Next-Generation Shopping Experiences

### Function

AI enhances e-commerce by enabling visual searches and creating hyper-personalized shopping experiences.

### Benefits

Makes the shopping experience more intuitive and engaging, improving product discovery and increasing customer engagement.

### Examples

**Visenze:** Allows customers to search for products using images, simplifying the discovery of similar or matching items from the catalog.

**PhaseZero.ai:** Uses AI to enhance e-commerce by personalizing customer experiences, optimizing inventory, and automating decisions with predictive analytics for the automotive and industrial parts industries.

**Syte:** Enhances the visual search experience by enabling users to upload images

## Market Trend Analysis

### Function

AI significantly enhances market trend analysis by processing large volumes of data to identify patterns and predict future market trends with high accuracy.

### Benefits

Makes the shopping experience more intuitive and engaging, improving product discovery and increasing customer engagement.

### Examples

**Crayon:** Allows customers to search for products using images, simplifying the discovery of similar or matching items from the catalog.

**Signals Analytics:** Uses AI to enhance e-commerce by personalizing customer experiences, optimizing inventory, and automating decisions with predictive analytics for the automotive and industrial parts industries.

Following our exploration of how AI can boost e-commerce sales, another key question often emerges for auto parts manufacturers:

## "How can we harness AI to streamline our supply chain and ensure the consistent availability of necessary repair parts?"

This question addresses a critical aspect of operations where delays not only impact service quality but also can trickle down to brand satisfaction.

By integrating AI at various stages of the supply chain, businesses can proactively manage inventory levels, predict maintenance needs, and optimize logistics, ensuring efficient operations and reliable service delivery.

This approach exemplifies how AI can be a pivotal tool in transforming challenges into opportunities for growth and efficiency in the auto parts industry.

## Crawl: Initial Steps

### Automated Inventory Alerts

- **Function**

  Utilize AI to monitor inventory levels and send automated alerts for replenishment when stocks dip below pre-set thresholds.

## Benefits

Ensures that essential repair parts are always in stock, preventing shortages that could stall repairs.

## Tools

**Netstock:** An inventory management solution that provides automated replenishment alerts, tailored to current stock levels and historical sales trends.

**Epicor:** Smart inventory planning and optimization (IP&O) offers AI-driven tools that fine-tune demand forecasts, optimize stocking policies, and enable strategic inventory decisions within the trusted Epicor ERP system.

# Demand Forecasting

## Function

Implement basic AI-driven forecasting tools to anticipate future part demands based on historical sales data, seasonality, and market trends.

## Benefits

Enhances accuracy in inventory management, minimizing overstock and shortages.

## Tools

**Forecast Pro:** Helps businesses getting started with AI to generate reliable demand forecasts.

**Infor:** Offers demand forecasting and planning tools within its CloudSuite Automotive, leveraging AI to predict demand accurately and align inventory with market needs.

# Walk: Developing Further

## Enhanced Supplier Integration

- **Function**

  Integrate AI into your supply chain systems to enhance data synchronization across suppliers, logistics partners, and distributors for real-time visibility.

- **Benefits**

  Streamlines operations and communication throughout the supply chain, reducing delays and improving market adaptability.

- **Tools**

  **SAP:** Facilitates comprehensive planning process integration across the supply chain network.

  **Oracle:** Enhanced supplier integrations, enabling companies to manage supplier relationships, optimize procurement processes, and ensure the timely delivery of parts and materials.

## Predictive Maintenances

- **Function**

  Deploy AI to forecast potential failures in vehicles, scheduling preemptive maintenance to prevent downtime.

### Benefits

Keeps logistics operations running smoothly, minimizing unexpected disruptions.

### Tools

**Uptake:** Specializes in predictive maintenance, using AI to foresee and mitigate equipment failures before they disrupt the supply chain.

**Predii:** Offers predictive maintenance solutions that help automotive manufacturers and fleet operators anticipate equipment failures and optimize maintenance schedules, reducing downtime and repair costs.

## Run: Advanced Implementations

### AI-Optimized Routing and Logistics

### Function

Use advanced AI algorithms to dynamically optimize delivery routes and logistics operations based on real-time traffic, weather conditions, and delivery schedules.

### Benefits

Reduces delays in delivering repair parts, improving supply chain efficiency and customer satisfaction.

### Examples

**Llamasoft:** Provides insights for optimizing logistics and reducing operational costs.

**Trimble MAPS:** Routing solutions that optimize delivery routes based on real-time traffic and weather conditions.

## Smart Contracts for Supply Chain Automation

### Function

Implement AI-driven blockchain technology to automate and enforce agreements between suppliers and retailers through smart contracts.

### Benefits

Increases transparency and accountability in the supply chain, speeding up processes and reducing the potential for disputes.

### Examples

**IBM Blockchain:** Delivers a powerful platform for creating and managing smart contracts, enhancing automation and security in supply chain transactions.

**ConsenSys Codefi:** Used to streamline supply chain processes allowing for the automation of complex agreements between suppliers and retailers.

# GETTING STARTED WITH AI

## 01 Understand Your Business Needs

Before diving into AI, it is crucial to assess one's business objectives. Identify the key areas where AI can add value—whether it is in predictive maintenance, customer engagement, or inventory management. Understanding the specific needs of the business will help identify the right AI solutions.

## 02 Build a Data Strategy

As always, it is all about the data. AI thrives on data. Ensure the business has a robust data collection and management strategy in place. This includes gathering historical data, normalizing the data, and ensuring data quality and security.

Storage and accessibility are important as well. Perhaps look at implementing a data lake to be ready to engage with an AI partner. A well-organized data foundation is essential for successful AI implementation.

## 03 Select the Right AI Partner

There are various AI tools and platforms available, each with unique capabilities. Evaluate vendors and tools based on business needs, scalability, ease of integration, and support services.

Collaborate with a partner who can provide automotive aftermarket-specific AI solutions and can provide those solutions in a safe, secure environment which protects intellectual property.

## 04 Invest in Training and Skills Development

AI implementation requires skilled professionals who understand both AI technologies and the automotive industry's specific business requirements. Invest in training one's existing workforce or hiring experts in AI, data science, and machine learning.

Collaborating with external potential AI partners can also provide the necessary expertise.

## 05 Crawl, Walk, Run

Begin with pilot projects in specific areas to assess the effectiveness of AI solutions. For example, start with AI-driven predictive maintenance for a small fleet of vehicles or implement AI-based inventory management for a particular product line. Analyze the results, gather feedback, and gradually scale-up the implementation across the organization.

## 06 Ensure Compliance and Ethics

As with any technology, AI implementation must comply with industry regulations and ethical standards. Ensure that one's AI systems respect customer privacy and data protection laws. Establish clear policies and guidelines to address these concerns.

## 07 Monitor and Optimize

AI is not a one-time implementation but an ongoing process. Continuously monitor the performance of AI systems, analyze the outcomes, and refine the algorithms as needed.

Stay updated with the latest advancements in AI to keep systems optimized and competitive.

The AI partner one selects will bring AI expertise and industry knowledge, but business subject matter experts will be needed to ensure the solution is fully customized to meet the business requirements.

## Conclusion

The integration of AI in the automotive aftermarket industry is not just an opportunity—it is becoming a necessity for staying competitive in a rapidly evolving market.

By understanding the business needs, building a solid data foundation, choosing the right tools, and starting small, one can successfully navigate the complexities of AI adoption.

Embracing AI will enable the business to enhance operational efficiency, deliver superior customer experiences, and drive growth in the digital age.

# KEY AI TERMINOLOGY

When getting started with AI, especially in the context of the automotive aftermarket industry, understanding the following key terminology will be important

## Artificial Intelligence (AI)

- **Definition:** The simulation of human intelligence by machines. AI encompasses a variety of techniques that allow machines to learn, reason, and solve problems.
- **Example:** AI can be used in predictive maintenance to anticipate when a vehicle part will need to be replaced.

## Machine Learning (ML)

- **Definition:** A subset of AI that involves training algorithms on data to enable them to make predictions or decisions without being explicitly programmed.
- **Example:** ML algorithms can analyze customer purchase patterns to predict future sales trends.

## Deep Learning

- **Definition:** A subset of machine learning that uses neural networks with many layers (deep neural networks) to model complex patterns in large amounts of data.
- **Example:** Deep learning can be used in image recognition for identifying vehicle parts.

## Neural Networks

- **Definition:** Computational models inspired by the human brain, consisting of layers of nodes (neurons) that process data.
- **Example:** Neural networks can be used to classify images of car parts based on visual characteristics.

## Data Mining

- **Definition:** The process of discovering patterns and relationships in large datasets.
- **Example:** Data mining can help identify common failure points in certain car models.

## Natural Language Processing (NLP)

- **Definition:** A field of AI that enables machines to interpret and make decisions based on visual data.
- **Example:** Computer vision can be used for automated inspections of vehicle components.

## Computer Vision

- **Definition:** A field of AI that enables machines to interpret and make decisions based on visual data.
- **Example:** Computer vision can be used for automated inspections of vehicle components.

## Algorithm

- **Definition:** A set of rules or steps used by AI systems to perform a task or solve a problem.
- **Example:** An algorithm might be used to optimize the supply chain for auto parts.

## Big Data

- **Definition:** Extremely large datasets that require advanced methods to store, process, and analyze.
- **Example:** Big data analytics can be used to analyze vehicle sensor data to predict maintenance needs.

## Predictive Analytics

- **Definition:** The use of historical data, statistical algorithms, and machine learning techniques to predict future outcomes.
- **Example:** Predictive analytics can forecast when a car part will fail based on usage patterns.

## Supervised Learning

- **Definition:** A type of machine learning where the model is trained on labeled data, meaning the input and the corresponding output are provided.
- **Example:** A supervised learning model can be trained to identify defective car parts based on labeled images.

## Unsupervised Learning

- **Definition:** A type of machine learning where the model is trained on data without explicit instructions on what to do with it.
- **Example:** Unsupervised learning can cluster similar types of vehicle issues without predefined labels.

## Reinforcement Learning

- **Definition:** A type of machine learning where an agent learns to make decisions by taking actions that maximize cumulative rewards.
- **Example:** Reinforcement learning can be used to optimize the routing of delivery trucks to reduce fuel consumption.

## Automation

- **Definition:** The use of technology to perform tasks without human intervention.
- **Example:** Automation in manufacturing can streamline the production of auto parts with minimal human oversight.

Understanding these terms will provide a solid foundation for anyone looking to explore AI applications in the automotive aftermarket industry.