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Artificial Intelligence in Logistics

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Abstract

Logistics is one area where AI has started to have an effect. It is now a must-have part of any company's next software system. The advent of new and developing technologies like artificial intelligence, machine learning, and block chain has changed the disjointed and disorganized logistics industry. A few of the advancements that these technologies have brought to the logistics business are autonomous trucks, predictive analysis, and smart highways. Artificial intelligence and machine learning may be quite helpful in the supply chain when it comes to expediting processes, preventing human mistake, saving time, etc.

Keywords

Artificial Intelligence, Machine Learning, Logistics, Technology, Supply Chain

1. Introduction to Artificial Intelligence

Artificial Intelligence is the intelligence of machines which is totally opposite to the intelligence of humans or animals. AI applications include advanced web search engines (like Google search), recommendation systems (like YouTube, Amazon and Netflix), understanding human speeches (like Alexa), generative and creative tools (like Snap Chat). AI is the fastest technology which gives reply to a chat message in milliseconds where as it takes more time for humans to type and send a chat message

2. Meaning of AI in Logistic Companies

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Logistic organizations can benefit from a wide range of capabilities including autonomous equipment and predictive analytics. AI has mostly been used in the logistics industry for four business functions namely: service operations, product and service development, marketing and sales and supply chain management

3. Role of AI in Logistic Sector

- **Saving time:** AI plays a crucial role in saving time, lowering expenses, enhancing productivity and improving accuracy. It helps us to save time and money by automating a variety of time consuming operations and assisting with demand forecasts. AI aids in logistics, which helps to reduce shipping costs, which in turn helps to generate more profits. AI allows computers to gather, analyze and make informed decisions in a matter of seconds saving time for humans.

- **Driverless Vehicles:** AI has introduced driverless vehicles to increase the delivery procedure significantly

- **Robotics:** Robotics is interconnected with intelligent machines which is an enhanced application of AI that processes logistics management

4. Applications of AI in Logistics

- **Planning:** Logistics planning needs extensive preparation that involves coordinating with suppliers, customers and various company units. Machine learning solutions can help with planning since they are effective at scenario analysis and numerical analytics both of which are important for planning

- **Forecasting Demand**

  i) Organizations may leverage real-time data in their forecasting attempts thanks to AI capabilities

  ii) Manufacturers can better manage the number of deployed trucks to local warehouses and decrease operational expenses by improving their workforce planning with increased demand prediction accuracy

iii) Local warehouses/retailers can cut storage expenses

iv) Customers are less likely to experience stock outs that reduce customer satisfaction

- **Supply Chain Management:** Artificial Intelligence assists firm in analyzing demand in real-time so that supply planning parameters can be updated dynamically to optimize supply chain low

- **Warehouse Automation:** Only 12% of organizations are employing AI technology in their warehouses, according to the 2020 MHI Annual Industry Report, but that number is predicted to rise to above 60% in the next six years

- **Robots in Warehouses:** Another AI technology that is being heavily invested in to improve supply chain management is Warehouse Robots. Between 2017 and 2022, the warehouse robots industry is predicted to increase at a CAGR of 11.8% with a market value of USD 2.28 billion

5. Types of Artificial Intelligence

Artificial Intelligence can be divided into two types: (A) Type 1 (AI Based on Capability) and (B) Type 2 (AI Based on Functionality)

A. Type 1 (AI Based on Capability)

i) **Weak AI / Narrow AI:** An example of narrow artificial intelligence is the ability to intelligently carry out a certain task. Narrow AI is the most popular type of AI that is currently accessible. **Narrow AI examples include:** AI-powered chess game, speech recognition, image recognition, self-driving automobiles, and recommendations for purchases on online stores

ii) **General AI:** An intelligence known as general artificial intelligence (AI) is capable of handling any intellectual work as effectively as a human. The goal of general artificial intelligence is to create a system that is capable of thinking like a person on its own. The goal of current global research is to create machines with general artificial intelligence.

iii) **Super AI:** Super AI refers to a system's intelligence level where computers are able to outperform humans at any task and have cognitive qualities. It is an AI-produced result.

Super AI's capacity for independent thought, reasoning, problem-solving, judgment, planning, learning, and communication are some of its primary traits.

B. Type 2 (AI Based on Functionality)

i) **Reactive Machines:** Artificial intelligence starts with robots that are purely reactive. These AI systems don't keep track of memories or past encounters for use in the future. Google's Alpha Go and IBM's Deep Blue system are two instances of reactive machines.

ii) **Limited Memory:** Machines with limited memory can temporarily store certain data or memories. These devices have a certain amount of time to use stored data. Example: Autonomous vehicles using a constrained memory system. These vehicles can store information to help them traverse the road, such as the speed limit, distance from other vehicles, and recent speeds of adjacent cars.

iii) **Theory of Mind:** Mental theory AI should be able to communicate specifically like humans and comprehend human emotions and beliefs. Although these AI devices have not yet been constructed, researchers are working very hard to make advancements in this area.

iv) **Self-Awareness:** Self-Recognition Future Artificial Intelligence is known as AI. These machines will possess consciousness, feelings, and self-awareness in addition to being extremely intelligent. These devices will surpass human intelligence. Self-awareness artificial intelligence is still a theoretical idea that does not exist in reality.

6. Benefits of AI in Logistic Industries

- **Better Customer Services:** People in the logistic industries mostly depend on reliable service providers. The greatest transport service is offered to firms and their clients by artificial intelligence technology instruments since they are efficient and in style in the business sector. Customers trust AI because it offers them dependable, individualized service. AI assists clients based on their past purchasing experiences.

- **Shipment and Delivery:** AI technology tools are used by the logistics sector to improve shipment and delivery productivity. Artificial Intelligence (AI) techniques are sophisticated enough to track traffic on roadways and save gasoline. It determines the route and free time to improve customer service with the aid of the route optimization technique.

- **Marketing and Sales Optimization:** Drone usage is becoming more and more popular in the logistics sector. AI offers solid technologies that can quickly improve the delivery process. Drones are utilized to safely deliver various medications and other commodities.

- **Back-Office Automation:** The logistic sectors, which rely on AI to maintain workforce, email, billing, and other operational services, are the foundation of the technology's improved benefits.

- **Smart Roads:** In the logistics industry, smart roads can be of great assistance since they can minimize delays in product delivery and meet customer service requirements. Solar panels are used on smart roads to prevent ice buildup in the winter. This uses AI to support driverless vehicles for quick goods delivery.

7. Advantages of Artificial Intelligence

- It replies within milliseconds
- It is most beneficial technology for everyone
- It can solve arbitrary problems
- It knows all the languages and it even translates the language into other languages
- It has the higher knowledge that even a human being cannot imagine

8. Disadvantages of Artificial Intelligence

- Most of the human beings are addicted and dependable on the AI and not preferring to use their brain and knowledge what they have
- People are addicted to AI in the same way that they are addicted to smart phones. The upcoming generations may totally depend on AI and Robots for their works

9. Conclusion

AI in Logistics is a rapidly growing field that has the potential to change supply chain management. By understanding its benefits, challenges and practices for implementation business can improve efficiencies and reduce costs. As technology advances at an ever increasing rate, companies must stay ahead by investing in AI solutions specifically to their needs, if they want to remain competitive in today's global market.