PROMISING FUTURE FOR AUTONOMOUS VEHICLES IN LOGISTICS: CHALLENGES AND OPPORTUNITIES

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Logistics plays a key role in the modern economy. It ensures the efficiency of long-distance transport and the transport of goods and cargo. Thanks to the development of technology and the introduction of innovative solutions, logistics transport has become faster and more reliable.

The introduction of modern technologies and innovative solutions helps to improve the shipping and transport process and optimise costs. One such innovative approach in logistics is the use of autonomous vehicles. They are increasingly finding their way into logistics chains. For example, autonomous vehicles are already widespread in various logistics centres and warehouses [1].

One of the key features of autonomous vehicles is their ability to continuously learn and improve. They can accumulate experience and data from their journeys, analyse it and use the knowledge gained to make more accurate and efficient decisions in the future. It is because of their ability to improve that autonomous vehicles will be discussed in this article today.

Autonomous vehicles are a technological breakthrough that is changing the way we think about transport. They are vehicles capable of travelling without human intervention, using various technologies and artificial intelligence.

Autonomous vehicles use artificial intelligence algorithms to analyse and process the collected data, make decisions and control traffic. They can perform functions such as controlling acceleration, braking, turning and selecting the optimal route. Their main goal is to ensure safe and efficient movement of people and goods without the need for a driver. They can be used in a variety of industries, including road transport, freight transport, public transport and even aviation [2].

Now let's look at the benefits of autonomous vehicles in logistics:

- Automation and increased productivity: allow automation of various tasks such as moving goods, sorting and packing.

- Reduced risks and errors: the use of machines reduces risks associated with human error, such as errors in navigation, steering and task execution.

- Improved safety: autonomous machines have the ability to operate in hazardous or hard-to-reach areas where it can be dangerous for humans.

- Optimising resource utilisation: machines can be programmed to optimise the use of resources such as fuel, energy and time.

- Improved customer service: shipments can be delivered faster and more accurately, resulting in customer satisfaction and increased customer loyalty [3].

Unmanned logistics has applications in various fields and offers many possibilities, so now let's look at some examples of the application of devices in unmanned logistics:

- Unmanned trucks: unmanned trucks equipped with special sensors and control systems can automatically transport goods over long distances. They can optimise routes, avoid traffic jams and accidents, and save fuel.

- Unmanned drones: they are widely used in unmanned logistics to deliver small loads. They can deliver parcels, medical supplies, food and other goods to hard-to-reach or remote areas.

- Automated warehouses: they use various devices such as automated forklifts, conveyors, robot manipulators others to automate the storage and movement of goods.

- Smart containers and packaging: smart containers and packaging are equipped with sensors and monitoring systems that allow you to track the location and condition of your cargo in real time [4].

The application of devices in unmanned logistics presents a number of challenges and problems:

- Safety: vehicles and robots must be able to avoid obstacles, prevent collisions and ensure the safety of surrounding people and property.

- Technical challenges: they require complex technical infrastructure including sensors, cameras, navigation and communication systems.

- Regulation and legislation: appropriate rules and regulations need to be developed that define rules of use and liability for potential accidents.

- Challenges to technology acceptance: some people may fear job losses or doubt the reliability and effectiveness of such systems.

Now let's look at the unmanned logistics opportunities that may become part of everyday life in the near future:

- Autonomous vehicles: these vehicles can autonomously deliver goods without human intervention, reducing labour costs and increasing the speed and accuracy of delivery.

- Robotic warehouses: robots will be able to move and sort goods, pack and prepare them for dispatch.

- Intelligent management systems: artificial intelligence will be able to analyse data on cargo, routes and delivery conditions, predict possible problems and make decisions to optimise logistics processes [5].

Autonomous vehicles are a modern trend that uses devices to automate and optimise the delivery and storage of goods. The use of such machines in logistics can reduce costs, increase efficiency and improve the safety of operations. However, there are challenges and issues such as reliability and safety of the devices, as well as ethical and regulatory issues. In the future, the use of autonomous vehicles will continue to evolve and become an integral part of the modern delivery and logistics industry.

References

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