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Artificial intelligence and its role in aviation security

The article considers the role of artificial intelligence in ensuring safety in the aviation industry. Its application for threat detection, process automation, access control, cyber security and risk prediction is described. Artificial intelligence contributes to increasing the efficiency of security and reducing human errors in this area.

Introduction

Technology rules the world. And aviation is no exception. Artificial intelligence is also used in this field. True, here it is not developing as rapidly as in other industries. However, some progress has already been made.

Aviation security is a priority area for ensuring the smooth and safe operation of the global transport infrastructure. Every day, millions of people use air transport, and every flight must ensure the safety of passengers, crew and infrastructure. Given that threats in the aviation industry are constantly changing and becoming more complex, there is a need for innovative approaches to risk management.

Artificial intelligence (AI) offers new methods of increasing the effectiveness of detecting and eliminating threats. AI-based technologies make it possible to automate routine processes, analyze large data sets in real time, and predict potential threats before they occur. This allows not only to reduce the number of human errors, but also to increase the speed and accuracy of decision-making.

The application of AI in the aviation industry spans a variety of areas, from physical security, including passenger and baggage control, to cyber security, protecting critical digital systems from attacks. AI promotes proactive approaches to security, making the aviation industry more adaptive and resilient to the new challenges of today's world.

Artificial intelligence in threat detection and data analysis.

One of the most important roles of AI in aviation security is the early detection of threats. Aviation complexes collect a huge amount of data from various sources: video surveillance cameras, baggage scanners, flight monitoring systems and passenger flows. Thanks to machine learning algorithms, AI is able to analyze this data in real time, identify patterns that may indicate threats, and transmit information about them to security services. This allows to reduce the risks of terrorist acts, smuggling and other violations.[2]

Education process for pilots and in common pilots' sphere.

One of the main areas in which the aviation sector is constantly trying to improve is pilot training. Training a future pilot is a long and intensive process, with ground school and certification tests. According to experts, artificial intelligence will significantly improve the training of pilots. According to industry experts, artificial intelligence will allow pilots to have even more realistic simulations, giving pilots a

full visual range with augmented reality. A computer with implemented artificial intelligence will not only collect all training data, but will also record the pilot's behavior during training. All data collected during training will be used to improve the autopilots. Pilot assistance is another important function that can be improved with the help of artificial intelligence. In theory, it could give pilots greater situational awareness and reduce the time spent on instrument controls. It may also allow pilots to better communicate with other crew members during flight. And this is not just a theory, as Garmin, which specializes in GPS technology, has already introduced "Telligence". This is a product designed to reduce the pilot's workload and ensure a pleasant flight. "Telligence" allows pilots to talk to the aircraft - to set up communication in the cockpit using simple voice commands. This product is already certified and available for installation today.[1]

Process automation and access control.

Another important function of AI is process automation. Automated systems can replace humans in some routine tasks, such as checking baggage or controlling access to restricted areas. For example, AI-based biometric technologies allow the use of fingerprints or face scans to automatically identify passengers and staff, significantly reducing screening times and the potential for errors.

In the case of access to restricted areas, such as runways or technical facilities, AI ensures that only authorized persons have access. This reduces the possibility of intruders and increases the overall security of the airport. The implementation of AI also allows monitoring the behavior of people in these areas, detecting suspicious activities and warning about potential threats.[3]

Cyber security in the aviation industry.

In addition to physical security, cyber security plays an important role. Given that modern aircraft and aviation infrastructure are increasingly dependent on digital systems, there is a need to protect these systems from cyber attacks. Aviation flight control, data and communication systems must be protected against tampering that could lead to catastrophic consequences. AI is used to detect suspicious activities in digital systems, analyze attacks and respond to them in a timely manner.

AI-based cybersecurity systems have the ability to quickly adapt to new threats because they are constantly improving through self-learning. This provides a higher level of protection than conventional systems, as attacks can be stopped before they do damage. [4]

Risk forecasting and scenario modeling.

Artificial intelligence also plays a key role in incident prediction and risk modeling. It analyzes past events and likely scenarios to predict potential incidents or problems. For example, analyzing past security-related incidents allows AI to predict when and how the next threat might occur, as well as provide recommendations to prevent those threats.[5]

Conclusion

Artificial intelligence opens up new opportunities for improving the level of safety in the aviation industry. Using powerful algorithms to analyze large volumes of data, automate processes, control access and ensure cyber security, AI is becoming an integral part of modern aviation systems. With the development of this technology, the aviation industry will be able to significantly reduce risks, increase operational efficiency and provide safer conditions for passengers and staff.

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