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Prospects for the development of the aviation industry are related to the use of artificial intelligence

It focuses on the study of the concept of artificial intelligence and the possibility of its application in the fields of economy. The areas of application of artificial intelligence in the aviation industry is described.

One of the technologies that will revolutionize almost all areas of human life in the near future is Artificial Intelligence. This concept is found more and more often in various industries, acquiring new opportunities and applications every day. Studies of the emergence of this concept claim that the first definition of Artificial Intelligence was given by John McCarthy who used to work at Computer Science Department of Stanford University. He defined this concept in 1956 as “the science and engineering of making intelligent machines”. This concept was based on the assumption that human intelligence, its main distinguishing property, can be described accurately enough to then be simulated using a computer [1]. Later, in the process of developing this concept, artificial intelligence began to be considered as writing computer programs to solve relevant problems. One of the modern definition is following “Artificial Intelligence is the study of how to make computers do things at which, at the moment, people are better” [2].

Today, artificial intelligence is used in many fields: e-commerce, marketing, finance, education, navigations, robotics, human resource, healthcare, agriculture, astronomy, automobiles etc. The aviation industry, which is a high-tech industry, also uses products of this technology. In recent years, the aviation industry has experienced a period of crisis. Due to the pandemic COVID-19, the aviation industry suffered losses in 2020-2022. But accordingly to IATA (International Air Transport Association) aviation industry expected to become profitable in 2023 as airlines work to cut costs. It is predicted that airlines will make a profit of 4.7 billion US dollars this year. Starting from 2019, this will be the first year when airline operations will become profitable. In 2019, for comparison, the profit of airlines amounted to 26.4 billion US dollars [3]. Airline losses are expected to reach 6.9 billion US dollars in 2022. For comparison, airline losses in 2020 and 2021 amounted to 42.0 billion and 137.7 billion US dollars, respectively.

According to data from the International Civil Aviation Organization (ICAO), the main areas of innovation implementation are aimed at increasing mobility. It is important to leverage advanced technologies to improve travel efficiency and create new business models, which in turn will allow airlines to reduce costs and increase profits. The aviation industry is very technological, so the latest technologies find their application. Such technologies are artificial intelligence, unmanned aircraft innovations, biometrics, block chain, robotics, electric aircraft and alternative fuels [4].

The tasks of artificial intelligence in aviation mainly include improving flight safety, making flight planning and aircraft maintenance automated. In Flight Path Optimization segment AI algorithms analyze the flight data like route distance, altitudes, mileage, fuel use, aircraft type, weather conditions and a lot of other data points. Analysis of all this data allows artificial intelligence to develop an optimal flight path, which in turn will minimize the flight time and the amount of fuel consumed during the flight [5].

Timely maintenance of aircraft, detection of defects and breakdowns allows airlines to ensure compliance with the traffic schedule, most of the flight delays and cancellations occur precisely because of the inappropriate technical condition of the aircraft. This share reaches 35%. In turn, flight delays and cancellations lead to an increase in airline costs. Artificial intelligence technologies make it possible to monitor the technical condition of the aircraft in real time, notifying the technical staff about possible malfunctions and problems. Thus, timely diagnosis and replacement of parts that require it will increase the probability of meeting the planned flight schedule.

As AI technologies are tied to operational systems and databases, airline management and senior management will be able to track material costs and related cash costs and plan material costs for the future. This will optimize spare parts supply chains and optimize overall costs by eliminating the cost of expedited parts delivery and staff overtime.

Such a revolutionary technology as artificial intelligence is radically changing the aviation industry and is mainly aimed at ensuring flight safety. Also, artificial intelligence algorithms are used to optimize operational processes, such as flight planning, formation of crews to perform flight tasks, formation and monitoring of supply chains, ensuring interaction with consumers and development of individual offers.

Artificial intelligence technology is implemented in many operational processes of aviation enterprises, some of them are presented in the Fig.1.



Fig. 1. Artificial Intelligence in the airline industry

The use of this technology for revenue management makes it possible to determine which destinations are most attractive to customers, to form the price of air transportation based on the capabilities of each market segment, to form

distribution networks, and to increase the percentage of seat occupancy to maintain the competitiveness of airlines [6].

A significant amount of development is aimed at researching consumer behavior: what flight directions does the client look at before choosing, what additional services attract consumers, what is the frequency of their flights. All this is aimed at individualizing offers and thus increasing consumer satisfaction. A fairly large share of communication channels is accounted for by mobile applications.

The operational activities of aviation companies can also be significantly improved with the help of artificial intelligence. Ensuring fast, timely and complete exchange of information allows you to perform all operational processes in the minimum necessary time and ensuring the interaction of all air traffic participants in real time. In addition, it increases the accuracy of forecasts of aviation enterprises.

It should be noted that all technologies related to a large amount of information must be provided with an appropriate level of its protection. So, in parallel with the development of artificial intelligence, big data, blockchain, data protection systems are being developed. This is especially important to ensure flight safety, but it is also of great importance to preserve commercial secrets of airlines and personal data of passengers. And speaking about the optimization of costs and revenues of airlines, it should be noted that such measures will require significant financial investments.

Therefore, artificial intelligence technology can in many ways improve the operation of air transport, optimize costs, provide additional service, safety, improve the operational activities of airlines, and improve the passenger experience. But like any technology, artificial intelligence has its own risks. The statements of many scientists about the dangers of artificial intelligence may be populism, but what exactly they will be can be assessed only after some time.

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