Trending Digital Innovations in Aerospace and Aviation Industry

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Abstract

The prospective breadth is shown by an overview of system manufacturing under aeronautics. The primary goals are to discuss system planning and execution using computer-based technologies like the Internet of Things and the digital block chain method. The review's categories span everything from digital devices, mobile and desktop applications, to other AI-based solutions used to address aviation services. As a result, automation and the internet of things can be used to design and manufacture aircraft more quickly and affordably, as well as gather essential data about flying takeoffs and landings and safety measures.

Keywords: Aircraft, Aerospace, Aviation, Block chain, Cloud computing, Big data analytic

1. Introduction

Aircraft is a flying machine in air, which could take goods and passengers in a large amount to the destination places. The two modules of aircrafts are aerospace and aviation industry. Aerospace deals with the basic functions of the aircraft involving its blueprint to providing the certification of various aircraft systems, while the Aviation industry does all the managerial functions. For making perfect aircraft, both of these industries are required so that no catastrophic failures could occur during flights (Vagdevi and Guruprasad, 2015).

Years ago, the manual processes were to be used for making any aircraft functional. Thus aerospace and aviation industry could not consider its flaws as early as possible and tracking was not possible due to the lack of proper strategy. Therefore, the trending computer-system based techniques extend over these issues with the efficient performance by tracing everything over computer based technologies.

2. Literature Review

The aircraft supply chains involve a set of complex activities and in the distant past, large-scale plants were required to make aircraft. A wide range of stakeholders were involved in the supply chain, including raw material suppliers, creators, workers, and the assemblers of manufacturing parts. Basically this process was covered into two separate parts having tier 1 and 2. Tier-1 suppliers looked at the structure, propulsion, pneumatic systems, and flight system. Tier-2 suppliers managed the mechanical pumps, motors, and control system. the third tier suppliers assembled all the parts generated during the preceding steps and fitted them in combination. Passengers might get benefits from the aviation sector for their flights in this way (Mocenco et al., 2015).

This process has been tedious and time consuming since the 1940s. As a result of the longer supply chain, more money was spent on the manufacturing process. The entrance of innovation and technology

into the engineering sector has resulted in a significant change in the aircraft manufacturing process (Rose-Anderssen et al., 2008).

Under the technological area, a variety of CAD/CAM software for airplane designing, flight control, running simulators, and artificial intelligence support systems are now being employed to automate the process and reduce the manufacturing process to aircraft delivery (Koverninskiy et al., 2016).

After considering the problem of delays in the vast supply chain of the aviation department, advances were made after the 1940s, when changes in the work process was projected with the innovative methods. Earlier each unit has its own workstations, such as assembly lines and networks, which was now replaced with the process that has resulted in efficient solutions.

3. Methodology

Visitor information, collaboration, and communication among different parties involved are essential from the time aeronautical and airline companies should be established until the air carrier arrives successfully. Customers' desire for superior products and services has motivated these firms to embrace digital technologies such as enormous amounts of data managing through analytic, Cloud Computing through Block chain method and mobile computing.

Various trending technologies

- Block chain: Deploying cloud based supply chain management using block chain process. The virtual storage on cloud infrastructure is much more cost-effective as the bill would be generated for using the services as per the usage. Thus operational cost, maintenance of systems and securing data through encryption mechanisms make it more popular among clients worldwide. Block chain in aviation network is the most influential technology that has various blocks in the chronological order having multiple activities in each block to be performed (Karumanchi et al., 2019).

- Big data analytics: For civil aircraft health management, looking at trends of passengers in particular time-span and providing adequate offers for the frequent passengers. Fuel monitoring space and optimization, inflight music system as per passenger interest, and more client satisfaction could enhance aviation business (Chen et al., 2016).

- Mobile computing based applications: Mobile based applications provide more soothing environment to the passengers. Mobile technology can contribute in different ways constituting passenger registration and booking flight over online platforms, tracking the delivery goods, looking at flight schedules and mandatory updates (Sarol et al., 2022).

Various strategies to be used

- Outsourcing strategy: Outsourcing parts is the technique adopted to optimize results in the globally competitive aviation business. As the need for aviation components grows, businesses that specialize in certain aircraft parts are approached, and solutions are devised and prepared as a result. Maintenance, Repair, and Overhaul (MRO) firms are expanding rapidly. The MRO business could help in getting rid of the irreversible harm or even deaths in the aircraft accidents (Liangrokapart and Sittiwatethanasiri, 2023).

- System design and manufacturing: For manufacturing system design, manufacturing the aviation based functions and simulation for the actual system implementation this mobile computing based

strategy could work well. Various system simulator before actual pilot training could be the one option (Negahban and Smith, 2014).

4. Results

Simulators and AI-based tools along with improved communication, better feedback solutions by passengers through natural language processing interactions and usability response are some advantageous efforts of these technologies.

5. Conclusion

Timely delivery of aircraft and quality-based services such as customer support services, aircraft maintenance, keeping record of passengers and providing adequate offers to the frequent passengers could be attained with the usage of technology. These technical applications and strategies are still developing. Sometimes it is hard to bring conformity with the standard solutions. Aviation industry needs real-time solutions as the delay of fraction of seconds could be dangerous for the airplane. Moreover, strong internet networks worldwide and powerful security systems for keeping the passengers' information and flights sensitive data secure from the unprivileged access.

6. References

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