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Chapter 19

Performance Analysis and Optimization of Eppler-398 Unmanned Aerial Vehicle Using Machine Learning Techniques

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Summary

The main objective of the research paper is to analyze and optimize the performance of uncrewed aerial vehicles (UAVs) using artificial intelligence. The paper concentrates on the meticulous examination of each component of the UAV and subsequently compares its characteristics to preexisting data. The Eppler-398 airfoil has been chosen as a foundation for developing an inflatable airfoil, incorporating certain alterations to enhance its aerodynamic performance and augment its lift capabilities. The primary objective of the research is to facilitate improved flow control and the generation of lift through the utilization of an inflatable airfoil. Additionally, the paper brings attention to the potential of UAVs in networking and communication systems, proposing their integration to amplify the exposure and capacity of traditional networks. Regardless, a thorough analysis of the several aspects of creating an AI-powered autonomous UAV network has to be done in detail. The UAV's constituent parts are seamlessly integrated and subjected to rigorous analysis. An extensive evaluation of 2-D and 3-D normal and inflatable airfoil is conducted. The effect of varying angles of attack on airfoil performance is systematically explored through computational simulations. The analytical phase is effectively executed using these software tools, providing valuable insights into the UAV's aerodynamic behavior.

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