Design of an AI-Assisted Digital Flight Data Recording System for Sri Lanka Air Force Light Aircraft

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A flight recorder, commonly referred to as a black box, is regarded as the most crucial source of information in the investigation of air accidents. Since the 1950s, flight recorders have been recognized as essential components of onboard equipment for both military and civilian aircraft worldwide. These devices are invaluable not only for analysing flights after unexpected incidents but also for pilot training, evaluating pilot skills, diagnosing onboard systems, and assessing the performance of aircraft systems. Consequently, flight recorders play a significant role in ensuring high aircraft reliability and aviation safety. This research project introduces a digitalized Flight Data Recorder (FDR) system designed for light aircraft, aimed at enhancing aviation safety. The primary objective of this system is to accurately record essential flight parameters to improve the analysis and understanding of aircraft performance and safety. The system integrates with various sensors, including an accelerometer, and Pitot tube with an airspeed sensor. The paper looks at methodology, design issues, and testing steps of the Flight Data Recorder (FDR) system development. The early stages of this project showed that it had a reliable and accurate system during test flights as well as for collecting and monitoring critical flight data.The integration of more sensors in tandem with AI-driven functionalities to enhance its capacity further will be studied further. These findings provide insights into how important these advanced FDR systems are for light aircraft operations. This AI-enhanced FDR system uses state-of-the-art technology to improve aviation safety.

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