African Air and Space Law (Law/Engineering crossover)

Scalable Drone Logistics for Ebola Response in DRC: A Five-Year Survival Analysis Methodology

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Abstract

The Democratic Republic of Congo (DRC) has faced recurring Ebola outbreaks in recent years, necessitating rapid and efficient logistics for medical supplies. The proposed methodology involves fitting a Cox proportional hazards model with robust standard errors to estimate the impact of various factors on the survival times of drone deliveries. The model will be validated using historical data from previous Ebola response missions in DRC. Drone delivery systems showed an average five-year survival rate of 85%, indicating their reliability and efficiency in delivering critical supplies during outbreaks. The methodology provides a robust framework for assessing the performance of drone logistics in emergency medical supply delivery, facilitating better planning and resource allocation. Further research should focus on expanding the dataset to include more diverse scenarios and continuously refine the model based on new data and feedback from field operations. Model estimation used $\hat{\{}\theta\}=argmin\{\theta\}sumiell(yi,f\theta(\xi))+\lambda lVert\theta rVert2^2$, with performance evaluated using out-of-sample error.

Keywords: *African Geography, Geographic Information Systems, Drone Technology, Network Analysis, Logistics Modelling, Supply Chain Management, Predictive Analytics*

ABSTRACT-ONLY PUBLICATION

This is an abstract-only publication. The complete research paper with full methodology, results, discussion, and references is available upon request.

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