

Deploying UAV's Equipped with LIDAR for the Quantification of Tree Biomass and the Systematic Classification of Arboreal Species

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Sumit Saha ; Susamoy Aich ; Nirlov Saha ; Sujay Saha ; Ratna Chakrabarty ; Soham Kanti Bishnu [All Authors](#)

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Abstract:

Research was like looking deep into the use of unmanned aerial vehicles (UAVs) as platforms to carry light detection and ranging (LiDAR) systems, essentially applied ostensibly for precise biomass measurements of trees and systematic classification of tree species and other purposes. By capturing high-density point cloud data, the study is able to undertake a comprehensive assessment of forests of their not only structural attributes but also spatial attributes. The UAVs will fly predefined paths so that they can record data across the widest areas and through the most different terrain with minimum interference from human contact. The LiDAR data collected are subjected to advanced preprocessing techniques like outlier removal and noise reduction for improved fidelity measures. Each tree species is classified with computational engines using morphological and radiometric features for the accurate differentiation of the taxa. Simultaneously, biomass estimation is done with very high accuracy, demonstrating the capability of the system to manage complex forested environments. It stresses the transformational aspect of UAV-LiDAR systems in ecological monitoring and their contribution to sustainable forest management through powerful means of measurements and species identification. The advancement to environmental science occurs within the scope of promoting biodiversity conservation and re-invention of assessment methodologies for forestry resources.

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- Authors 
- [Sumit Saha](#)
Department of Electronics and Communication Engineering, Institute of Engineering and Management, University of Engineering and Management, Kolkata, India
- [Susamoy Aich](#)
Department of Electronics and Communication Engineering, Institute of Engineering and Management, University of Engineering and Management, Kolkata, India
- [Nirlov Saha](#)



Department of Electronics and Communication Engineering, Institute of Engineering and Management, University of Engineering and Management, Kolkata, India

[Sujoy Saha](#)

Department of Electronics and Communication Engineering, Institute of Engineering and Management, University of Engineering and Management, Kolkata, India

[Ratna Chakrabarty](#)

Department of Electronics and Communication Engineering, Institute of Engineering and Management, University of Engineering and Management, Kolkata, India

[Soham Kanti Bishnu](#)

Department of Electronics and Communication Engineering, Institute of Engineering and Management, University of Engineering and Management, Kolkata, India

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