

Investigating the Accuracy of Object Detection in UAV Model Utilizing Neural Networks for Military Applications in Sri Lanka

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In the modern military setting, fast improvements in drone technology have transformed warfare strategies, providing key advantages in reconnaissance, surveillance, and special operations. Sri Lanka's diversified and difficult geography have presented unique security concerns that demand advanced defensive technology. With key objective of developing an object detection method utilizing neural networks, this study examined the integration of Unmanned Aerial Vehicles (UAVs) equipped with advanced object detecting techniques into Sri Lanka's military structure. Here, object detection in UAV imaging have utilized YOLOv8 (You Only Look Once Version 8), a deep learning model which is known for its accuracy and real-time processing capabilities for recognizing objects of interest. An adapted aerial object identification dataset and a questionnaire were used in this study to assess YOLOv8's performance in a range of operational circumstances. The way how this model detects a variety of objects in a range of environmental conditions was evaluated. The study also analysed the ethical consequences, operational issues, and technological difficulties of using UAVs for military reconnaissance. Through integrating modern object detection technology on UAVs with deep learning language, it is possible to enhance Sri Lanka's military capabilities. The effectiveness of YOLOv8 model, which is well-known for its accuracy and real-time processing in boosting national security have been analysed and discussed. By addressing the technological considerations in the use of UAVs technologies, this study may offer robust defence plans customized to unique security and geographic conditions of Sri Lankan Military context.

Keywords: *reconnaissance, object detection, UAVs, military*