Detecting Jamming and Spoofing Attacks on Unmanned Aerial Vehicles with Advanced Neural Network Models

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Abstract:
Security issues have been highlighted by the widespread deployment of UAVs in both civilian and military settings due to their susceptibility to signal jamming and spoofing. Traditional UAV autopilot systems put cybersecurity last on the list of priorities. An increasing concern in smart city security systems is the vulnerability of UAVs to GPS spoofing and jamming, which can lead to signal loss, hacking, or hijacking. Because of these problems, this study suggests using the Attn-BiLSTM model for preventative and attack detection purposes. Normalisation of z-scores is the first step in preprocessing. Attribute selection using chi-square and correlation analyses. Using a CNN to extract spatial-temporal information and a BiLSTM to process them are necessary for UAV signal integrity prediction. Important aspects for the safety of UAV communications are brought to light by the attention mechanism's expansion. The proposed method achieves a prediction accuracy of 99.18%, which is higher than four leading deep learning models, according to the experimental results. By protecting UAVs against jamming and spoofing assaults, this study improves their operational security and reliability in dangerous areas, demonstrating the significance of AI in UAV cybersecurity.

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