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Wildfire detection using transfer learning on augmented datasets

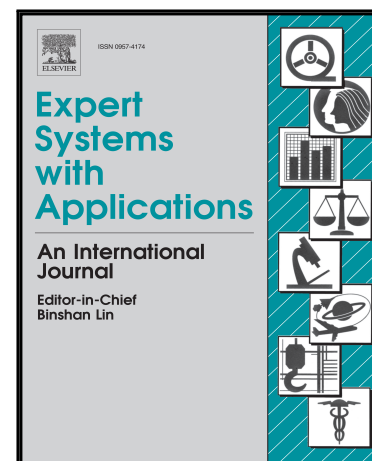
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Wildfire detection using transfer learning on augmented datasets

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Abstract

Wildfire detection is a time-critical application as the difficulty to pinpoint ignition locations in a short time-frame often leads to the escalation of the severity of fire events. This problem has motivated considerable interest from expert systems research to develop accurate early-warning applications and the breakthroughs in deep learning in complex visual understanding tasks open novel research opportunities. However, despite the improvements in performance demonstrated in the current literature, a comprehensive study of the challenges and limitations of this approach is still a gap in the state-of-the-art. To address this issue, the contributions of this work are threefold. First, we overview recent works to identify common difficulties and shortcomings of these approaches, and assess issues related to the quality of the databases. Second, to overcome data limitations, this work proposes a transfer learning approach coupled with data augmentation techniques tested under a tenfold cross-validation scheme. The proposed framework enables leveraging an open-source dataset featuring images from more than 35 real fire events, which unlike video-based works offers higher variability between samples, allowing evaluating the approach in an extensive set of real scenarios. Third, this article presents an in-depth study

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