

Leveraging NASA Historical Big Data and Deep Learning Techniques to Assess Wildland Fires

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Wildland fires present an escalating challenge threat in California, with their frequency and intensity growing. These fires pose significant risks to both the environment and communities, making it crucial to better understand the complex relationships between wildfires and environmental conditions to enhance strategies for mitigation and resilience. This research aims to identify long-term patterns and the probability of wildfire occurrence in relation to various environmental conditions. To develop this research, we employed various statistical analysis, pattern recognition techniques and Deep Learning (DL) techniques, using ensemble of NASA's Moderate Resolution Imaging Spectroradiometer (MODIS) observations, and the Gridded Surface Meteorological Big Data over 24 years of fire seasons. Deep learning (DL) techniques are powerful tools for analyzing large, multi-variable datasets in wildfire studies, uncovering intricate patterns and relationships that may be challenging or impossible to detect with traditional methods. This study leverages DL techniques to further explore the complex relationships between wildland fires and key environmental variables with greater depth and accuracy.