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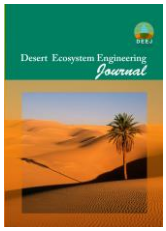

Identifying Factors Influencing Wildfires in Khorramabad's Natural Areas Using a Decision Tree Model

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Extended abstract

Itroduction: The frequent occurrence of wildfires in the natural landscapes of the Zagros region necessitates comprehensive research to identify contributing factors and predict future fire incidents. Accordingly, this study aims to determine the key drivers of wildfires in the Khorramabad County watershed, located in the central Zagros, using decision tree-based modeling approaches.

Material and Methods: The study examined fire-influencing factors across four categories: climate, topography, land use, and human activity. Wildfire data spanning 2011–2024 (380 fire points), obtained from the Lorestan Province General Department of Natural Resources and Watershed Management, served as the dependent variable. The dataset was split into training (70%, 266 points) and evaluation (30%, 114 points) subsets. Model performance was assessed using the ROC curve and confusion matrix for validation..

Results: Variable importance analysis revealed that distance from roads and the Normalized Difference Vegetation Index (NDVI) were among the most significant factors influencing wildfire occurrences in the study area. The results demonstrated a positive correlation between fire incidence and three key variables: (1) greater proximity to roads, (2) higher vegetation density, and (3) increased wind effects. Model validation indicated an 85% accuracy rate in correctly classifying fire events versus non-fire events. These findings provide actionable insights for identifying fire risk factors, supporting wildfire prevention strategies, and promoting sustainable land management practices in the region..

Discusssion and Conclusion: Given the critical role of forests and rangelands in water and soil conservation, as well as erosion prevention, identifying key drivers of wildfires is essential for effective land management. This study highlights distance from roads, NDVI, precipitation, wind effect, and temperature as the most influential factors affecting fire occurrences in the study area, ranked in order of significance. The decision tree model demonstrated high predictive accuracy (85%), confirming its effectiveness in identifying wildfire risk factors. These findings provide valuable insights for:Wildfire prevention strategies, Sustainable land management, and Informed decision-making for policymakers and land-use planners. Furthermore, the results serve as a foundational reference for future research on natural resource management, particularly in fire-prone ecosystems. By integrating these findings into regional planning, stakeholders can better mitigate fire risks and enhance ecosystem resilience.

***Keywords*:** Machine learning, Remote sensing, NDVI, ROC curve.

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