

## **Predicting Potential Forest Fire Occurrences In The State Of Uttarakhand, India Using Maxent Species Distribution Modelling.**

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**Abstract:** The increasing risks of forest fire hazards in the country calls for a better knowledge and understanding of the processes and parameters that control forest fire occurrences. An increase in understanding of the forces that drive the occurrence of forest fires and prediction of future forest fire occurrences, considering the various determinants, is essential in order to devise better strategies to mitigate forest fire hazards and identify potential forest fire risk zones. Globally, a plethora of mathematical and statistical models have been used to assess probabilities of forest fire, however, these models suffer from limitations. Maximum Entropy model, a Species Distribution model (SDM), is a simplistic and reliable model that estimates the probabilistic occurrence distribution of maximum entropy based on a set of environmental constraints. Maxent (Maximum Entropy) model is widely used in the field of biotechnology to estimate the spatial occurrences of various species of plants and animals. Forest fire hazard distribution models are both conceptually and methodologically closely related to the SDMs. In both the cases, the underlying approach is to assess and analyse forest fire locations which is analogous to the species occurrence locations used in SDMs on the basis of environmental parameters that hypothetically influences the spatial distribution of forest fire occurrences. Forest fires are either naturally or anthropologically caused. The occurrences depend on various top-down or bottom-up drivers that follow clear spatial patterns. The paper reports the results on the probabilistic estimation of the spatial distribution of forest fire risks in relation to the environmental determinants prevailing in the Uttarakhand state of India, derived from the Maxent model of Species Distribution based on the MODIS C6 fire occurrence data. The Jackknife test was also employed to assess the importance of the various environmental determinants of forest fire occurrences. This modelling approach can be effective in formulating plans and policies for forest fire management in the region, thus, minimizing both the economic and ecological damage caused by forest fires every year.

**Keywords:** Forest Fire, Maxent, Jackknife, Species Distribution Model, Prediction