# Satellite Modeling of Wildfire Susceptibility in California by Using Artificial Neural Networking

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Wildfires have become increasingly frequent and severe due to global climatic change, demanding improved methodologies for wildfire modeling. Traditionally, wildfires are assessed through post-event, in-situ measurements. However, developing a reliable wildfire susceptibility model has been difficult due to failures in accounting for the dynamic components of wildfires (e.g. excessive winds). This study examined the feasibility of employing satellite observation technology in conjunction with artificial neural networking to devise a wildfire susceptibility modeling technique for two regions in California. Timeframes of investigation were July 16 to August 24, 2017, and June 25 to December 8, 2017, for the Detwiler and Salmon August Complex wildfires, respectively. NASA's MODIS imagery was utilized to compute NDVI (Normalized Difference Vegetation Index), NDWI (Normalized Difference Water Index), land surface temperature, net evapotranspiration, and elevation values. Neural network and linear regression modeling were then conducted between these variables and ?NBR (Normalized Burn Ratio), a measure of wildfire burn severity. The neural network model generated from the Detwiler wildfire region was subsequently applied to the Salmon August Complex wildfire. Results suggest that a notable degree of variability in ?NBR can be attributed to variation in the tested environmental factors. Neural networking also proved to be notably superior in modeling accuracy as compared to the linear regression. Furthermore, the neural network model generated from the Detwiler data predicted ?NBR for the Salmon August Complex with high accuracy, suggesting that if fires share similar environmental conditions, one fire's model can be applied to others without the need for localized training.

**Awards Won:**
Fourth Award of $500
American Meteorological Society: Certificate of Honorable Mention
National Taiwan Science Education Center: Taiwan International Science Fair Special Award is a trip to participate in the Taiwan International Science Fair