Índice general

Capítulo 1

Capítulo 1: Introducción

1.1. Introducción

Posible estructura de la introducción obtenida de "Spatial Prediction of Wildfire Susceptibility Using Field Survey GPS Data and Machine Learning Approaches, Omid Ghorbanzadeh, Khalil Valizadeh Kamran, Thomas Blaschke, Jagannath Aryal, Amin Naboureh, Jamshid Einali and Jinhu Bian"

1. Importancia de los bosques y de su monitorización para una adecuada gestión
2. Papel de los incendios forestales en el ecosistema.Influencia del humano. Consecuencias de los incendios para las personas
3. Efectos del cambio climático y factor humano
4. Dificultad de la predicción de incendios forestales y necesidad de la misma
5. Uso de AI y ML para abordar el problema
6. Enfoque del trabajo presente

Spain could be considered as a key area for wildfire modeling since it is, by far, the most fire-affected territory within the European Union -> Alguna característica relevante de Andalucía ¿Biodiversidad?

INFOCA

1.2. Objetivos

El objetivo de esta investigación será construir modelos que permitan predecir el riesgo de incendio forestal en la Comunidad Autónoma de Andalucía.

Subobjetivos:

1. Construir un conjunto de datos que permita la realización de análisis y la posterior construcción de modelos de Machine Learning para la predicción del riesgo de incendio forestal en Andalucía a partir de un estudio previo del problema.
2. Modelizar el riesgo de de incendio forestal usando distintos algoritmos de ML y comparar sus resultados
3. Analizar potenciales casos de interés.

Table 6. *Cont.*

No	Factors	Impacts	References
3	Altitude (m)	Altitude is an essential feature of fire danger distribution that should be considered. The wildfires that occur at higher altitudes are less severe because of the increase in moisture.	Koutsias et al. 2002, [30]; Ganteaume, et al. 2013, [31] Jaafari et al. 2019, [26]
4	Annual temperature (°C)	There is a direct relationship between temperature increase and wildfires.	Baltar et al. 2015, [32]; Oulad Sayad et al. 2019, [10]
5	Annual rainfall (mm)	The annual rainfall parameter is one of the most significant variables of wildfires; rainfall moisture influences the speed of wildfires, which makes more extension of the burned area.	Vasilakos et al. 2009, [33]; Tanskanen et al. 2005, [34]
6	Wind effect	Wind can affect the extension and direction of the wildfires immediately after their ignition.	Darvishsefat et al. 2018, [11]; Sakellariou et al. 2016, [3]; Fovell and Gallagher et al. 2018, [35]
7	Plan curvature (100/m)	The positive curvature can be considered convex, such as the top of the hills, while negative curvature is concave, which refers to features like valleys. These criteria have different effects on the dynamics of wildfires.	Hilton et al. 2016, [36]; Pourtaghi et al. 2015, [4]
8	Topographic wetness index (TWI)	Fuel moisture is directly related to the required heat of ignition occurs. The actual relationship between the TWI and wildfires differs from other ground conditions and features.	Porensky et al. 2018, [37]; Ghorbanzadeh and Blaschke, 2018, [12]
9	Landform	Areas with steep slopes usually present the highest percentage of wildfires	Cantarello et al. 2011, [38];
10	Land use	Land use patterns based on shape and type have different impacts on wildfire risk.	Pourghasemi et al. 2016, [29]
11	NDVI	Reduction of the NDVI can cause an increase in water stress and the risk of fire.	Verbesselt et al. 2006, [39]; Pourtaghi et al. 2015, [4]
12	Distance to stream (m)	There is an indirect relationship between the distance from water sources and wildfire risk.	Razali and Sheriza 2010, [40]; Lee et al. 2010
13	Distance to road (m)	Roads provide access to forest areas; as a result, the risk of wildfire increases.	Syphard et al. 2008 Lee et al. 2010, [9]
14	Recreation area (m)	Recreation areas are places for human gatherings; humans, intentional or unintentional, can increase the risk of wildfire.	Stephens, 2005, [41]; Keeley and Fotheringham, 2003, [42]
15	Potential solar radiation	Increasing solar radiation can cause a reduction in the soil moisture and an increase in temperature and, consequently, wildfire risk.	Peters et al. 2013, [43]; Oulad Sayad et al. 2019, [10]
16	Distance to villages (m)	Expansion of residential area can increase the risk of wildfires, mostly because of human activities.	Canu et al. 2017, [44]; Lee et al. 2010, [9]

Figura 1.1: Spatial Prediction of Wildfire Susceptibility Using Field Survey GPS Data and Machine Learning Approaches, Omid Ghorbanzadeh, Khalil Valizadeh Kamran, Thomas Blaschke, Jagannath Aryal, Amin Naboureh, Jamshid Einali and Jinhu Bian.

1.3. Hipótesis

"Spatial Prediction of Wildfire Susceptibility Using Field Survey GPS Data and Machine Learning Approaches, Omid Ghorbanzadeh, Khalil Valizadeh Kamran, Thomas Blaschke, Jagannath Aryal, Amin Naboureh, Jamshid Einali and Jinhu Bian"

1.4. Revisión bibliográfica

"Spain on fire: A novel wildfire risk assessment model based on image satellite processing and atmospheric information, Helena Liz-López , Javier Huertas-Tato a , Jorge Pérez-Aracil, Carlos Casanova-Mateo, Julia Sanz-Justo, David Camacho"

"A review of machine learning applications in wildfire science and management Piyush Jain, Sean C.P. Coogan, Sriram Ganapathi Subramanian, Mark Crowley, Steve Taylor,

and Mike D. Flannigan"

"Los incendios forestales en Andalucía: investigación exploratoria y modelos explicativos" Oliver Gutiérrez-Hernández (1*), José María Senciales-González (2), Luis V. García (1)

1.5. Análisis del problema

El área de estudio (Figura 1) abarca el conjunto de la comunidad autónoma de Andalucía (España), la región más meridional de la península Ibérica, un territorio de 87.268 km2, donde el 50,8 % de la superficie está ocupada por usos y cubiertas forestales.

-> MAPA

2002-2022 Razones: - Disponibilidad datos - Cambios en los regímenes de incendios