Predicting Wildfires in California Counties

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The problem

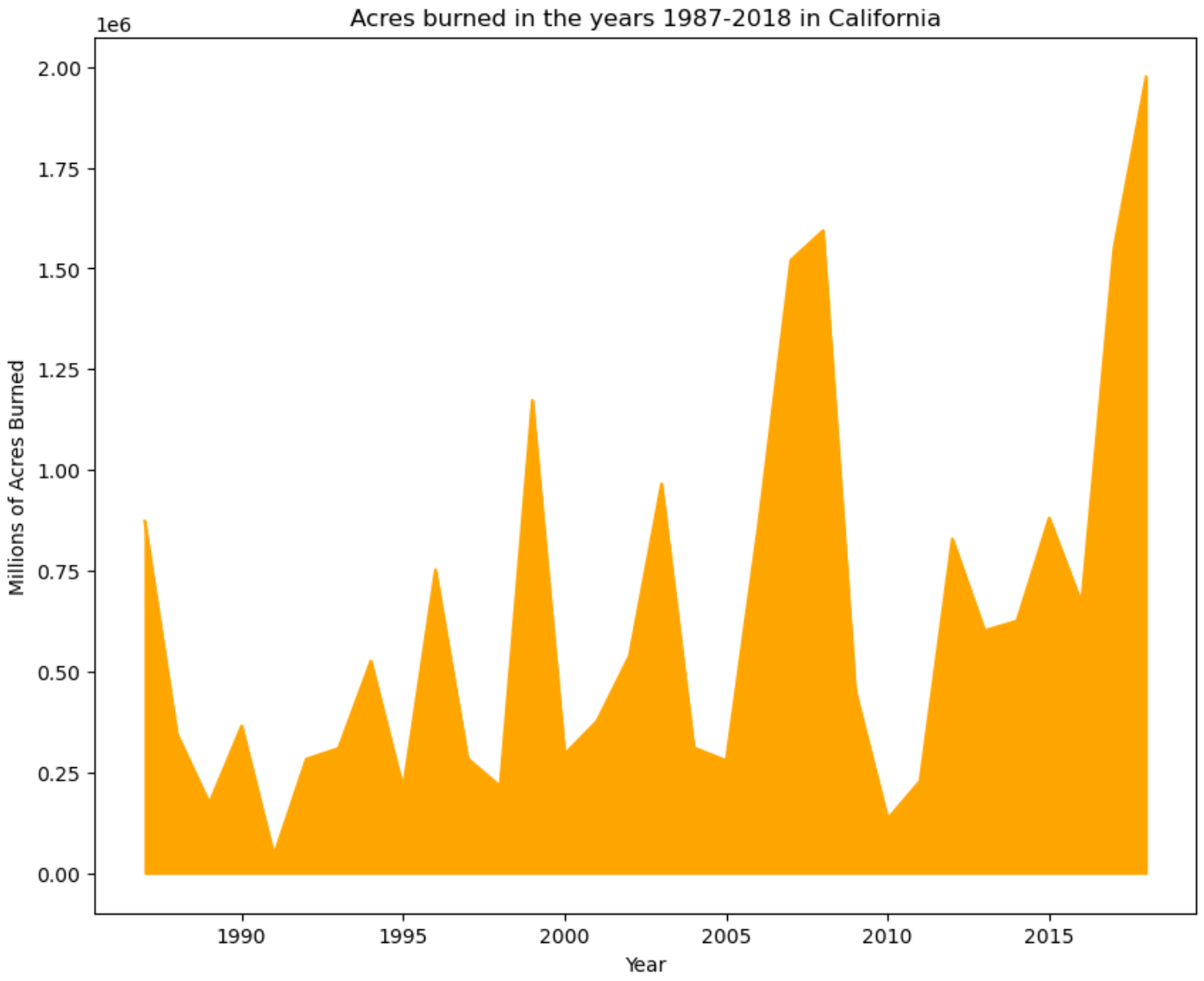
- Impacts on life
  - Damage to life and health: deaths, trauma, air pollution
  - Evacuations
- Impacts on economy
  - Damage to buildings and structures
    - Example: In 2020, the US suffered $21.9 billion in property damage [1]
  - Work stability, business closures, civilian displacement
  - Example: In 2018, California wildfires cost $148.5 billion [2]

Fire Name (County)	Date	Structures	Deaths
Camp Fire (Butte)	November 2018	18,804	85
Tubbs Fire (Napa & Sonoma)	October 2017	5636	22
Tunnel Fire (Alameda)	October 1991	2900	25
Cedar Fire (San Diego)	October 2003	2820	15
North Complex (Butte, Plumas, Yuba)	August 2020	2352	15

Top 5 from the table of most destructive wildfires up to 2022 [3]

[1] N. Reiff (2022)
[2] K. Corry, “Full cost of California’s wildfires to the US revealed” (2020)
[3] Department of Forestry and Fire Protection (2022)

Wildfires over time



Who cares?

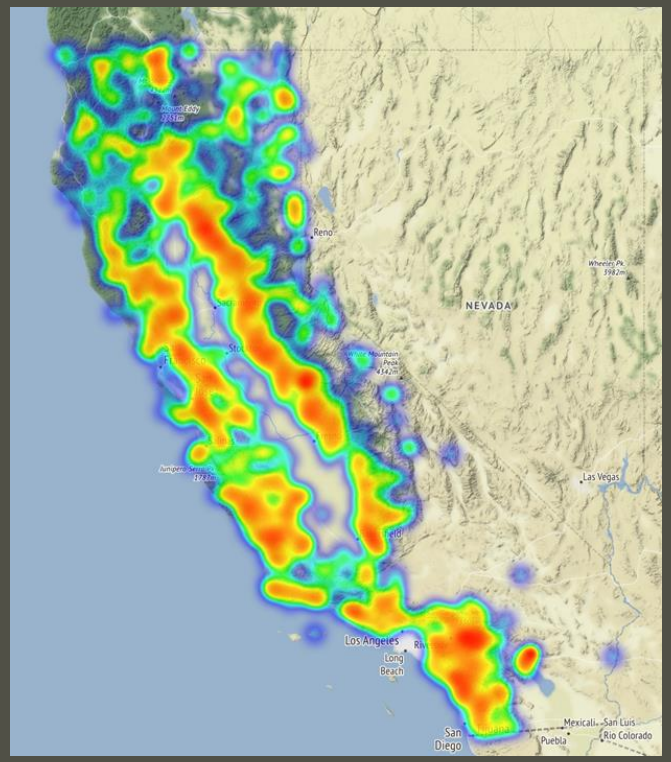
- Anyone close to a high-risk fire area
- Insurance companies
- Government organizations
  - Department of Forestry and Fire Protection
- Emergency responders

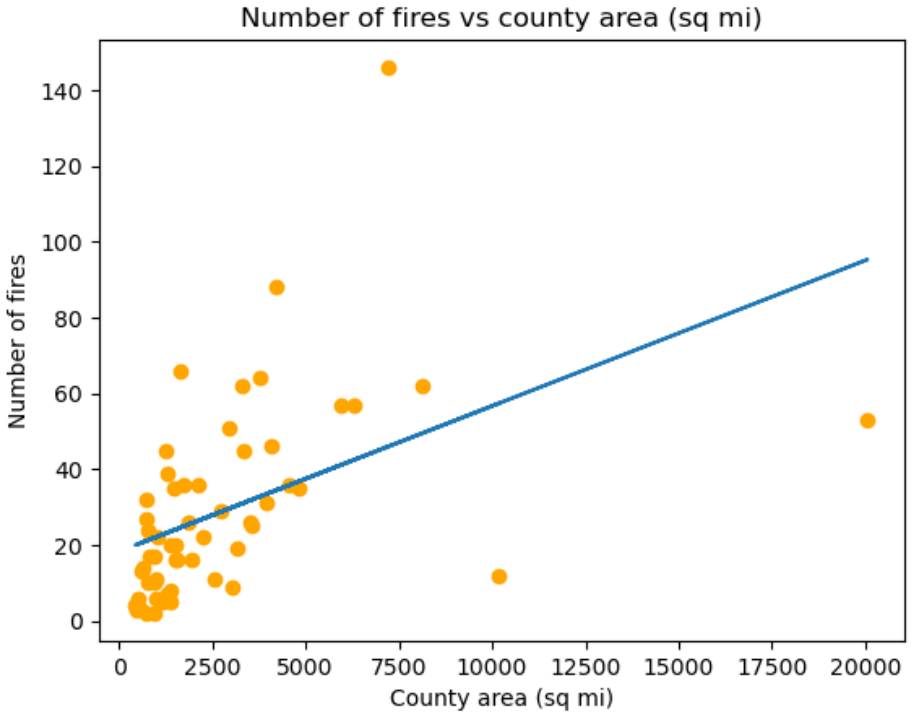
About wildfires

- Causes
  - Numerous!
  - Including human activities
- Influences
  - Fuel
  - Weather
  - Topography

The county and its size

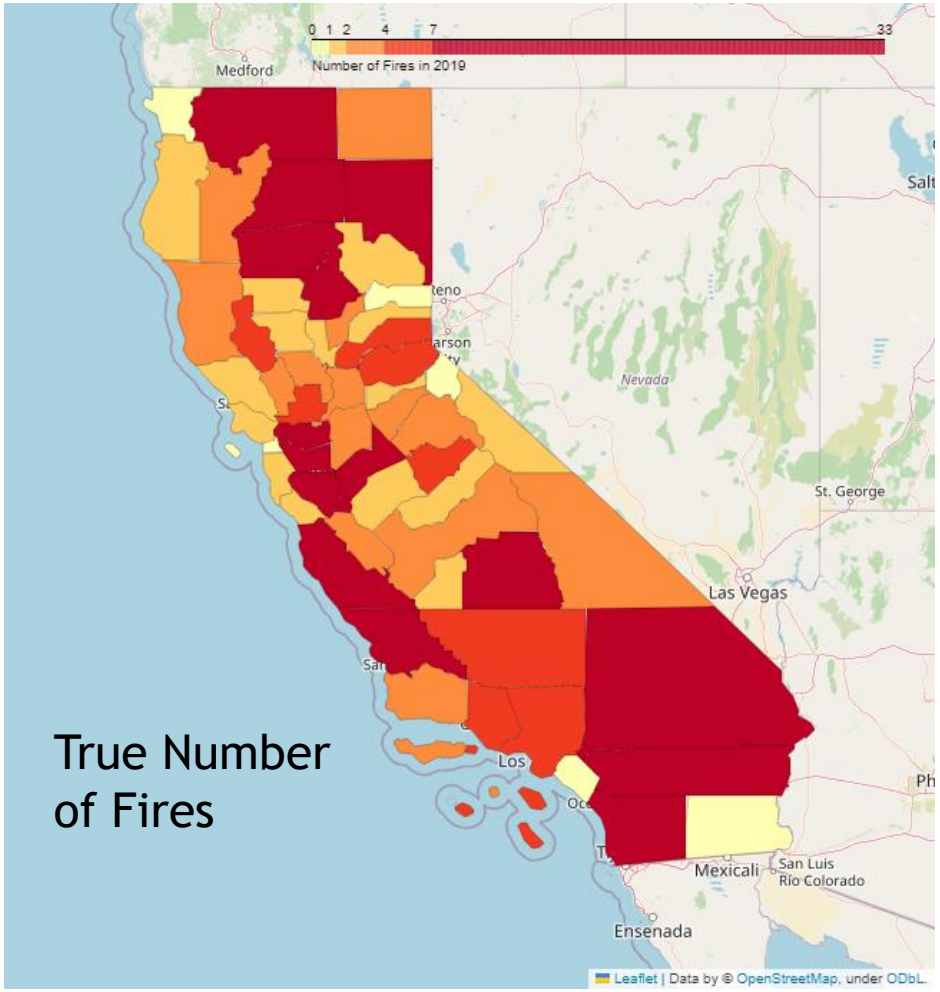
- Location
- Size

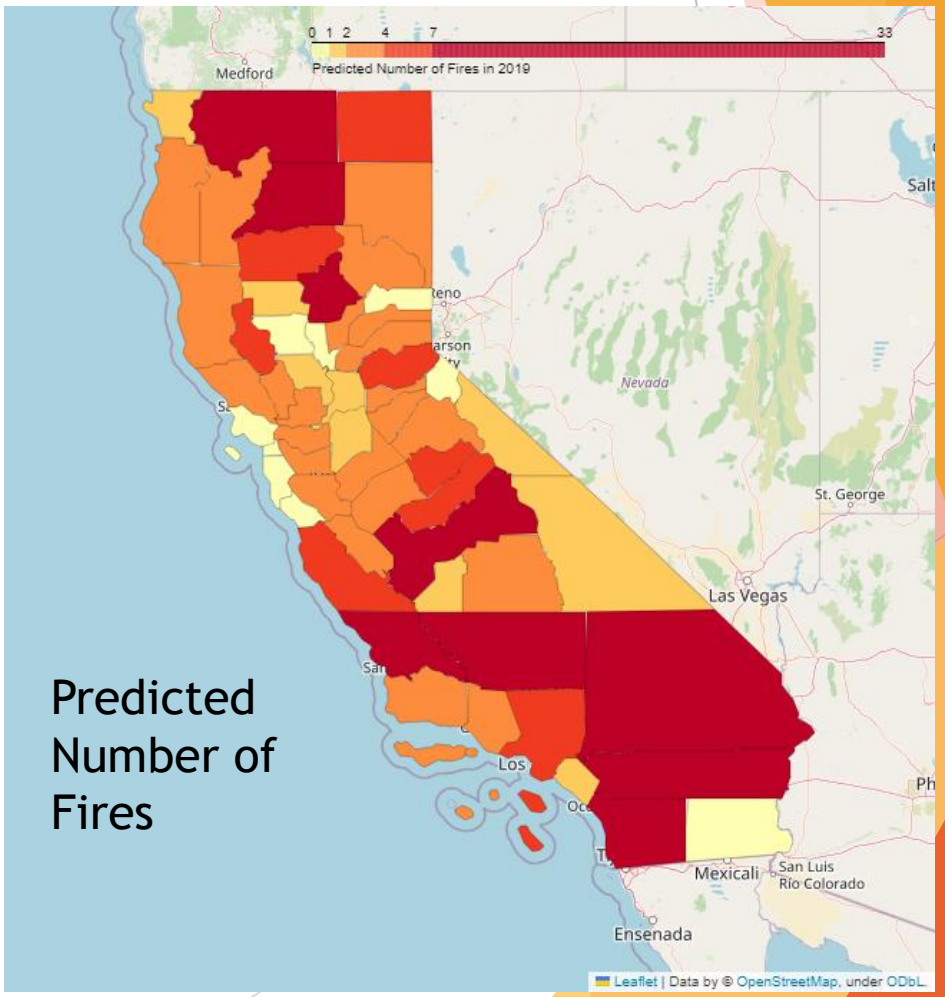




The model and its prediction

- Random Forest Regressor with 0.2 max features and 297 estimators





How it can be used

Knowing how many and where there will be fires gives an idea for preparation or expectations

Future work

- Wildfires are complex
- Plenty more work can be done, and many ideas can be explored
- Improvements:
  - Different or more data for prediction
  - Geographic coordinates or other location divisions
  - Considering seasonality and periods
  - Using climate data
- Other ideas:
  - Hierarchy of risk
  - Visualization of risk of spread
  - Local fuel or flammability

- Thank you.