

WILDFIRE SMOKE
DAN COSTA



IMAGE RECOGNITION

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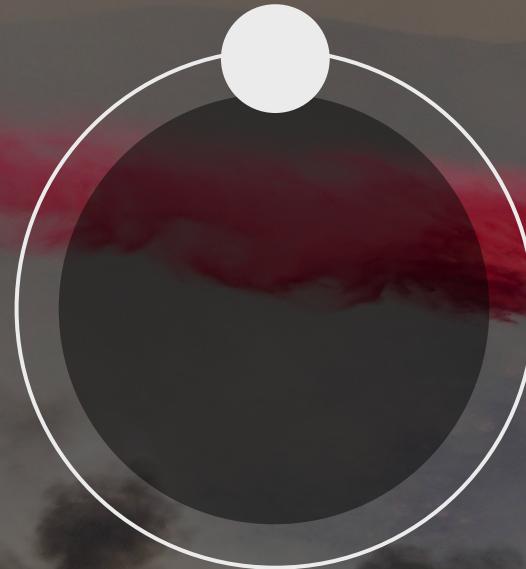
NEXT STEPS

DAN COSTA

- Data Scientist
- 11 Years Experience
- Wildfire Enthusiast

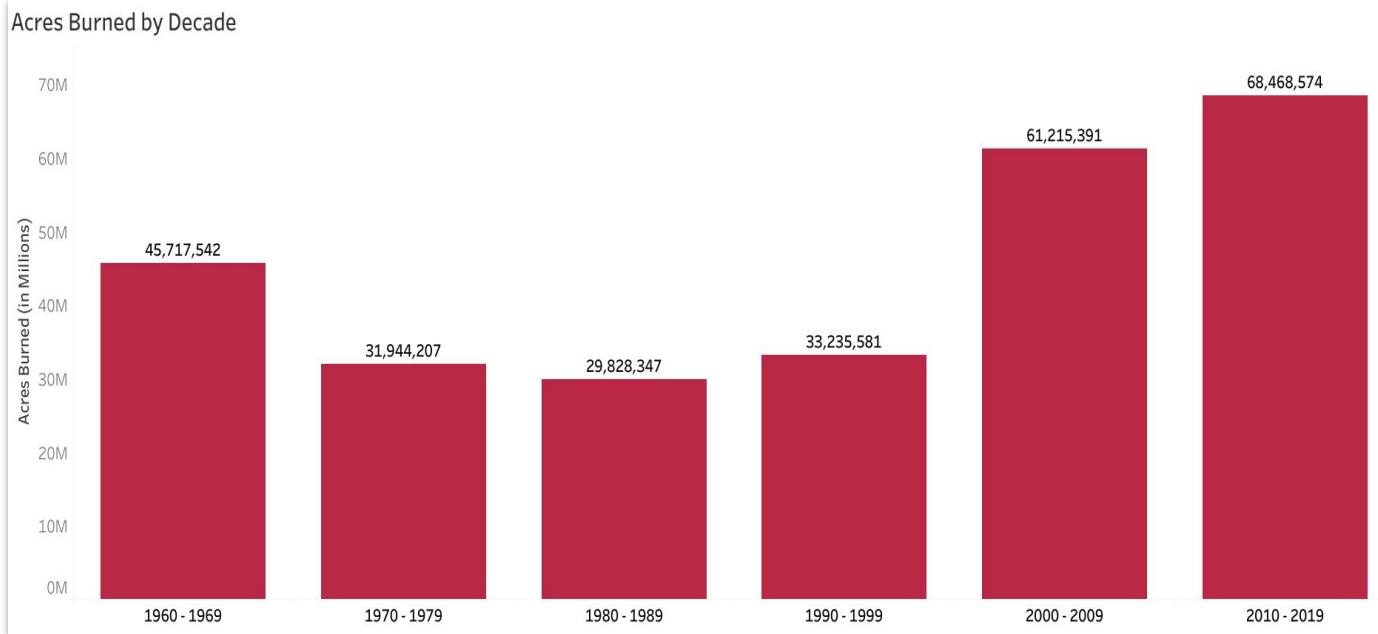


WILDFIRE HISTORY

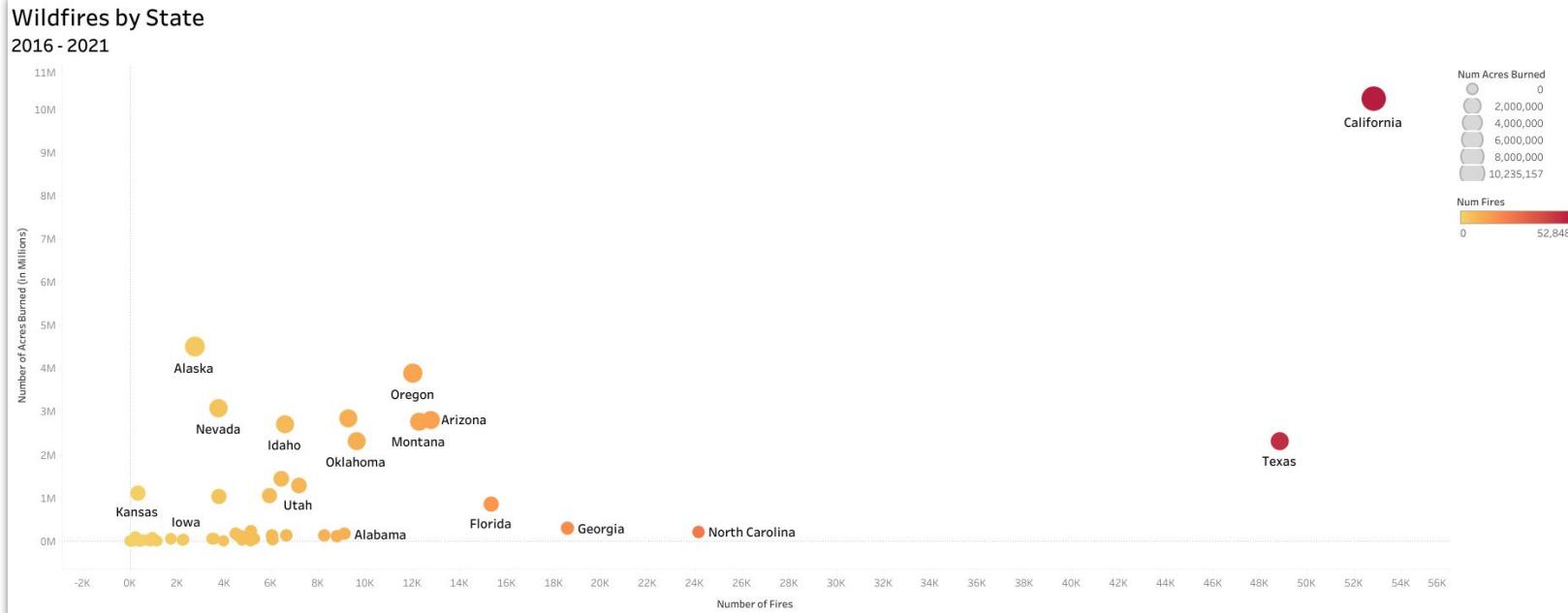


UNITED STATES

ACRES BURNED BY DECADE

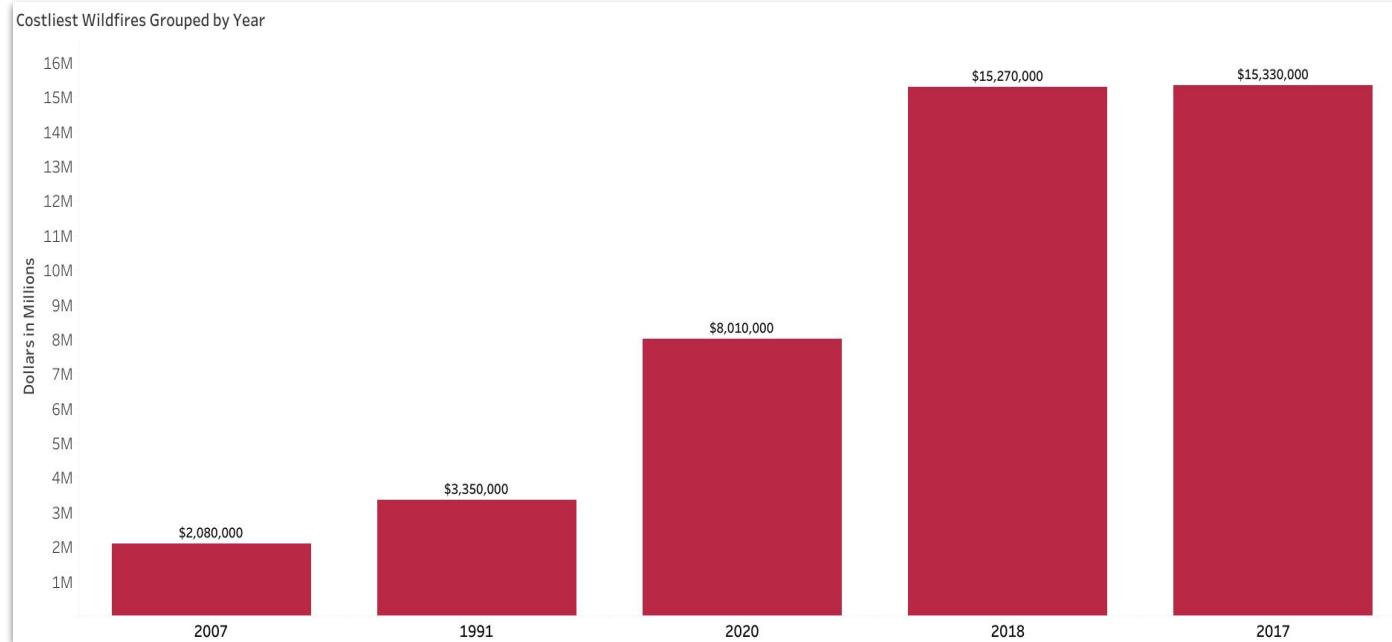


WILDFIRES BY STATE



COSTLIEST FIRES - U.S. HISTORY

GROUPED BY YEAR



MOST DESTRUCTIVE FIRES

CALIFORNIA

Rank	Fire Name	Date	Acres	Structures	Deaths
1	Camp Fire	Nov. 2018	153,336	18,804	85
2	Tubbs Fire	Oct. 2017	36,807	5,636	22
3	Tunnel Fire	Oct. 1991	1,600	2,900	25
4	Cedar Fire	Oct. 2003	273,246	2,820	15
5	North Complex Fire	Aug. 2020	318,935	2,352	15
6	Valley Fire	Sep. 2015	76,067	1,955	4
7	Witch Fire	Oct. 2007	197,990	1,650	2
8	Woolsey Fire	Nov. 2018	96,949	1,643	3
9	Carr Fire	Jul. 2018	229,651	1,614	8
10	Glass Fire	Sep. 2020	67,484	1,520	0

A photograph of a road through a forest. On the left, several tall, charred tree trunks stand as skeletal remains. A small green bush is visible in the foreground. The road curves to the right, with a white dashed line marking its center. In the distance, a white car drives away from the viewer. The sky is filled with thick, dark smoke, and the overall atmosphere is one of destruction and aftermath.

A PICTURE IS WORTH
A THOUSAND WORDS

DATA USED

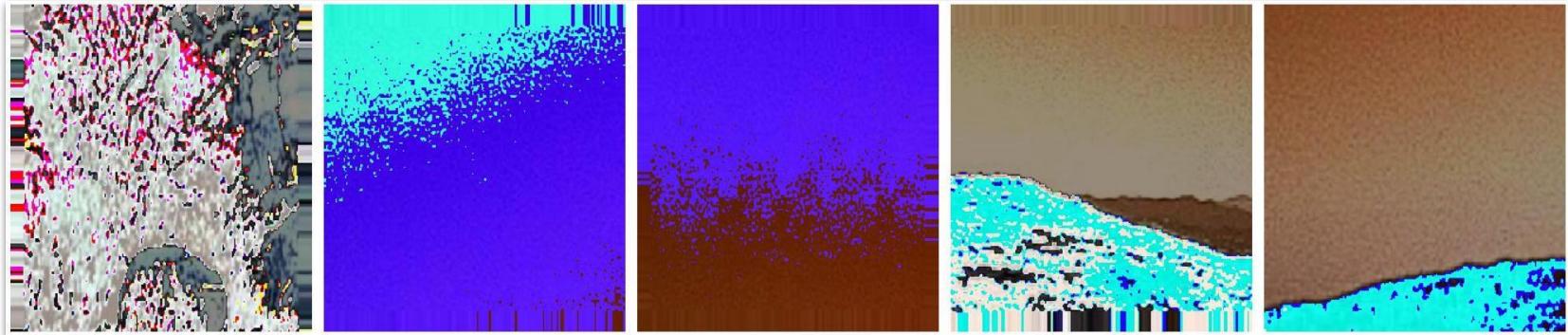
High Performance Wireless Research
and Education Network (HPWREN)

Provided By:

University of California San Diego
San Diego Supercomputer Center
Scripps Institution of Oceanography, Geophysics and
Planetary Physics



IMAGE AUGMENTATION



Expand Dataset

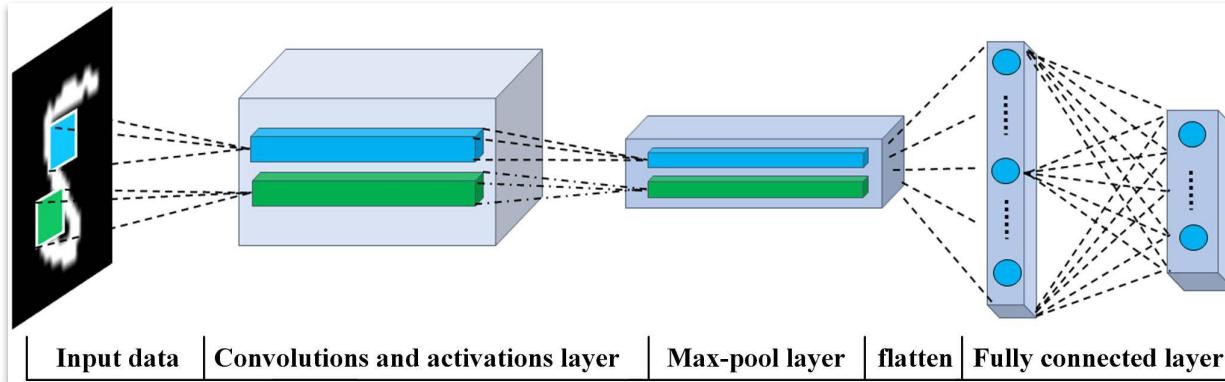
Provide Differing Perspectives

Reduce Overfitting

Forms of Augmentation:

- Stretch
- Zoom
- Color Distortion
- Flip

CONVOLUTIONAL NEURAL NET



Binary Classification: Is Smoke Present Within Image?

Hidden Activation Functions: ReLu

Activation Function: Sigmoid

Loss Function: Binary Crossentropy

Optimizer: Adam

Trainable Layers: 3,715,169

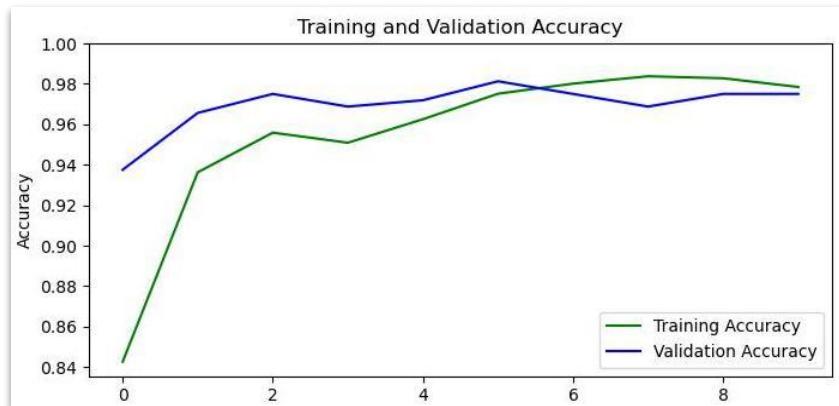
MODEL EVALUATIONS



ACCURACY

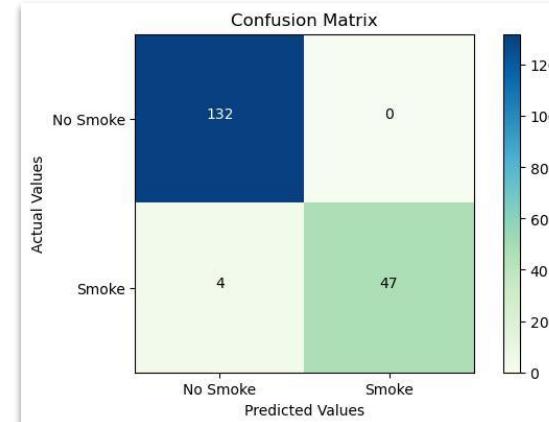
Training: .969

Validation: .978



CLASSIFICATIONS

Goal to minimize False Negatives





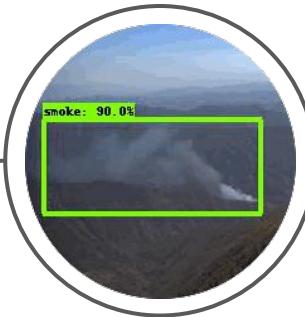
NEXT STEPS



NEXT STEPS



MORE
DATA



BOUNDING
BOXES



ALERT
SYSTEM

THANK YOU!

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Do you have any questions?
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