



GUN VIOLENCE IN AMERICA

A Firearms Image Classification Project
Eric Au & Henry Chung

Texas gunman had threatened school shootings on social media, reports say

Teenager displayed worrying behavior in the months before the Uvalde attack, schoolmates tell news outlets



THE BUSINESS PROBLEM

- COULD SHOOTINGS BE PREVENTED?

- Gov. Hochul signed new executive order establishing the Domestic Terrorism Unit dedicated to tracking hate speech and extremist violence online [\(Source: City & State New York, May 2022\)](#)

- STAKEHOLDERS:

New York State Domestic Terrorism Unit

- THE TASK:

- Create a machine learning model that can classify images of guns.
- Proactively detect potentially dangerous individuals on social media and for authorities to respond appropriately.

Shooter warning signs get lost in sea of social media posts

By AMANDA SEITZ May 27, 2022



THE DIGITAL AGE

- 72% OF U.S ADULTS USE AT LEAST ONE FORM OF SOCIAL MEDIA (2021)

Source: Pew Research Center

- “WHEN SOMEBODY STARTS POSTING PICTURES OF GUNS THEY STARTED PURCHASING, THEY'RE ANNOUNCING TO THE WORLD THAT THEY'RE CHANGING WHO THEY ARE ...”

-Katherine Schweit, retired FBI agent who spearheaded the agency's active shooter program (Source: AP News, 2022)

Gun Related Deaths in America

Number of gun deaths by firearms (1999 - 2020)

Source: Centers for Disease Control and Prevention

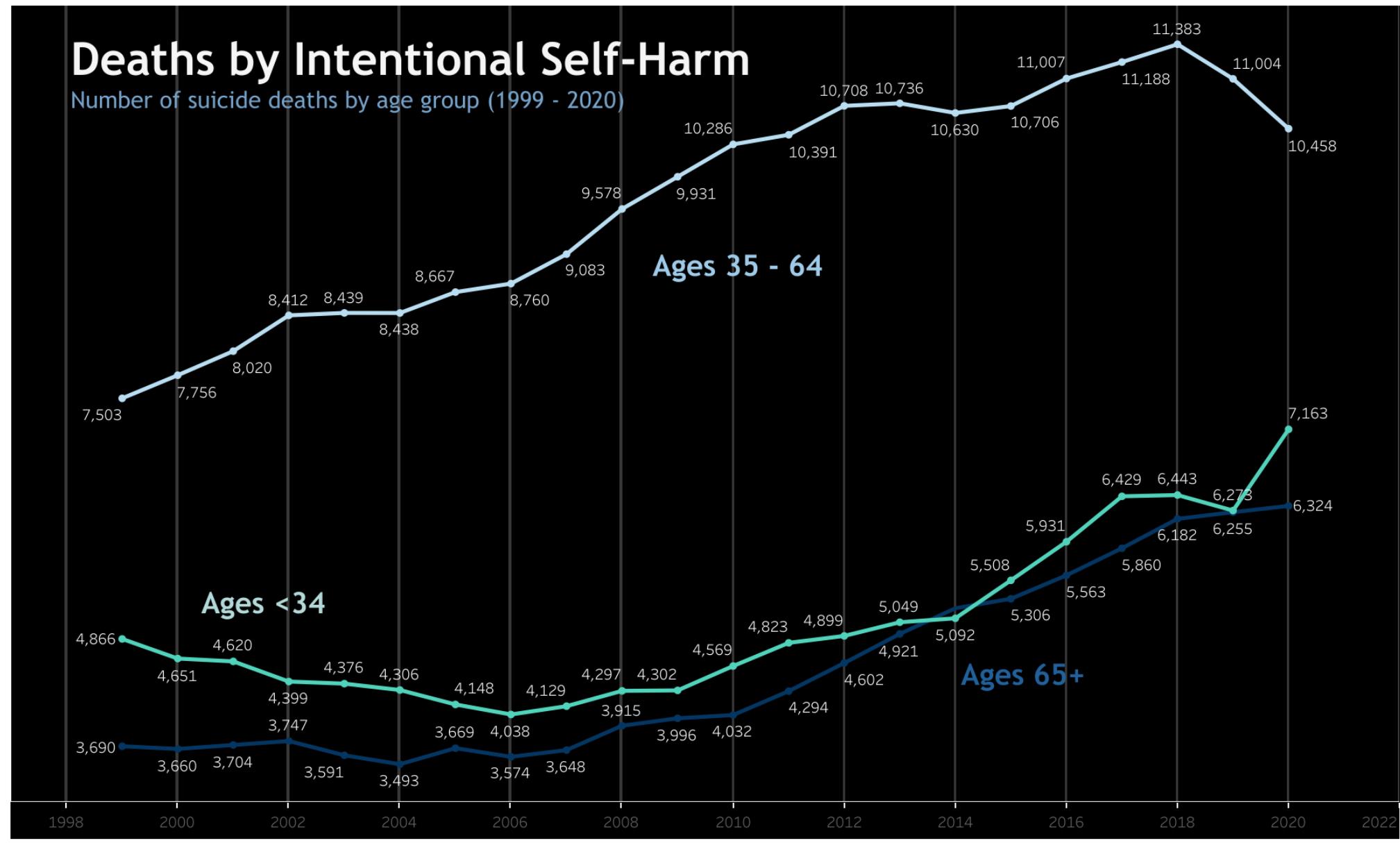
Deaths by Intentional Self-Harm



Deaths by Assault

Deaths by Intentional Self-Harm

Number of suicide deaths by age group (1999 - 2020)

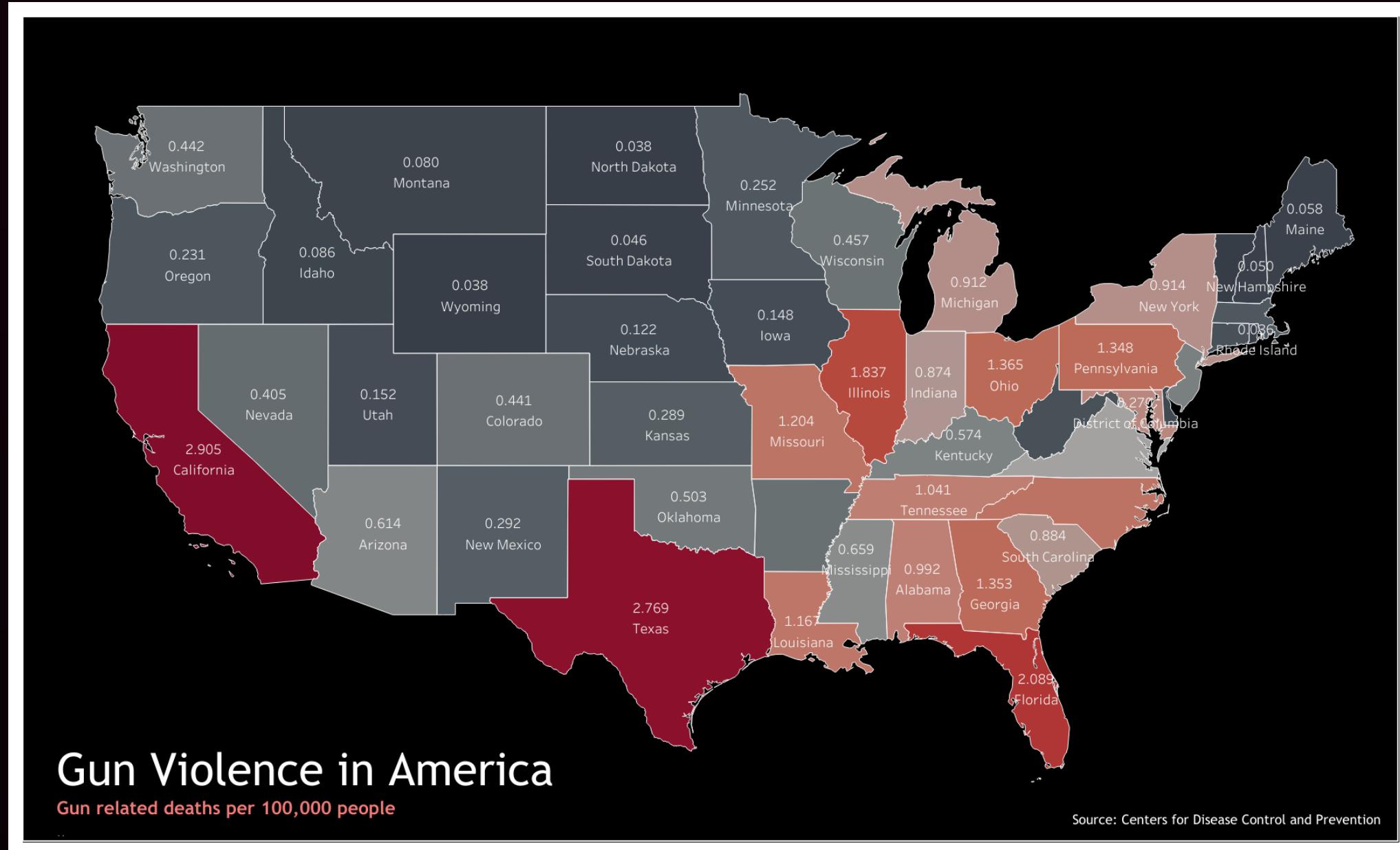


Deaths by Assault

Number of homicidal deaths by age group (1999 - 2020)

Ages < 34





THE IMAGE DATASET

Collection of images sourced from the Andalusian Research Institute in Data Science and Computational Intelligence (DaSCI)

5,000



images used (3,000 in training, 1,000 in testing, 1,000 validation sets)

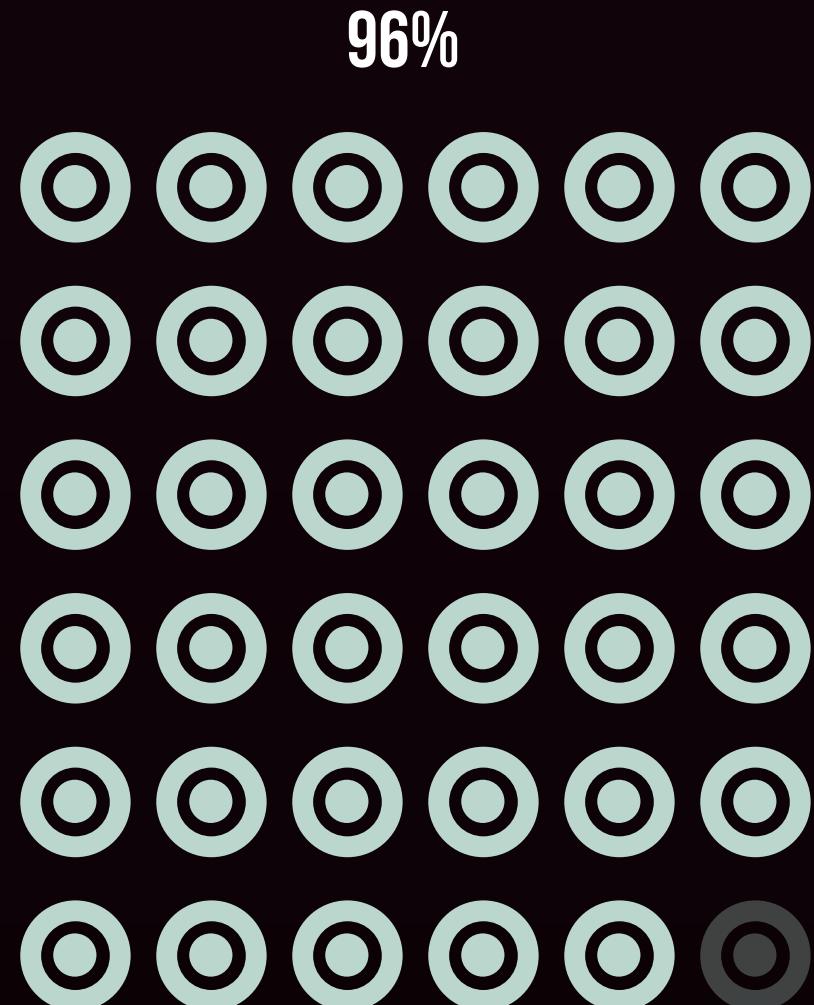
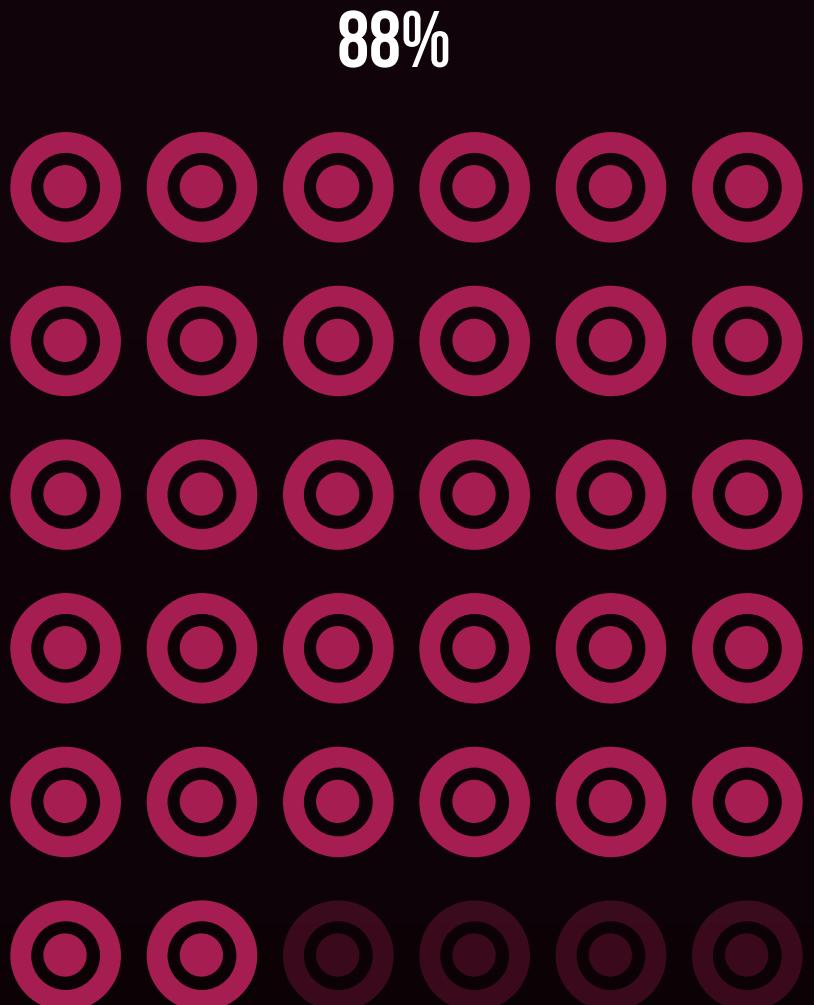
65%



gun images in each set

MODEL RESULTS

Convolutional
Neural
Network



PROACTIVE MEASURES

CONCLUSIONS, RECOMMENDATIONS, & FUTURE STEPS

The technology works and can be improved.



SOCIAL MEDIA PARTNERS & DATA PRIVACY

Technology is available for implementation at a larger scale.

NATURAL LANGUAGE PROCESSING

Detect harmful language with social media posts.



EXPAND TO SECURITY FOOTAGE

Cut down on response time to active shooter situations.



THANK YOU

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