Understanding Drought Awareness from Web Data - A Computer Vision Approach

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Data

SPEI

Google Trends
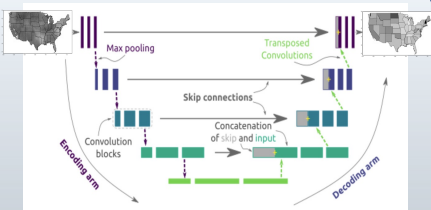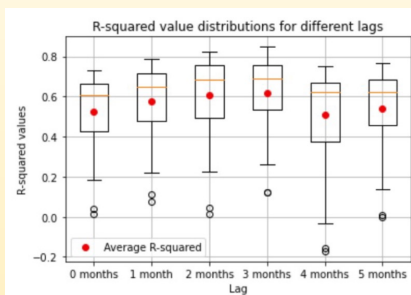
UNet Model

- Two encoder layers analyze images. The first picks up simple details, and the second finds complex patterns
- Decoder Blocks rebuilds the image in detail
- Skip connections link encoder and decoder layers, ensuring no loss of fine details from the original image
- This allows the model to learn nonlinear relationship between inputs and targets
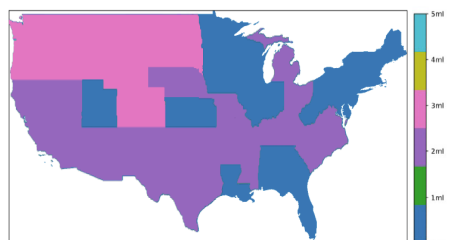
Interested in learning more?
Scan the QR code for a link to our paper or email me:
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SCAN ME

Do people respond to droughts by searching drought terms on Google and is there a lag?

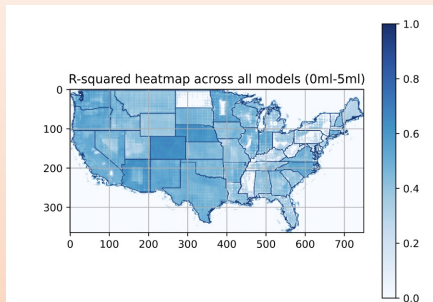R-squared value distributions for different lags

- 6 UNet models trained on lagged SPEI data
- Significant nonlinear correlations found
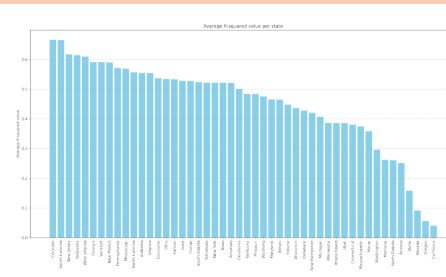- The 2 months and 3 months lagged models performed best

- Distribution of best lag models over CONUS
- 2 and 3 months lagged were the best performing models

Does the relationship between droughts and people's search interest vary over place?
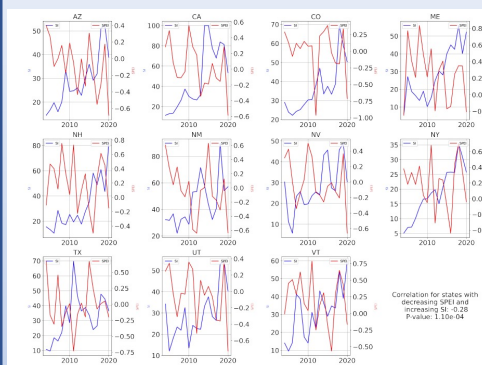

R-squared heatmap across all models (0ml-5ml)

- Model performance (averaged over all models) per pixel over test period (2017-2020) was plotted
- Significant spatial variability in performance was observed
- Nonlinear correlations visualized
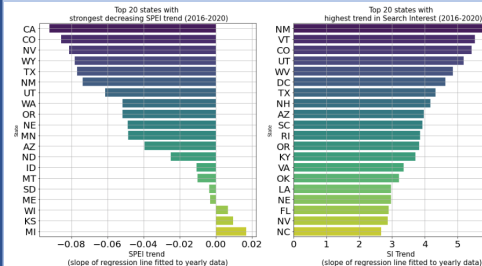

Average R-squared value per state

Search Interest is more correlated to droughts in states where droughts are comparatively recent (as indicated by USDM and various other data sources)

Have people in drought hotspots become increasingly interested in droughts?

Search interest has generally risen in states with increasingly dry conditions!

Top 20 states with strongest decreasing SPEI trend (2016-2020) | Top 20 states with highest trend in Search Interest (2016-2020)

For California, with increasingly dry conditions, search interest did not increase recently!
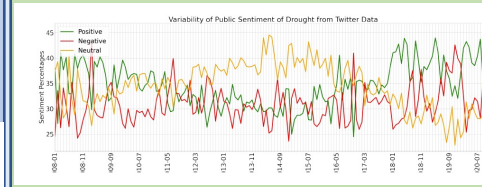

How have people's sentiments about drought changed over time?

Sentiment Analysis of Tweets

NEGATIVE — Totally dissatisfied with the service. Worst customer care ever.

NEUTRAL — Good Job but I will expect a lot more in future.

POSITIVE — Brilliant effort guys! Loved Your Work.

Variability of Public Sentiment of Drought from Twitter Data

Sentiments are becoming more polarized

Future Directions

- Understanding the underlying mechanisms of change
- Computer vision based global drought prediction models