Mapping Visual Themes among Authentic and Coordinated Memes

Keng-Chi Chang · UC San Diego · kechang@ucsd.edu · kengchichang.com · 2022 PolMeth at WUSTL

loe Biden is already leading

Background & Research Question

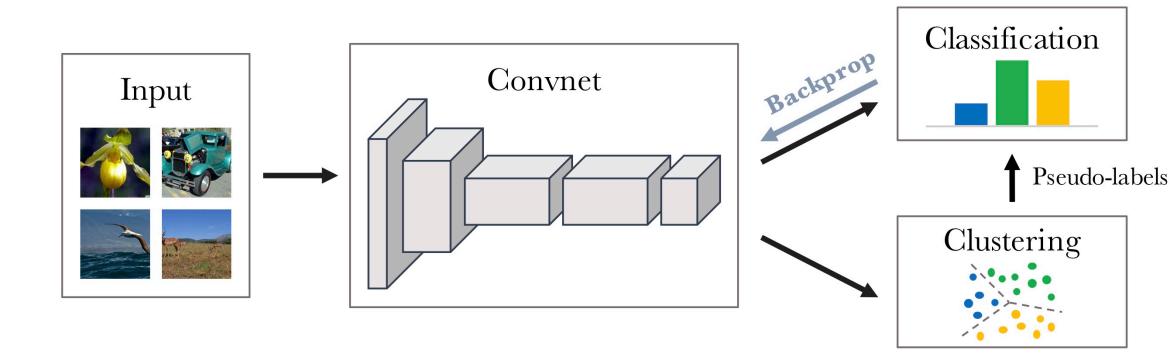
- Russian IRA shared 1.8M images on Twitter during 2016 election
- Validated US Twitter users, 19% tweets are memes, 30% political
- What distinguishes state-linked memes from authentic ones?

Data Collections

- 26K authentic memes from r/meme subreddit (authentic memes)
- 15K non-meme image-with-text data (COCO-Text) as negative sample for training (so not simply a classifier for images with or without text)
- 26K images from IRA on Twitter (coordinated memes if classified as meme)

Methods Overview

- 1. Classify IRA images into memes vs. non-memes (test accuracy > 0.97)
- 2. Extract visual embeddings jointly for both authentic memes (Reddit) and coordinated memes (IRA) using DeepCluster (Caron et al. 2019)



- 3. Cluster memes based on visual embeddings using K-means
- 4. Label the clusters and compare between authentic/coordinated

Summary of Findings

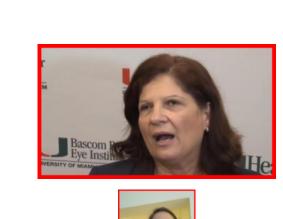
- Latent visual embeddings reveal similarity between memes
- Authentic and coordinated memes share most visual themes
- Coordinated IRA memes more military, gender, quotes
- Authentic Reddit memes more movie characters, comics
- IRA accounts are not widely utilizing popular meme schemes in the US
- Logistic regression on visual embedding discern IRA with $F_1=0.84$

Example Clusters







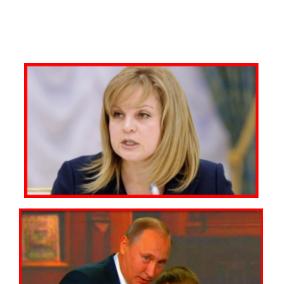




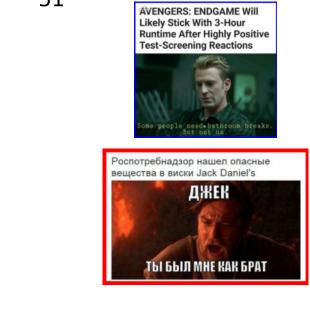


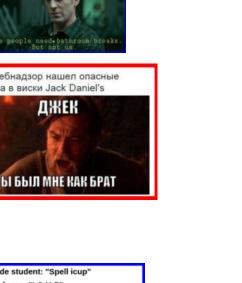




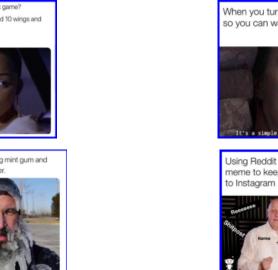




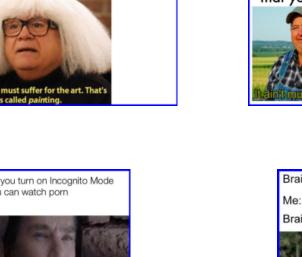








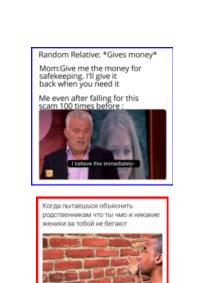
More Reddit Cluster



Global Warming is real!

The Earth is dying and





More IRA Cluster



повод поругаться.

Никита, сколько у тебя хромосом?

9: Screenshots/Tweets : Screenshots/websites 48: Politician speakin 18: Construction 11: Screenshots/Tweets dark 59: Top/bottom memes 80: Top/bottom memes 42: Character labeling 10: Office 36: Dogs memes 6: Winnie the Pooh 50: SpongeBob memes 19: Animal memes 24: Presentation memes 58: People talking memes 9: Dark/unclear 91: SpongeBob/Rick and Morty 2: Winnie the Pooh 78: Thomas/Incredibles 51: Movie scene memes 84: Bugs Bunny 79: Bugs/Plankton 32: Unsettled Tom meme 87: Black Hackerman meme Percentage Reddit <---->

Next Steps

Percentage IRA

- Compare with authentic memes on US Twitter or Russian social media
- 2. Use multimodal transformer (ex. VisualBERT) to extract embeddings that incorprate textual information and text-scene interactions
- More flexible clustering models to incorporate tweet-level covariates