

Studying the Dynamics of COVID-19 Misinformation Themes using Topic Streams

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Dr. Nitin Agarwal



COSMOS Director -
Leading projects with a
combined funding of over
\$20 million from various
agencies

- Department of Defense
- DARPA
- Department of State
- National Science Foundation

Thomas Marcoux

COSMOS Doctoral Student

- Topic Modeling
- Topic Streams
- Data Visualization



Dr. Esther Mead

COSMOS Post-doctorate
Fellow

- Computational Social Science
- Machine Learning
- Deep Learning



Why?

- Help policy-makers make informed decisions
- Quickly visualize large data set over time
- Automatically discover latent topics
- Derive meaning from large text corpus
- Useful for journalists, political scientists, sociologists, ...
- Quickly visualize large data set over time

Agenda

1. Data collection
2. Methodology
3. Results
4. Future directions




Data collection

- Misinformation narratives from 9 public fact checkers (POLITIFACT, Snopes, etc.)
- 243 unique narratives
- Title/theme pair
- 652,120 YouTube comments collected through official API



hydroxychloroquine

14 Discovered Myths
Filter by:




False Claim : Dr. Anthony Fauci wrote in a 2005 paper published in *Virology Journal* that hydroxychloroquine was effective in treating SARS.

 Debunk Date : 08/04/2020  Debunked By : snopes  Sources : Social Media

False Claim : This virus has a cure, which is called hydroxychloroquine, zinc, and Zithromax, so you don't need a mask.

 Debunk Date : 07/28/2020  Debunked By : politifact

False Claim : Barack Obama took Hydroxychloroquine in 2008.

 Debunk Date : 07/13/2020  Debunked By : truthorfiction  Sources : Twitter, Mark Levin

Public Misinformation Stories Data

- Available at cosmos.ualr.edu/covid-19

623
Known
Misinfo

False Claim : Nostradamus predicted that a “feeble man” would rule the “Western World” after a time of “plague.”

📅 Debunk Date : 03/30/2021 🏢 Debunked By : politifact

False Claim : Jamaica has not recorded any case of the coronavirus.

📅 Debunk Date : 03/22/2021 🏢 Debunked By : politifact

False Claim : Video suggests Dr. Anthony Fauci said vaccines don't protect against COVID-19.

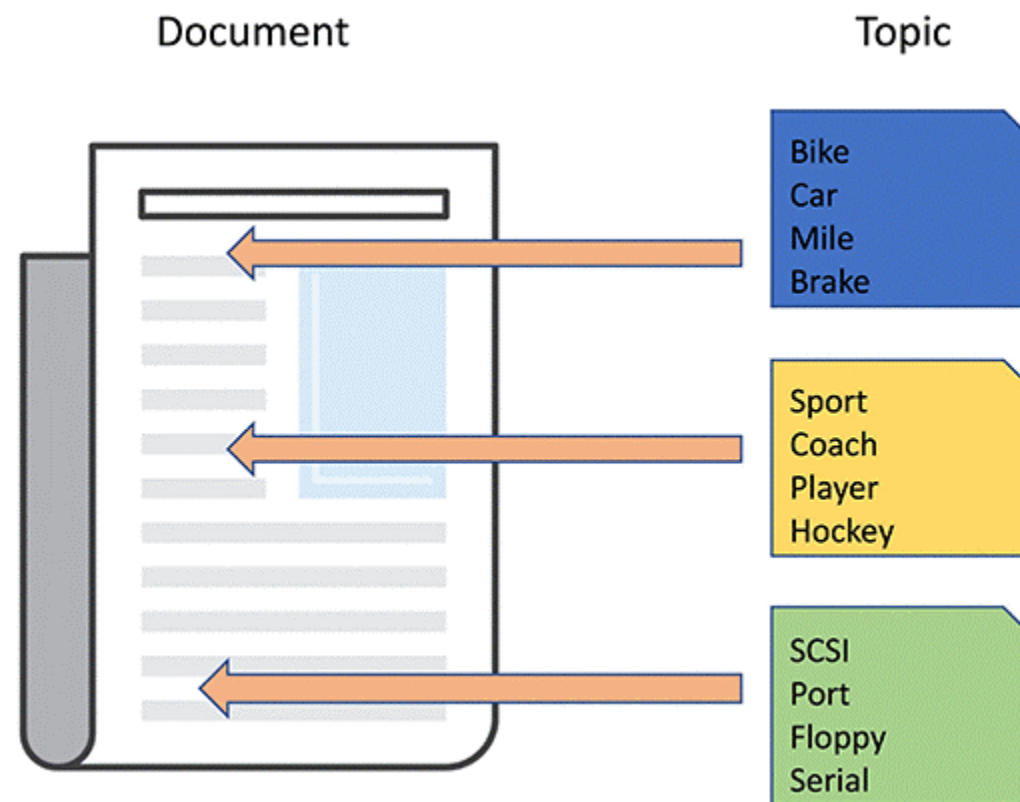
📅 Debunk Date : 03/08/2021 🏢 Debunked By : politifact

[More...](#)

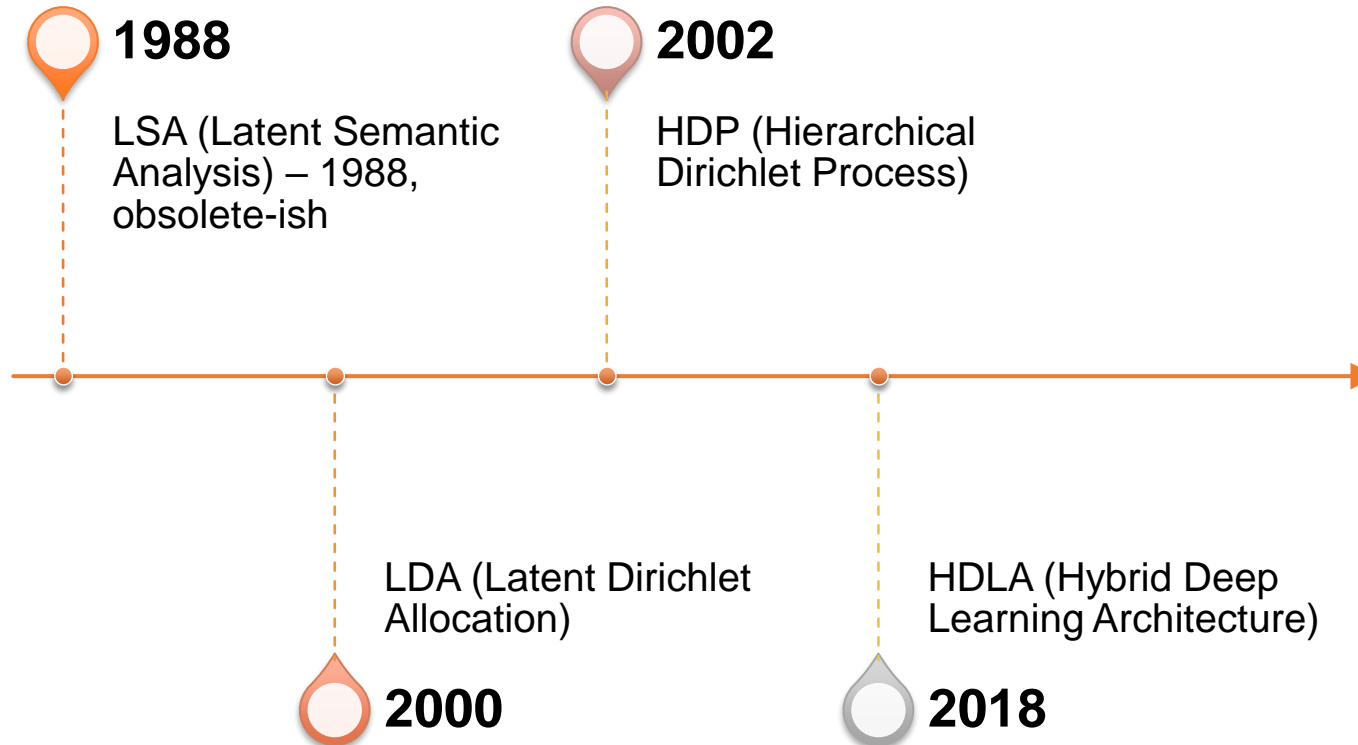


Methodology

- Topic Modelling
- Latent Dirichlet Allocation
- Distribution over time

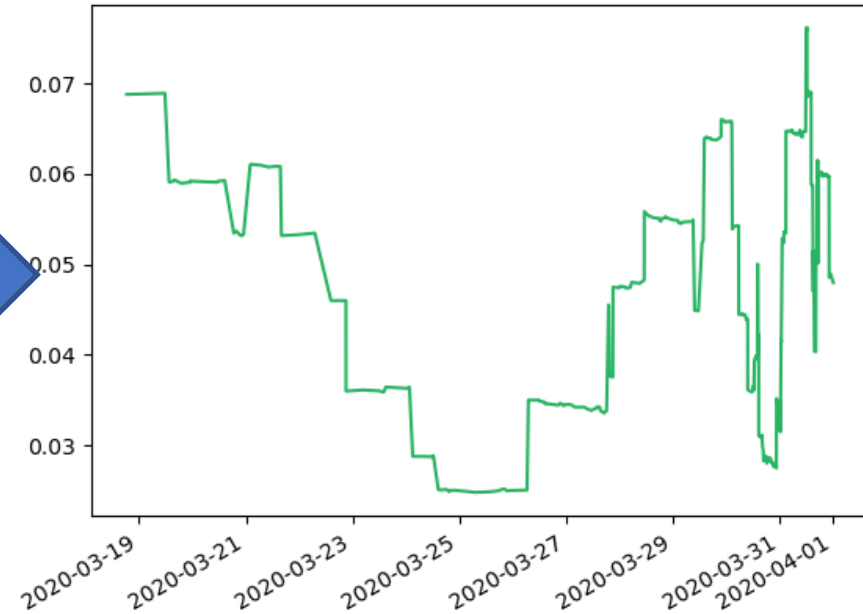
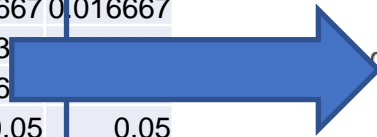


Topic Models

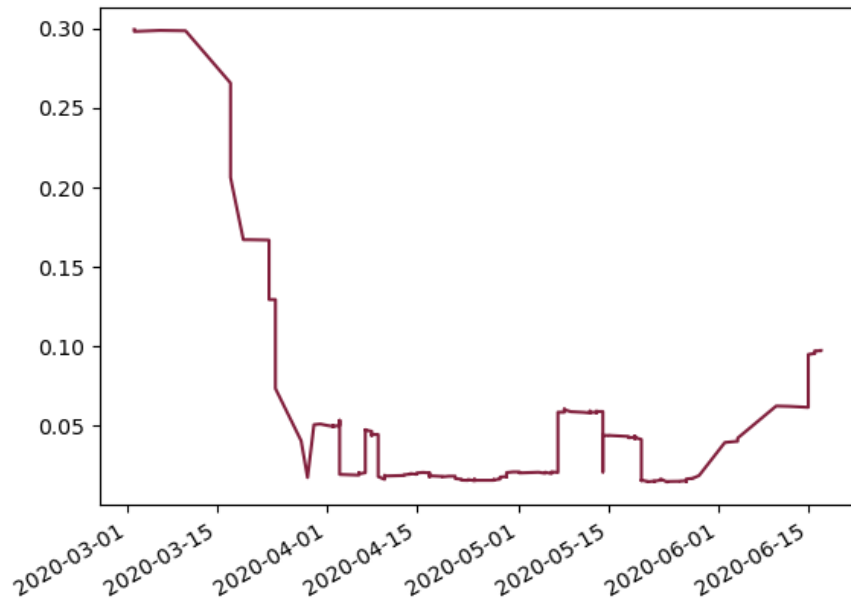


Stream Generation

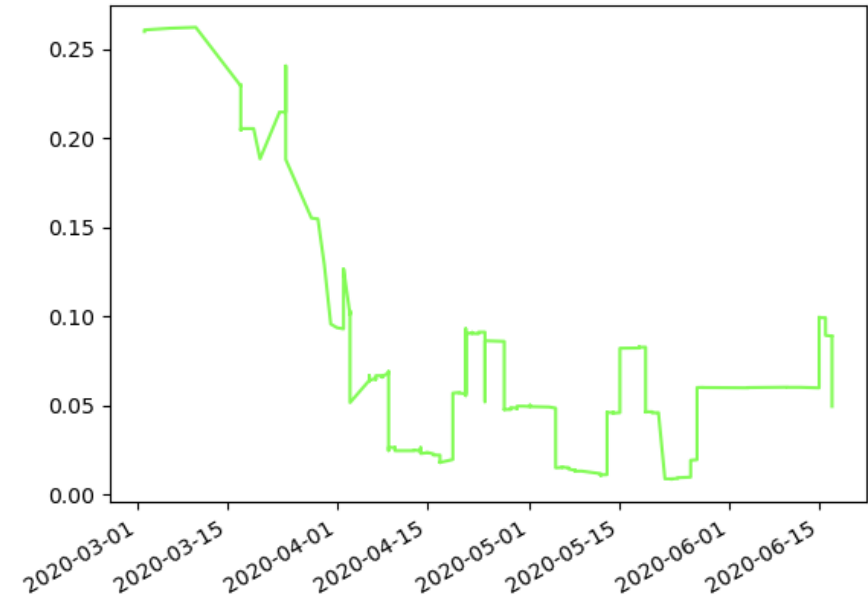
	0	1	2	3	4	5
2020-03-03 15:00:06	0.016667	0.016667	0.683333	0.016667	0.016667	0.016667
2020-03-03 20:53:10	0.016667	0.016667	0.016667	0.016667	0.016667	0.016667
2020-03-04 14:49:07	0.016667	0.016667	0.016667	0.016667	0.683333	0.016667
2020-03-04 20:36:05	0.016667	0.016667	0.016667	0.016667	0.016667	0.016667
2020-03-04 20:40:26	0.05	0.05	0.05	0.05	0.05	0.05
2020-03-05 01:39:39	0.008333	0.008333	0.008333	0.008333	0.008333	0.008333
2020-03-05 04:33:52	0.88125	0.00625	0.00625	0.00625	0.00625	0.00625
2020-03-05 14:14:36	0.01	0.01	0.01	0.01	0.01	0.01



LDA - Misinformation Stories

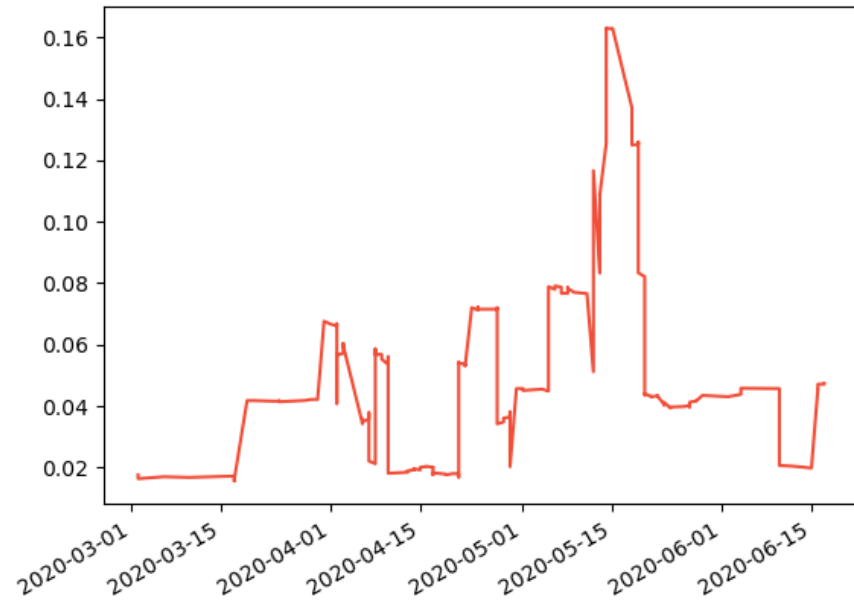


China

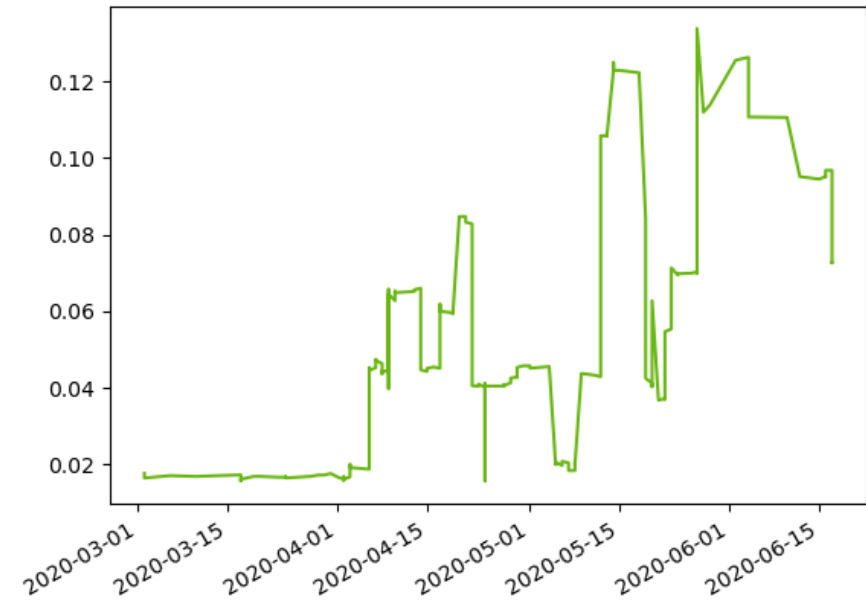


“Plandemic”

LDA - Misinformation Stories



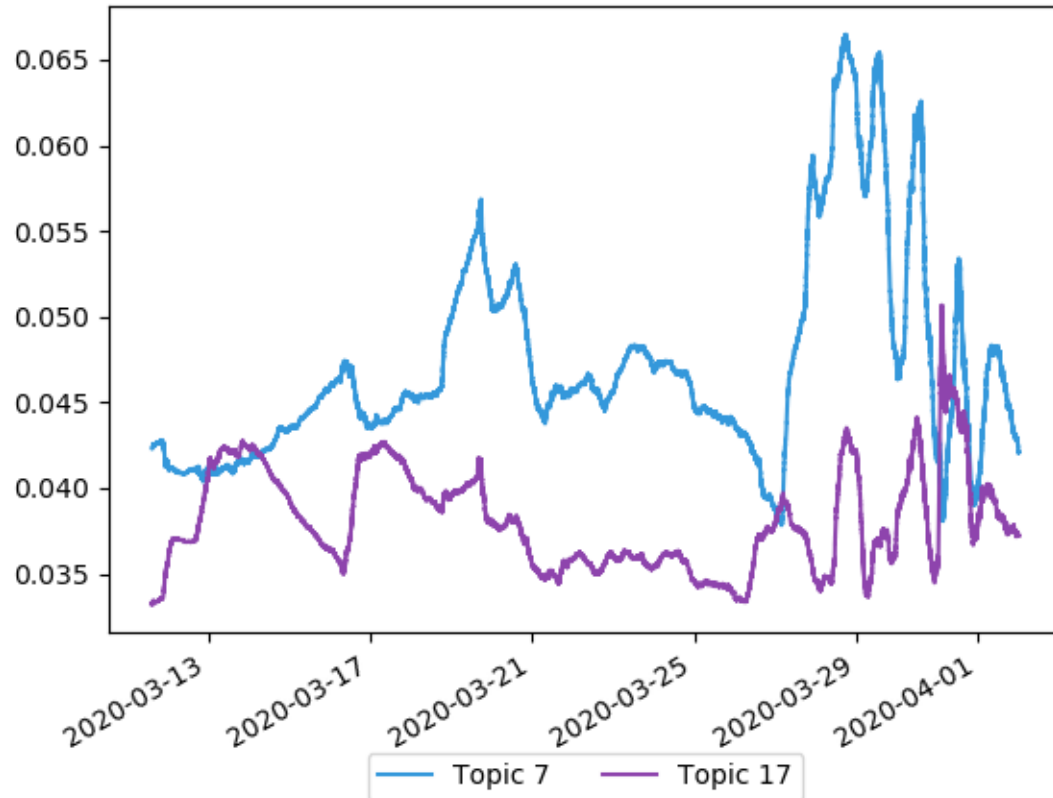
Trump



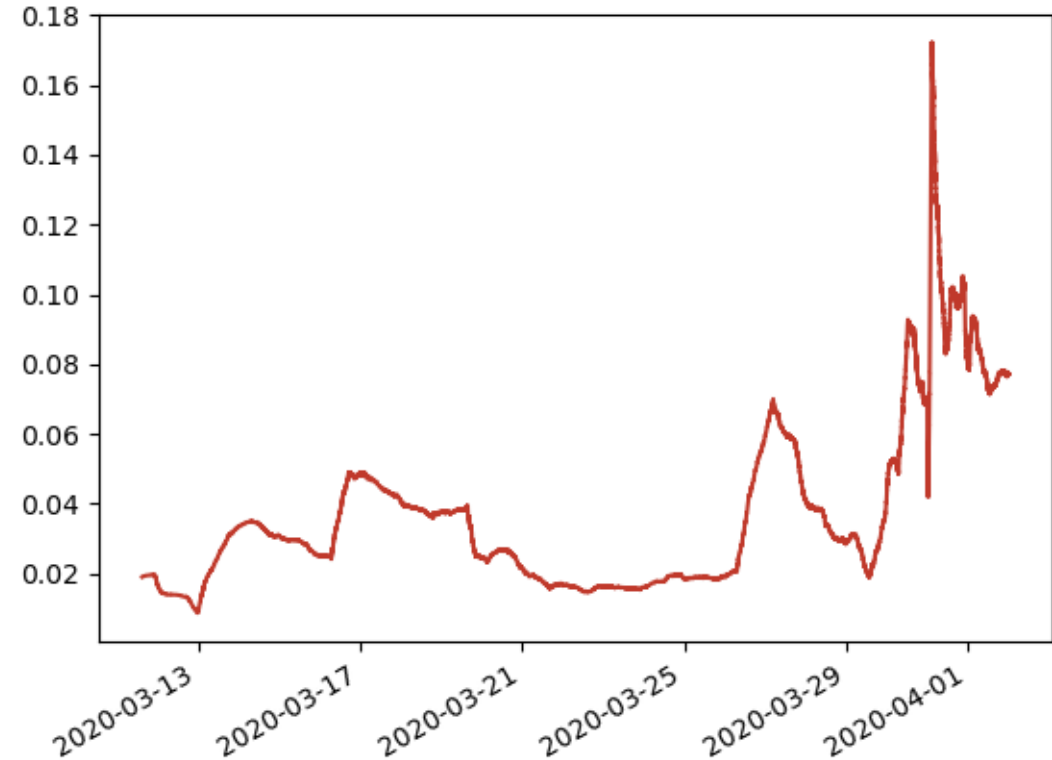
Health scams

YouTube Comments

LDA – Toxic Language



HDP – Polarizing topics (“Trump”, “China”, and “virus”)



Future directions

- Nest models
- Expand dataset
- More sophisticated models
 - Sentence BERT
 - Amazon SageMaker Neural Topic Mode
- Streamline entire process to public dashboard

COSMOS Tools:

- **Blogtrackers** - <https://btracker.host.ualr.edu>
- **VTracker** - <https://vtracker.host.ualr.edu>
- **Focal Structure Analysis** - <http://fsa.host.ualr.edu/>

Blogtrackers

YouTubeTracker



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