#### STAT 453: Introduction to Deep Learning and Generative Models

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## Stuff in the News

## Interesting Things Related to Deep Learning Week 1: Jan 27th, 2021

# "New AI research to help predict COVID-19 resource needs from a series of X-rays"

https://ai.facebook.com/blog/new-ai-research-to-help-predict-covid-19-resourceneeds-from-a-series-of-x-rays/

- Deep learning in collaboration with medial doctors at NYU
- 3 models
  - (1) patient deterioration (from 1 x-ray)
  - (2) patient deterioration (from multiple x-rays)

(3) Predict suppl. oxygen requirement (from 1 x-ray)

- Pre-trained on large (non-COVID) chest x-ray databases (with self-supervised learning)
- Fine-tuned on smaller COVID-19 x-ray dataset (27k x-rays from 5k patients)
- Outperformed human experts on some measures



Full paper on arXiv: <u>https://arxiv.org/abs/2101.04909</u> Pre-trained models on GitHub: <u>https://github.com/facebookresearch/CovidPrognosis</u>

# "New AI research to help predict COVID-19 resource needs from a series of X-rays"

If you are interested, there are also many other works in this area



https://arxiv.org/search/advanced?advanced=&terms-0-operator=AND&terms-0-term=COVID-19&terms-0-field=title&terms-7operator=AND&terms-7-term=x-ray&terms-7-field=title&classification-physics\_archives=all&classificationinclude\_cross\_list=include&date-filter\_by=all\_dates&date-year=&date-from\_date=&date-to\_date=&datedate\_type=submitted\_date&abstracts=show&size=200&order=-announced\_date\_first

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REPORT



### Learning the language of viral evolution and escape

Brian Hie<sup>1,2</sup>, 
Ellen D. Zhong<sup>1,3</sup>, 
Bonnie Berger<sup>1,4,\*</sup>, 
Bryan Bryson<sup>2,5,\*</sup>

+ See all authors and affiliations

Science 15 Jan 2021: Vol. 371, Issue 6526, pp. 284-288 DOI: 10.1126/science.abd7331

#### https://science.sciencemag.org/content/371/6526/284

- Trained bidirectional LSTM to predict virus mutations (including the COVID-19 coronavirus)
- Analogies from language modeling:
  - grammatically (biologically) correct
  - and semantic meaning (immune response)
- 0.85 AUC for predicting infectious coronavirus variants



### Human AI nabs \$3.2M seed to build personal intelligence platform

#### https://techcrunch.com/2021/01/13/human-ai-nabs-3-2m-seed-to-build-personalintelligence-platform/

an individual personal AI that is secured by blockchain to retain and recall [information]

As Kanuganti described it in September, the tool allows individuals to search for nuggets of information from past events using a variety of AI technologies:

It's made possible through a convergence of neuroscience, NLP and blockchain to deliver seamless in-the-moment recall. GPT-3 is built on the memories of the public internet, while Luther is built on the memories of your private self.



## Twitter is opening up its full tweet archive to academic researchers for free

To help researchers better study online discourse and platform trends By Nick Statt | @nickstatt | Jan 26, 2021, 2:00pm EST

#### https://www.theverge.com/2021/1/26/22250203/twitter-academic-research-public-tweetarchive-free-access

In addition to opening up its public archive, Twitter says it's also giving approved applicants a higher monthly tweet volume cap of 10 million tweets, which is 20 times higher than what was available on the standard free track before. It's also allowing more precise filtering to help researchers pinpoint tweets and other data relevant to what they're studying and "new technical and methodological guides" for helping researchers find what they're looking for and better make use of it in studies.

#### Apply & Access via https://developer.twitter.com/en/portal/dashboard

## Using artificial intelligence to manage extreme weather events

### News

McGill study aims to make social media contributions more useful to crisis managers

PUBLISHED: 18 JAN 2021

f	in	🍠 Tweet	

News
LSD may offer viable treatment for certain mental disorders PUBLISHED: 26 JAN 2021

#### https://www.mcgill.ca/newsroom/channels/news/using-artificial-intelligencemanage-extreme-weather-events-327770

The researchers found that by using a noise reduction mechanism, valuable information could be filtered from social media to better assess trouble spots

The team based their study on Twitter data from the March 2019 Nebraska floods in the United States, which caused over \$1 billion in damage and widespread evacuations of residents. In total, over 1,200 tweets were analyzed and classified.

"Social network analysis can identify where people get their information during an extreme weather event. Deep learning allows us to better understand the content of this information by classifying thousands of tweets into fixed categories, for example, 'infrastructure and utilities damage' or 'sympathy and emotional support'," says Sieber.

#### Link to the original study: https://onlinelibrary.wiley.com/doi/abs/10.1111/1468-5973.12311

[Submitted on 13 Jan 2021]

#### Re-labeling ImageNet: from Single to Multi-Labels, from Global to Localized Labels

#### Sangdoo Yun, Seong Joon Oh, Byeongho Heo, Dongyoon Han, Junsuk Choe, Sanghyuk Chun

ImageNet has been arguably the most popular image classification benchmark, but it is also the one with a significant level of label noise. Recent studies have shown that many samples contain multiple classes, de

#### https://arxiv.org/abs/2101.05022

- FYI ImageNet contains 14 million images
- researchers add multi-label information
- trained EfficientNet-L2 on 1 billion Instagram images as the machine annotator
- uses crop regions



Figure 1. **Re-labeling ImageNet training data.** Original ImageNet annotation is a single label ("ox"), whereas the image contains multiple ImageNet categories ("ox", "barn", and "fence"). Random crops of an image may contain an entirely different object category from the global annotation. Our method (**ReLabel**) generates location-wise multilabels, resulting in cleaner supervision per random crop.

## How Facebook is using AI to improve photo descriptions for people who are blind or visually impaired

https://tech.fb.com/how-facebook-is-using-ai-to-improve-photodescriptions-for-people-who-are-blind-or-visually-impaired/



- May be an image of 1 person, standing, and Machu Picchu
- Trained ResNeXt model on 3.5 billion instagram photos + hashtags
- Combined with Fast R-CNN object detection