PYTHON FOR QUICK, USEFUL MULTIMEDIA MANIPULATION

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ONLINE PRESENTATION

Anecdotes from a Python Programmer

PYTHON FOR QUICK, USEFUL MULTIMEDIA MANIPULATION

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ONLINE PRESENTATION

WHAT THIS TALK IS ABOUT

- I make and manipulate lots of images and videos in my day-to-day work.

WHAT THIS TALK IS ABOUT

- I show code and demonstrate these things I do all the time.
  - auto-cropping images.
  - Videos from a collection of images.
  - Animated GIFs.
  - YouTube + song metadata → M4A file.

WHAT THIS TALK IS ABOUT

- Functionality comes from three Github repos
  - GITHUB GIST THAT MAKES MOVIES FROM IMAGES
  - NPRSTUFF
  - COVID19_STATS
  - HOWDY

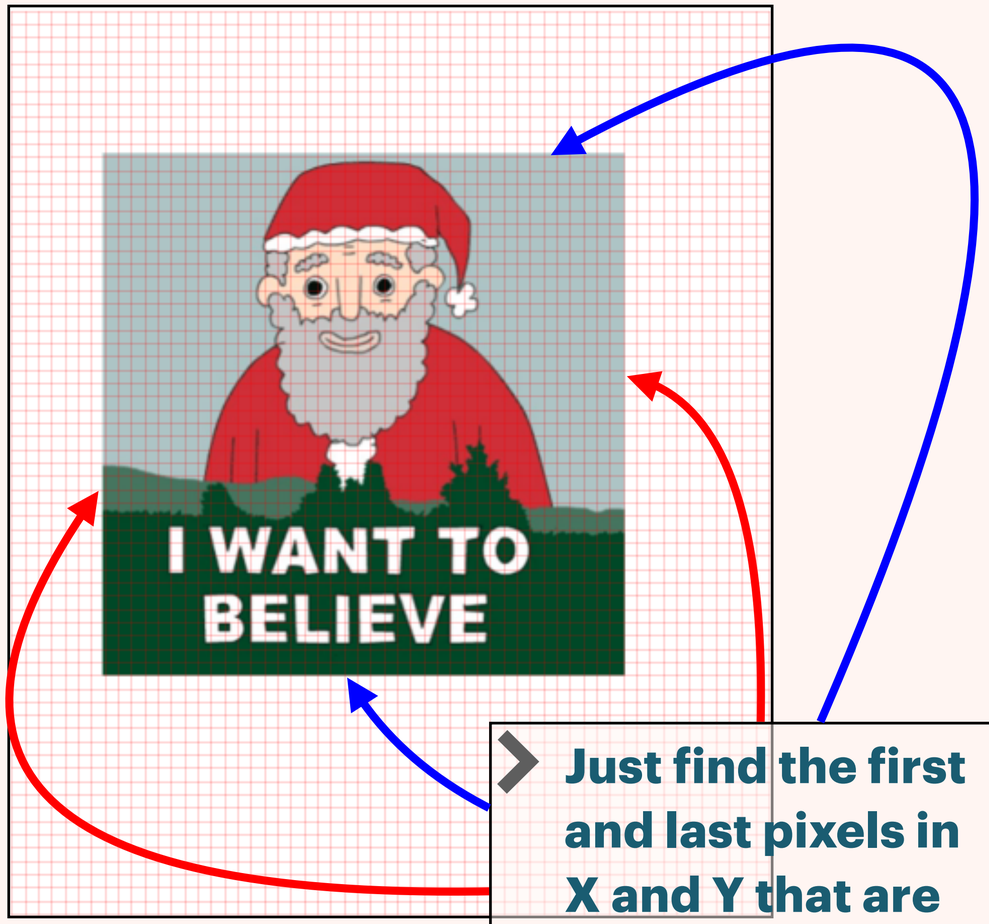
AUTOCROPPING IMAGES

AUTOCROPPING LOSSY (PNG, JPEG, TIFF, ETC.) IMAGES

- First, load image file from the imread function.
  - imread(...)

- Image is stored as a 2D numpy.array of RGBA values.

AUTOCROPPING LOSSY (PNG, JPEG, TIFF, ETC.) IMAGES



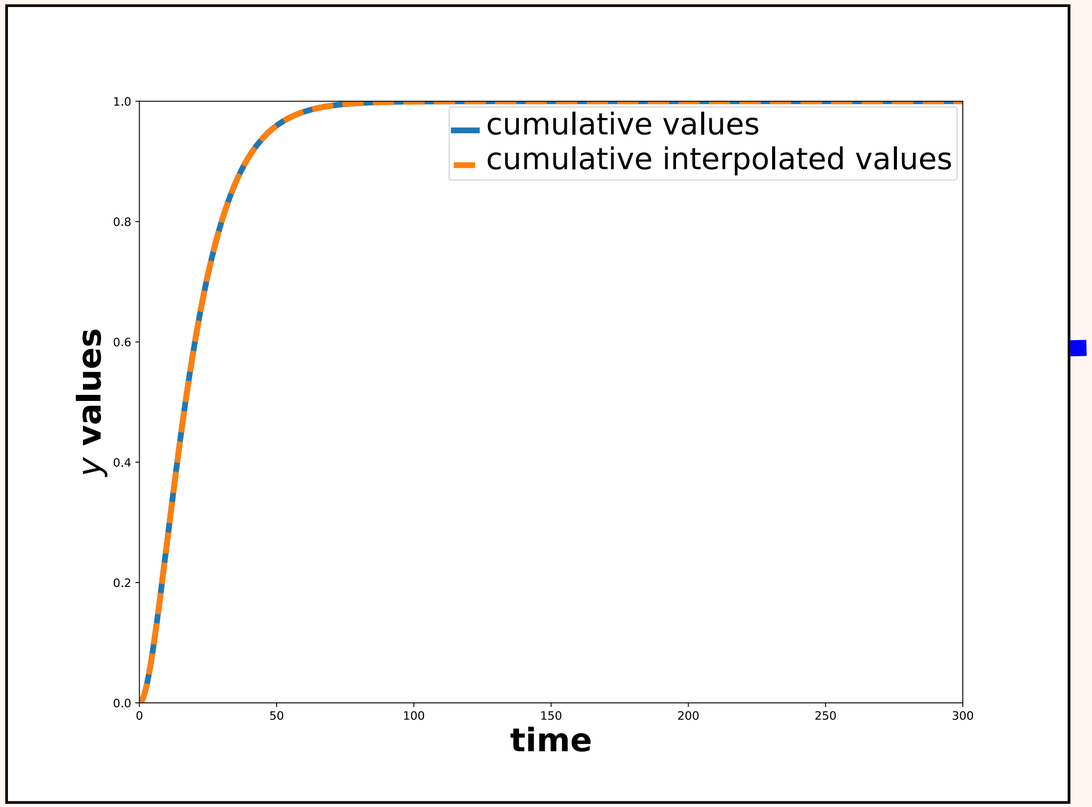
- Just find the first and last pixels in X and Y that are NOT white

- That is the bounding box. Crop!

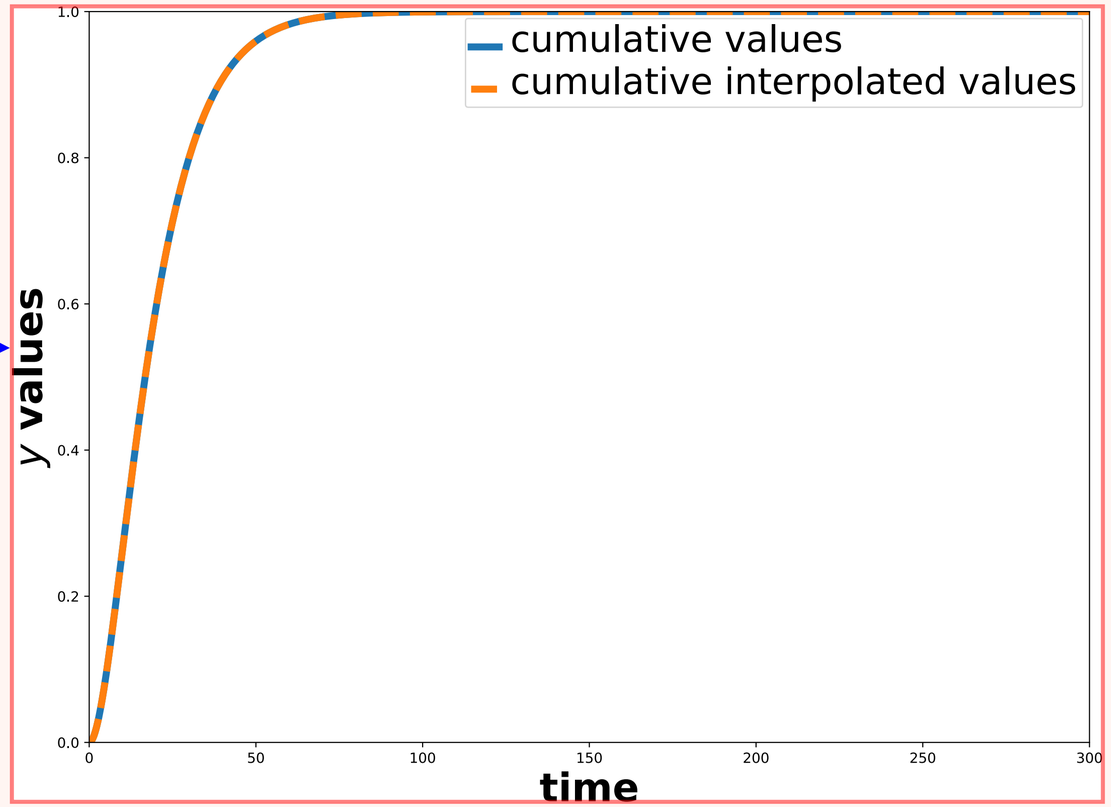
AUTOCROPPING PDF IMAGES

- Uses PyPDF2 and Adobe Ghostscript at a lower level.
- Uses Ghostscript to estimate the bounding box.
- Crops PDF according to bounding box using PyPDF2.

AUTOCROPPING PDF IMAGES



UNCROPPED



AUTOCROPPED

DEMONSTRATION

- **autoCropImage, from NPRSTUFF Github Repo, automatically crops images.**

```
usage: autoCropImage [-h] --input INPUT [--output OUTPUT] [--color COLOR]
                     [--trans] [--newwidth NEWWIDTH] [--show]
optional arguments:
  -h, --help            show this help message and exit
  --input INPUT         Name of the input file.
  --output OUTPUT       Name of the output file. Optional.
  --color COLOR         Name of the color over which to autocrop. Default is
                        white.
  --trans               If chosen, also remove the transparency wrapping around
                        the image. Works only for non-PDF images.
  --newwidth NEWWIDTH   New width of the image.
  --show                If chosen, then show the final image after cropped.
```

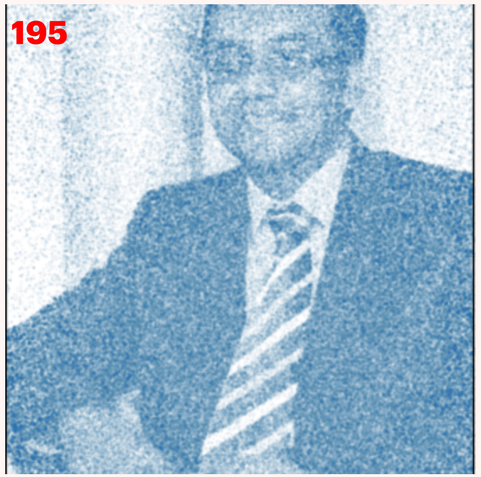
CREATING MOVIES

CREATING MOVIES

- One functionality, ***MP4 movie from a sequence of images***, is created for this presentation and as a GitHub Gist.
- Other functionality, ***MP4 movie into animated GIF***, uses convertImage's other functionalities.
- Unlike other tools, low-level functionality is handled by FFMPEG (video and audio creation SDK and tools) through subprocess.

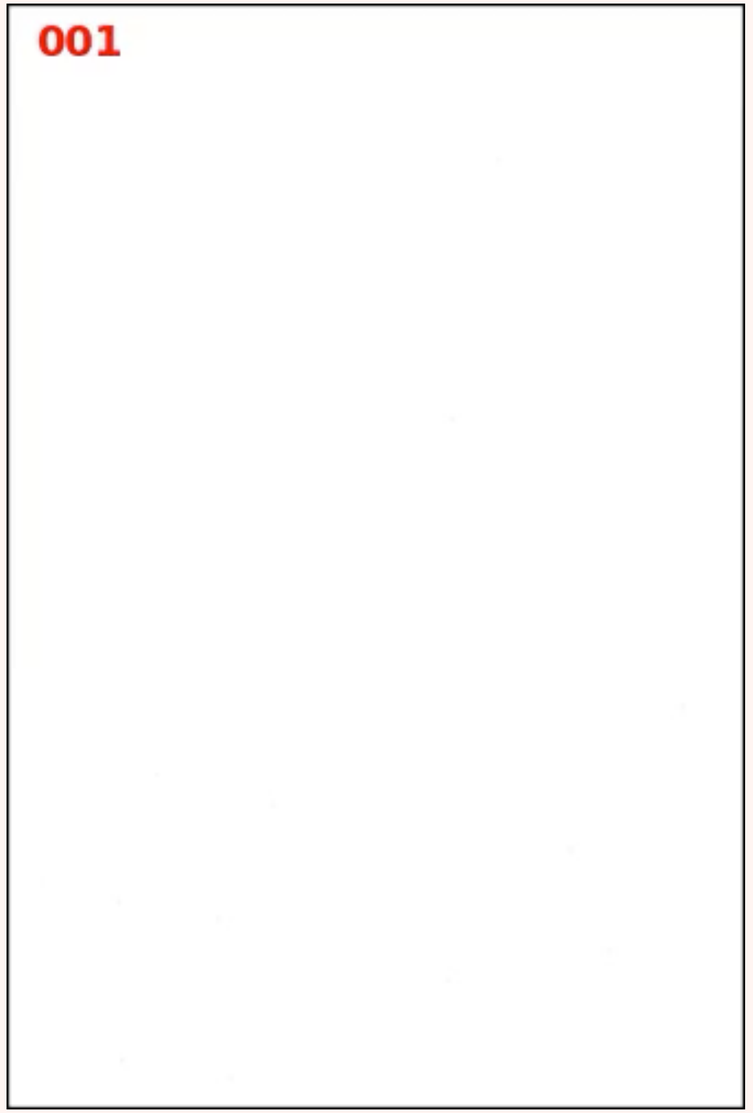
MOVIE FROM IMAGE SEQUENCE

- **Python CLI follows this website on creating an MP4 movie from sequence of images.**
- ***Image width and height must be divisible by 2.***



DEMONSTRATE MOVIE FROM IMAGE SEQUENCE #1

```
python3.7 demo_create_movie_sequence.py \
--prefix=img –output=mcmc_images.mp4 \
--dirname="mcmc_animation_images" --fps=10
```

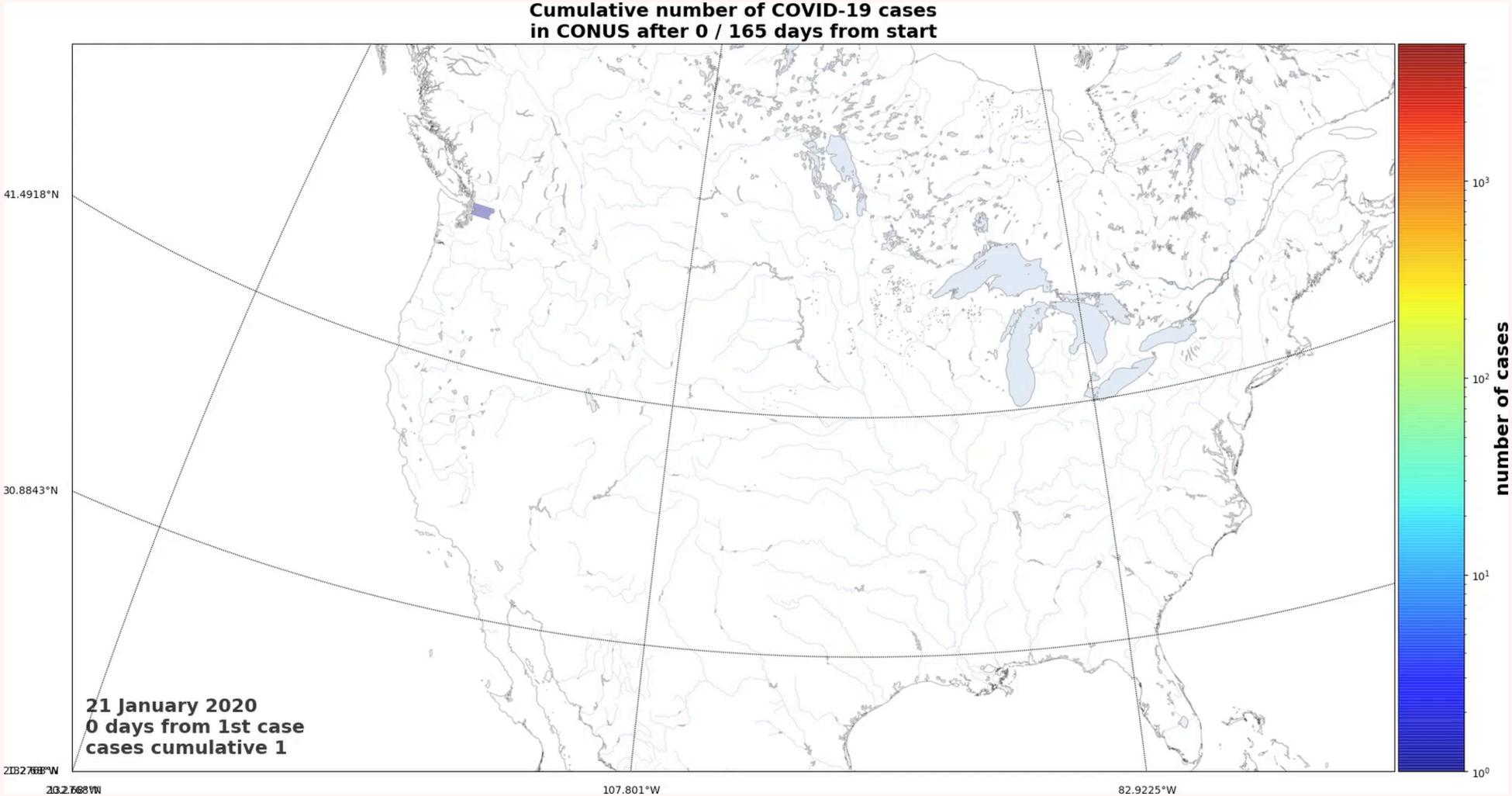


DEMONSTRATE MOVIE FROM IMAGE SEQUENCE #2

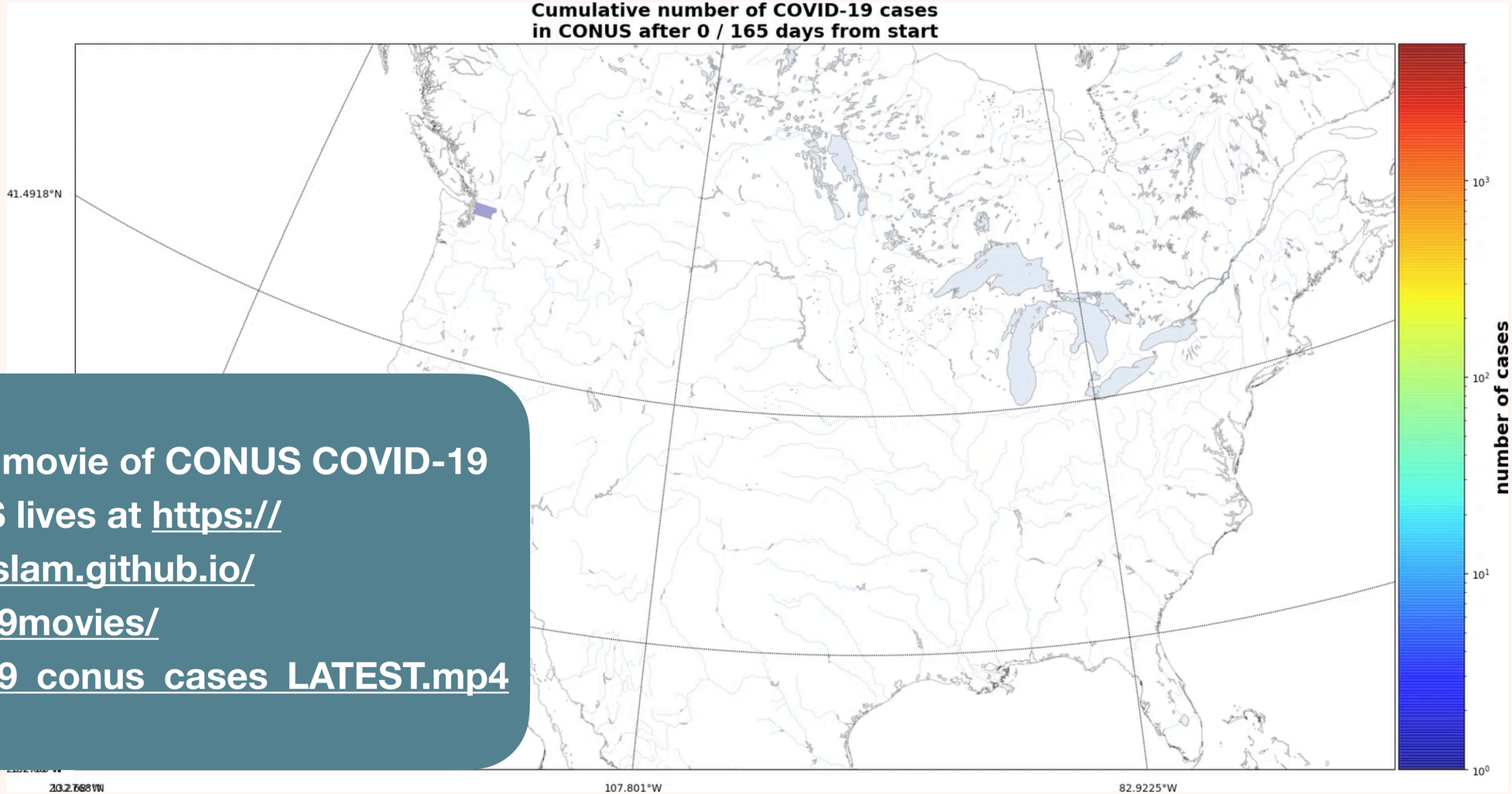
- From the COVID-19 statistics Github repo.
- Cumulative COVID-19 cases in CONUS from beginning to 4 JULY 2020.

```
python3.7 demo_create_movie_sequence.py \
--prefix="covid19_conus_cases_04072020." \
--output="covid19_conus_cases_04072020.mp4" \
--dirname="covid19_conus_cases_04072020_imagefiles" \
--fps=5
```

DEMONSTRATE MOVIE FROM IMAGE SEQUENCE #2



DEMONSTRATE MOVIE FROM IMAGE SEQUENCE #2



Latest movie of CONUS COVID-19 CASES lives at https://tanimislam.github.io/covid19movies/covid19_conus_cases_LATEST.mp4

ANIMATED GIF FROM MP4 OR YOUTUBE

- Why use? Some services (such as GitHub or Read the Docs) do not allow movie files in documentation
  - They DO allow animated GIFs.
- Two-step process creates a GIF from an MP4 file, taken from this website
  - 1st pass creates a high-quality global color palette representative of movie file.
  - 2nd pass converts to animated GIF using 1st pass color palette.
- YouTube to GIF (YouTube → MP4 → GIF) uses youtube-dl to download YT clip as MP4.

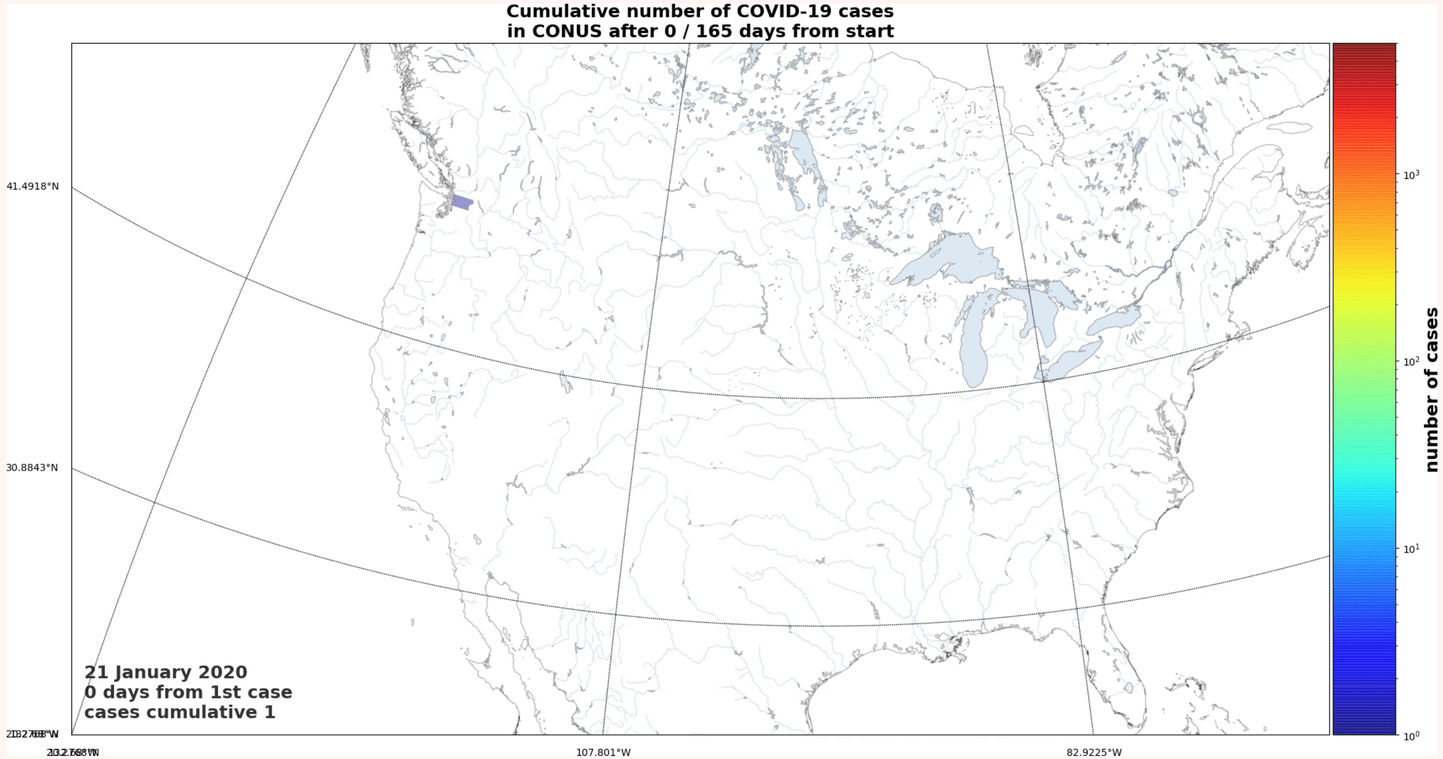
ANIMATED GIF FROM MP4 OR YOUTUBE

- **Also uses NPRSTUFF's convertImage's other functionalities**

```
usage: convertImage [-h] [--noverify] [--info]
                    {image,movie,youtube,square} ...

Uses CloudConvert to convert image or video files.

positional arguments:
  {image,movie,youtube,square}
                        Choose whether to convert a video or an image
    image               If chosen, convert an SVG(Z), PDF, or PNG into PNG.
    movie               If chosen, convert an MP4 into an animated GIF.
    youtube             If chosen, convert a YOUTUBE video with URL into an
                        animated GIF.
    square              If chosen, create a square MP4 file from an input MP4
                        file.

optional arguments:
  -h, --help            show this help message and exit
  --noverify            If chosen, do not verify the SSL connection.
  --info                If chosen, then print out INFO level logging.
```

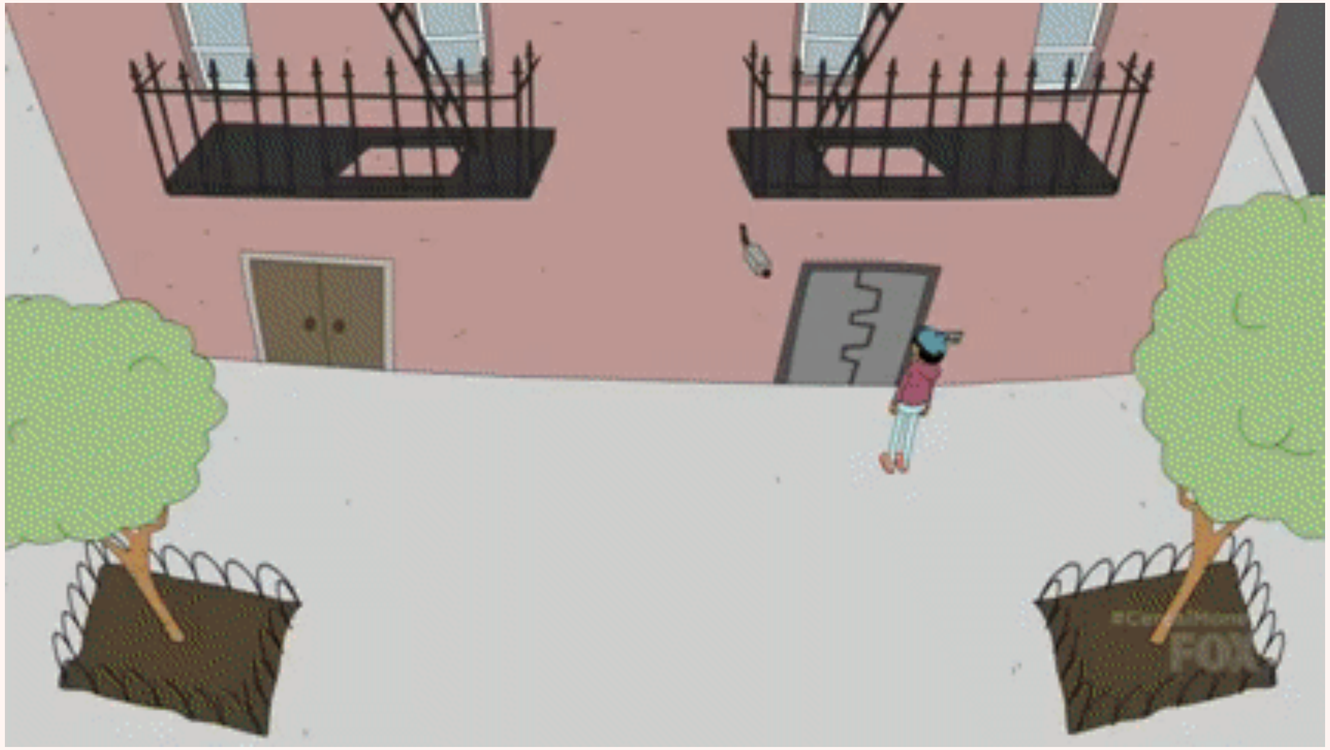
ANIMATED GIF FROM MP4

- convertImage movie -f covid19_conus_cases_04072020.mp4
- input: 1.8M; output: 32M



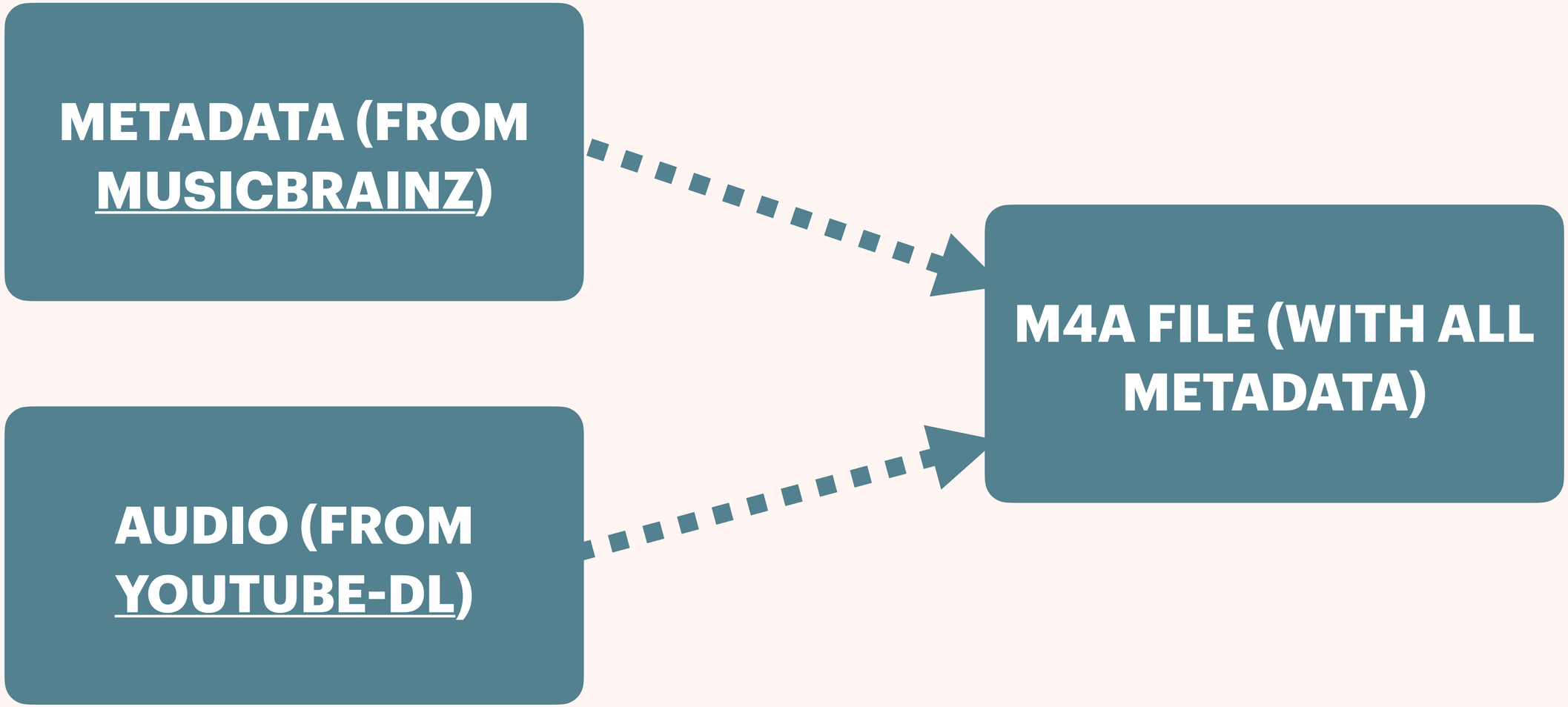
ANIMATED GIF FROM YOUTUBE

- A busy scene from the animated show, Lucas Bros. Moving Co.
- convertImage youtube -u "https://www.youtube.com/watch?v=R-pmYwr8zbU" -o "lucas_bros.gif" -q high.



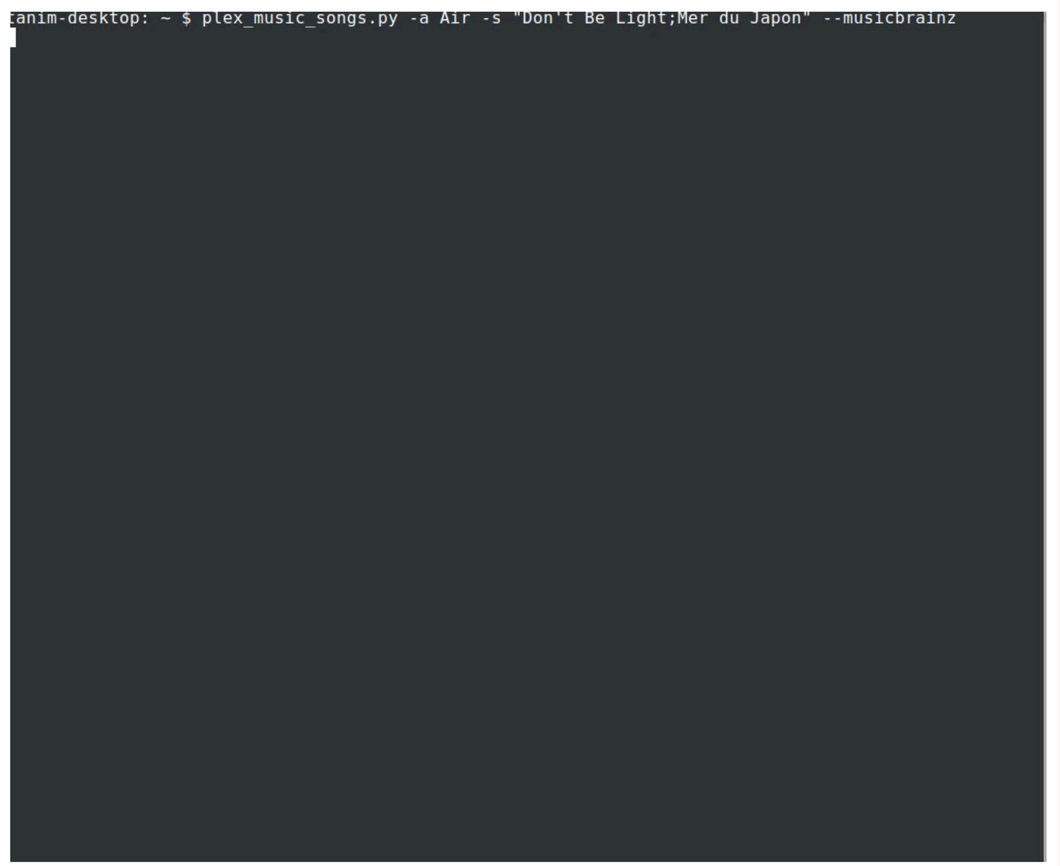
MAKING MUSIC

I USE PLEX_MUSIC_SONGS TO DOWNLOAD MUSIC



I USE PLEX_MUSIC_SONGS TO DOWNLOAD MUSIC

- plex_music_songs lives in PLEXSTUFF repository.
- Its documentation lives here.



RESOURCES

RESOURCES IN THIS PRESENTATION

- NPRSTUFF: python3 -m pip install --user git+https://github.com/tanimislam/nprstuff.git#egginfo=nprstuff
- PLEXSTUFF: python3 -m pip install --user git+https://github.com/tanimislam/plexstuff.git#egginfo=plexstuff
- COVID19_STATS: python3 -m pip install -user git+https://github.com/tanimislam/covid19_stats.git#egginfo=covid19_stats
- GITHUB GIST THAT MAKES MOVIES FROM IMAGES