

Creating Data Apps using Python

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FOSDEM' 21

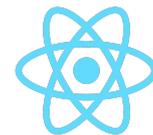
About Me

- Data Engineering 🛠️
- Like to Prototype 🔧
- Build in 🐍
- Organize PyData Munich
- Love to Travel ✈️
- Find me @nithishr



Wild West of Javascript

- Lots of Frameworks / Libraries
- Paradox of Choice



Streamlit

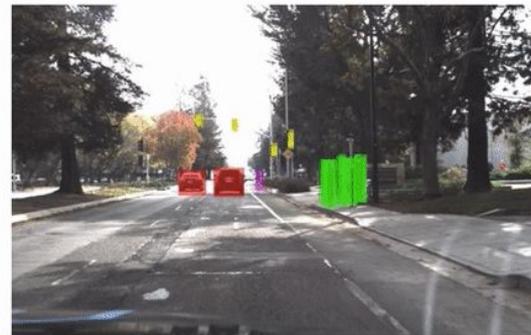


- Turn Data Scripts into Web Apps
- Interactive
- No Frontend Experience Required
- Easy to Deploy



Ground Truth

Human-annotated data (frame 38)



Real-time Computer Vision

YOLO v3 Model (overlap 0.3) (confidence 0.9)



Streamlit



Compatibility with Major Frameworks / Libraries



L^AT_EX



Vega-Lite



seaborn

DECK.GL



Streamlit Use Cases

- Creating an Interface for Machine Learning
- Visualizing Data

Interface for Machine Learning

Normal Workflow

- Build Model
- Light Wrapper in Flask / FastAPI
- Frontend in HTML / JS / CSS

Streamlit Workflow

- Build Model
- Integrate Streamlit Components for UI

Interface for Machine Learning

- Interface for Image Net

Image Classification

- 3 Lines of Streamlit Magic ✨

- Similar to CLI Parser

Demo: <https://youtu.be/1y1o4XoFluA>

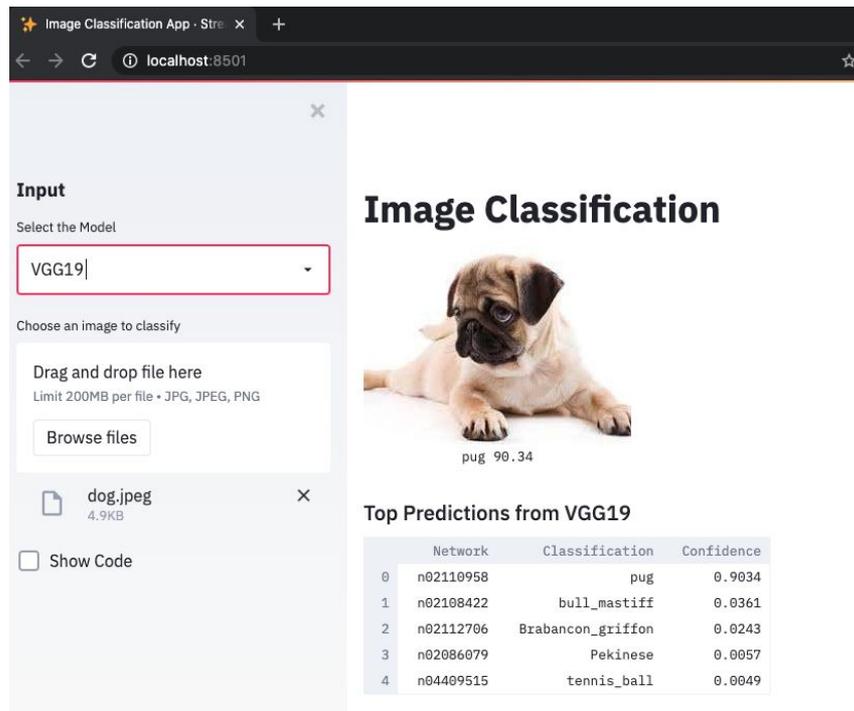


Image Classification

Top Predictions from VGG19

	Network	Classification	Confidence
0	n02110958	pug	0.9034
1	n02108422	bull_mastiff	0.0361
2	n02112706	Brabancon_griffon	0.0243
3	n02086079	Pekinese	0.0057
4	n04409515	tennis_ball	0.0049

Visualizing Data

- Notebooks
- Presentations
- Scripts
- Code
- Reports in Tableau
- Web Apps?



Jupyter Notebooks

- Great for Experimentation
- Graphs & Visualizations
- Storytelling using Data
- Customize with Code
- "I don't like notebooks" - Joel Grus

The image displays a collage of Jupyter Notebook interfaces. The top-left window shows a notebook titled "In Depth: Linear Regression" with introductory text and code cells. Below it, a "Simple" notebook shows code for solving a system of linear equations. The bottom-left window shows a "Julia" notebook with a scatter plot and code for solving a system of linear equations. The bottom-middle window shows a "python notebook" with code for solving the Lorenz attractor and a plot of the resulting trajectory. The bottom-right window shows an "R" notebook with a scatter plot and code for solving a system of linear equations. The top-right window shows a "Launcher" interface with buttons for Python 3, C++11, C++14, C++17, Julia 1.0, phylogenetics (Python 3.7), and R. The right side of the collage features a "Seattle Weather: 2012-2015" visualization with a scatter plot of temperature over time and a bar chart of the number of records.

Can you Visualize your Google Maps Data?

← Google Takeout

1 Select data to include and Measurements, Earth, Hangouts

Multiple formats

Home App
Device, room, home and history information from the Home app. [More info](#)

Multiple formats

Keep
Notes and media attachments stored in Google Keep. [More info](#)

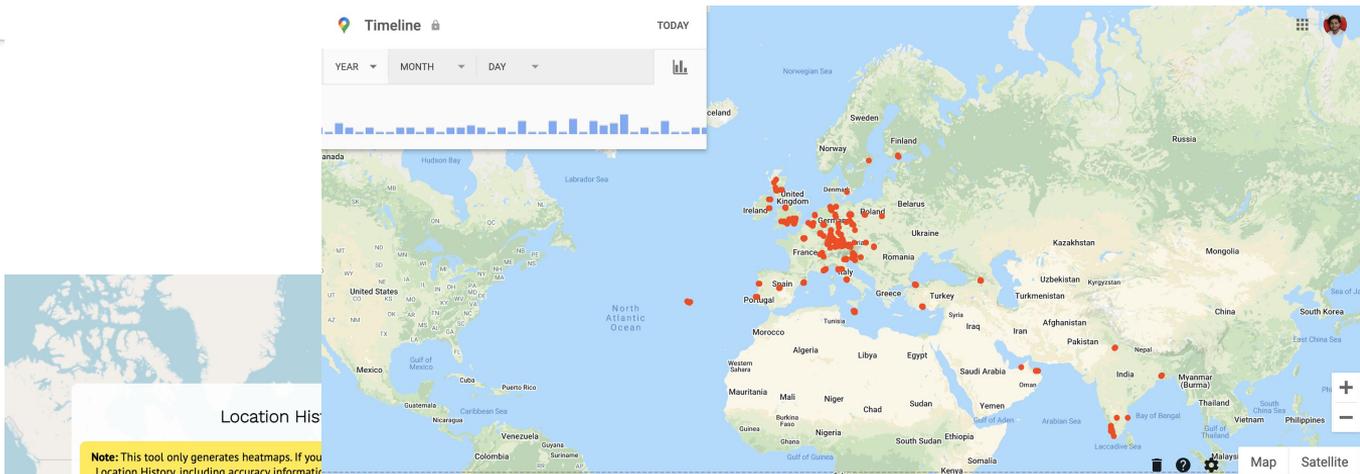
Multiple formats

Location History
Your Location History data collected while opted in to Location History.

Multiple formats

Mail
Messages and attachments in your Gmail account in MBOX format. User settings from your Gmail account in JSON format. [More info](#)

Multiple formats All Mail data included



Welcome to **Location History Visualizer**, a tool for visualizing your collected Google **Location History** data with heatmaps. *Don't worry*—all processing and visualization happens directly on your computer, so rest assured that nobody is able to access your Location History but you... and Google, of course.

To start off, you'll need to go to [Google Takeout](#) to download your Location History data: on that page, deselect everything except Location History by clicking "Select none" and then reselecting "Location History". Then hit "Next" and, finally, click "Create archive". Once the archive has been created, click "Download". Unzip the downloaded file, and open the "Location History" folder within. **Then, drag and drop LocationHistory.json from inside that folder onto this page.** Let the visualization begin!

Alternatively, select your **LocationHistory.json** file directly:

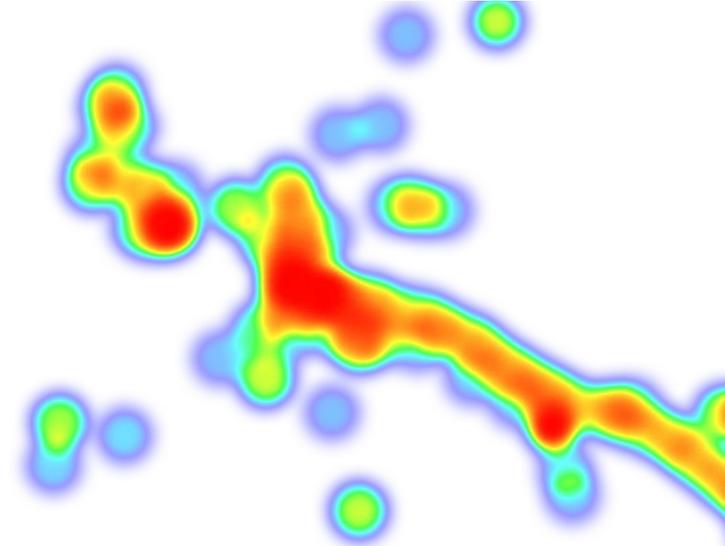
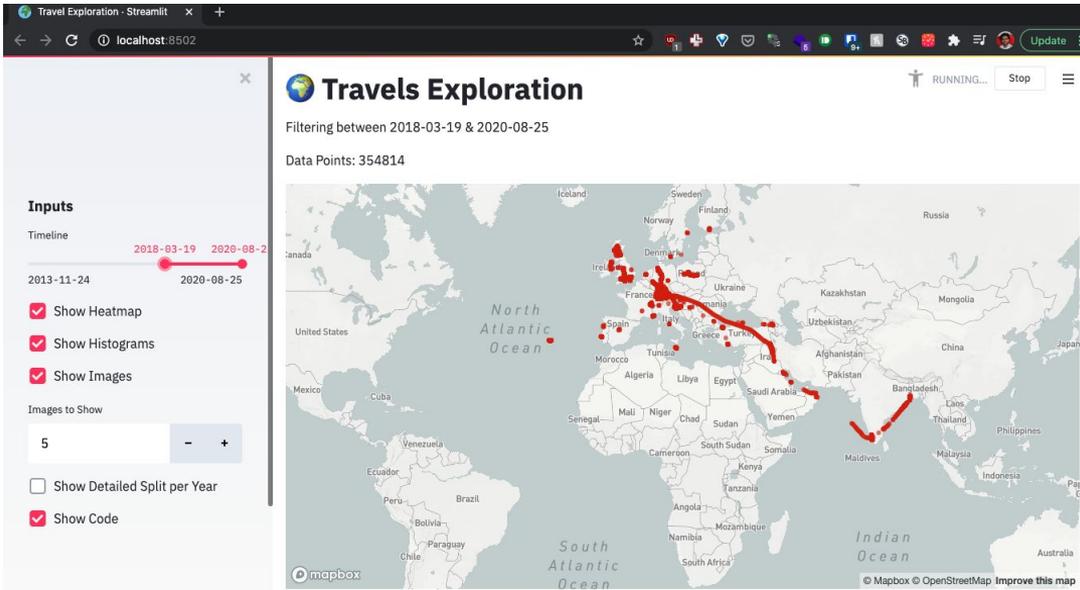
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An open source project by the makers of Location History Visualizer Pro.

Can you Visualize your Google Maps Data?

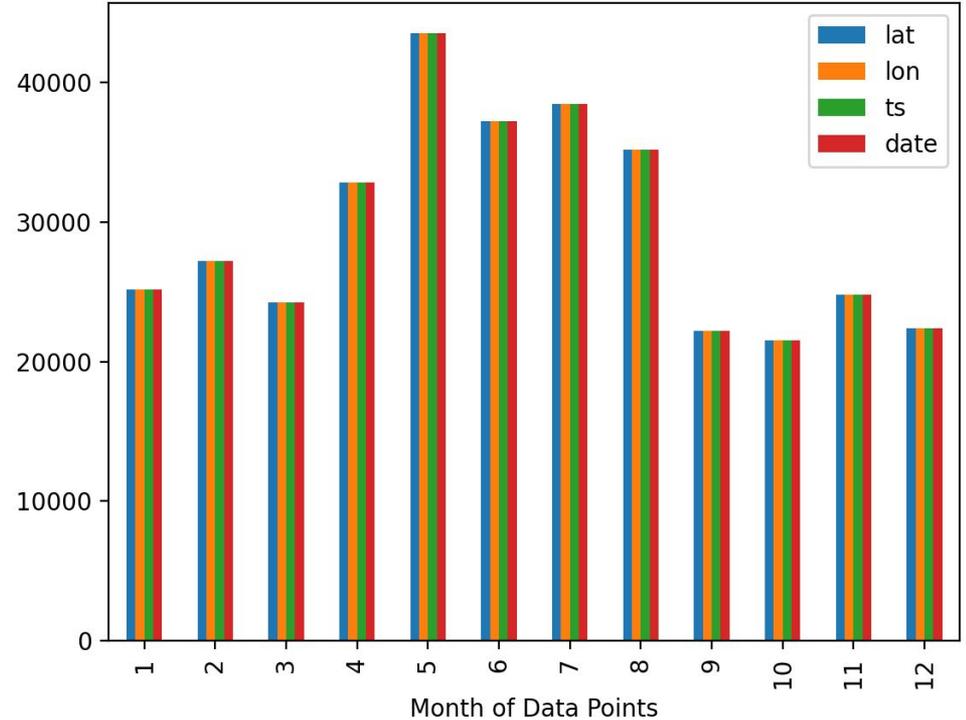
- Clean / Standardize Data
 - Latitude, Longitude, Timestamps
- Add Background Information
 - Images from **flickr**
 - Random Images based on Location
- Histograms
- Heatmaps

Can you Visualize your Google Maps Data?



Can you Visualize your Google Maps Data?

Image Highlights



Demo: <https://youtu.be/ZF1viSIB4ZA>

Alternatives

voilà

b**keh**



Panel

Pick your friend

Observations

Pros

- Interactive
- Customizable
- Deployment is easy
- Active Community

Cons

- No built in Authentication
- Early stages of Streamlit Sharing

Good to have for Data Scientists

Conclusion

- Great for Data Scientists
- Showcase Solutions
- No need to worry about Javascript



References

- Code:
 - Machine Learning UI
<https://github.com/nithishr/streamlit-ml-demo>
 - Travel Data Visualization
<https://github.com/nithishr/streamlit-data-viz-demo>
- Examples:
 - [Streamlit Gallery](#)

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