

Visualizing Location-Based Data

Using Google Fusion Tables

Many events are dependent on location, and having the ability to show these data in the context of their geographic origins can reveal trends that may otherwise be unobserved. Luckily, modern interfaces with Google Maps allow an unexperienced user to generate such content within minutes. No special software is required. Only a spreadsheet program and a web browser are needed.

This document provides a guide for geocoding location based data and visualizing with Google Maps by examining reports of UFO sightings in Texas taken from The National UFO Reporting Center Online Database <http://www.nuforc.org/webreports.html>

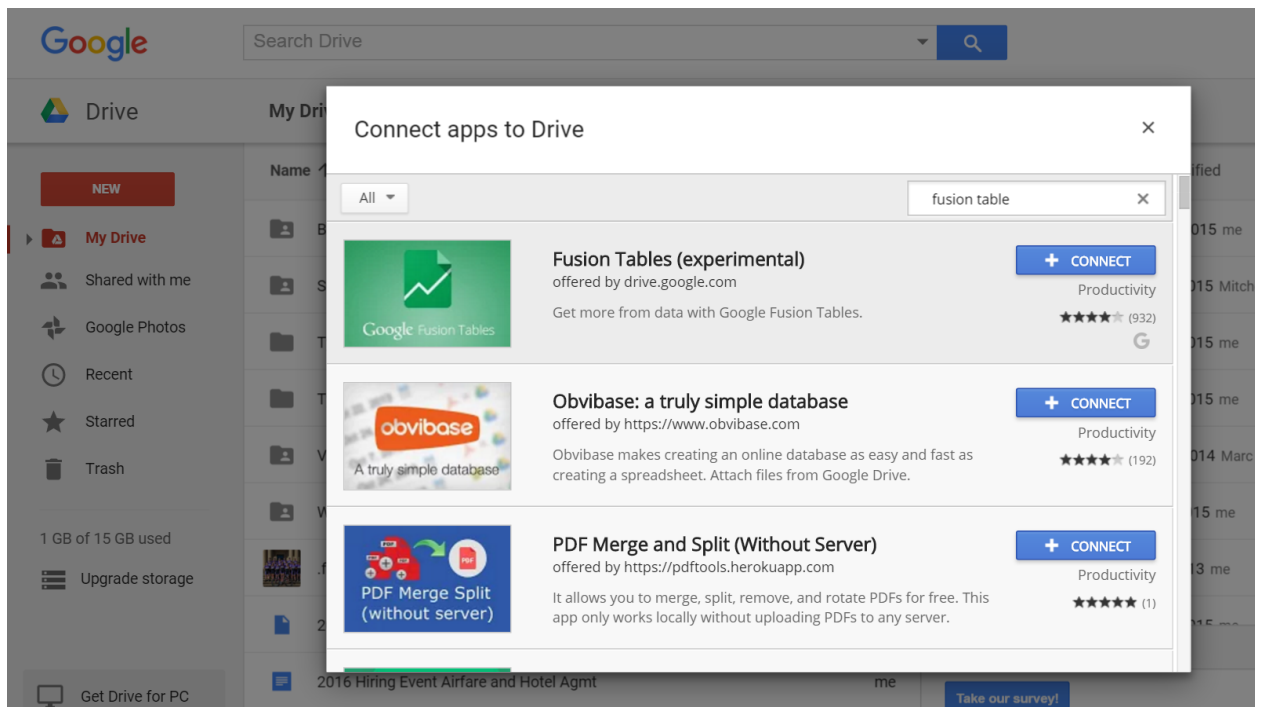
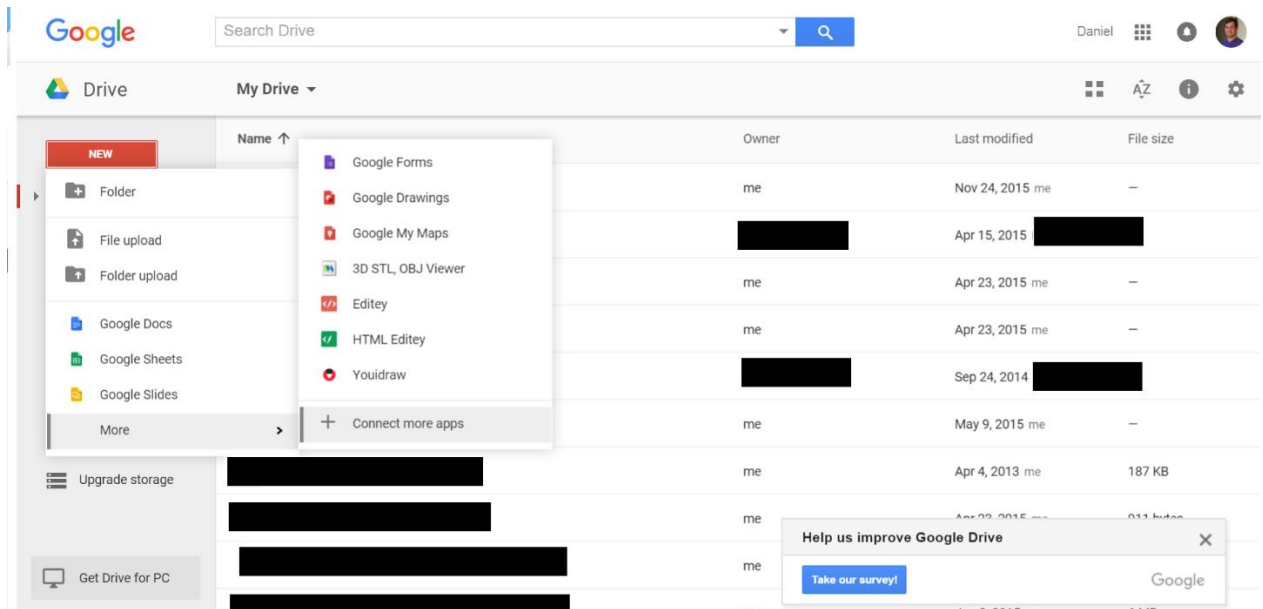
1. Format data. This example will use a CSV file. Below is a table of the data format:

| Date | Location | State | Shape | Time | Summary | Upload Date |
|-----------|----------|-------|---------|-------------|---|-------------|
| 2/19/2015 | Walburg | TX | Cigar | 1 minute | Two bright shiny white cylindrical cigar-shaped objects rounded nose and tails. | 2/20/2015 |
| 2/18/2015 | Helotes | TX | Chevron | 4-5 seconds | Translucent white in color and bird shape. | 2/20/2015 |
| 2/18/2015 | Frost | TX | Light | 3 hours | Assom ((sic. "Awesome")) i want 2 drive. | 2/20/2015 |
| 2/10/2015 | Midland | TX | Disk | ~5 seconds | UFO over Midland, Texas. | 2/12/2015 |

Notice that in addition to the location (city) that the event occurred in, there are several other details about the event. The date, time, shape, and description of the event may provide relevant details for detecting trends.

2. Create a Google Fusion Table. You will need to access a Google Drive Account and enable the Google Fusion Tables app to do this.

- Select **NEW** from on the Google Drive interface
- Select **+ Connect more apps**
- Search for **Fusion Tables (experimental)** and **+ CONNECT**



3. Import data. In this example, the input is a “UFO.csv” file but you may use many different formats.

Import new table

From this computer

Google Spreadsheets

Create empty table

Choose File UFO.csv

Separator character ☒ Comma ☐ Tab ☐ Colon ☐ Other

Character encoding UTF-8

You can upload spreadsheets, delimited text files (.csv, .tsv, or .txt), and Keyhole Markup Language files (.kml) [Learn more](#)

Or search public data tables

New to Fusion Tables?

Take a peek! [Play with a data set](#) or [try a tutorial](#).

Cancel

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4. Tag Location Data. Google is not smart enough (yet) to figure out which columns provide the relevant geographic data. You will need to tag the columns that contain locational references. Click the arrow on the column header to access the drop down menu.

- Select **Change...**. Change data type to location
- You must select “2 column location” and tag the latitude and longitude to use coordinate data

| File | Edit | Tools | Help | Rows 1 | Cards 1 | Heatmap | Map | Network Map | + |
|---------------|--------------------|-------|---------|-------------|--|---------|-----|-------------|---|
| Filter | No filters applied | | | | | | | | |
| 1-100 of 4412 | | | | | | | | | |
| Date | Location | State | Shape | Time | Summary | | | | |
| 2/19/2015 | Walburg | TX | Cigar | 1 minute | Two bright shiny white cylindrical cigar-shaped objects rounded nose and tails. | | | | |
| 2/18/2015 | Helotes | TX | Chevron | 4-5 seconds | Translucent white in color and bird shape. | | | | |
| 2/18/2015 | Frost | TX | Light | 3 hours | Assom ((sic. "Awesome")) i want 2 drive. | | | | |
| 2/10/2015 | Midland | TX | Disk | ~5 seconds | UFO over Midland, Texas. | | | | |
| 2/1/2015 | Frisco | TX | Light | 3:00 | Large and unusual light observed in the evening sky just southwest of Frisco, Texas... | | | | |

5. Geocode Data. Google will scan your location reference and convert these to a format that Google Maps will understand. The program will flag any ambiguous points. Sometimes a contextual hint will be required I.E. "Cities in Texas." In this example, the location data is the names of cities. However, you may use GPS coordinate data or other locational data.

- From the Fusion Table interface, select **File** on the menu bar.
- Select **Geocode...** from the dropdown menu.

UFO

Imported at Wed Mar 04 10:51:44 PST 2015 from UFO.xlsx.
[Add Attribution](#) - Edited on March 5, 2015

| File Edit Tools Help Rows 1 Cards 1 Heatmap Map Network Map | | | | | | |
|---|-------------|----|----------|-----------|--|-----------|
| Share... | | | | | | |
| New table... | | | | | | |
| Open... | | | | | | |
| Rename... | | | | | | |
| Make a copy | | | | | | |
| About this table | | | | | | |
| Geocode... | | | | | | |
| Merge... | | | | | | |
| Find a table to merge with... | | | | | | |
| Create view... | | | | | | |
| Import more rows... | | | | | | |
| Download... | | | | | | |
| 1/23/2015 | San Antonio | TX | Diamond | 2 minutes | 4 amber color diamond shape flying objects observed. | 1/26/2015 |
| 1/23/2015 | Buda | TX | Oval | 5 seconds | Looking up in our computer room out the widow, a bright blue/white object streaked across the sky. | 1/26/2015 |
| 1/23/2015 | San Antonio | TX | Triangle | unknown | Was driving west on I-10 toward 1604 and saw 2 white lights that looked like wingtip | 1/26/2015 |

Geocode

Use the Google Maps Geocoding service to place addresses on the map. [Learn more](#)

Location column

Location

Geocoding only uses location information in the selected column

▼ Add location hint

Texas

The general area of these locations. Examples: "France" or "Chicago, IL"



Geocoded 232 of at least 4226 ungeocoded rows

5%

Quality: 0% ambiguous

[Pause geocoding](#) [Cancel](#)

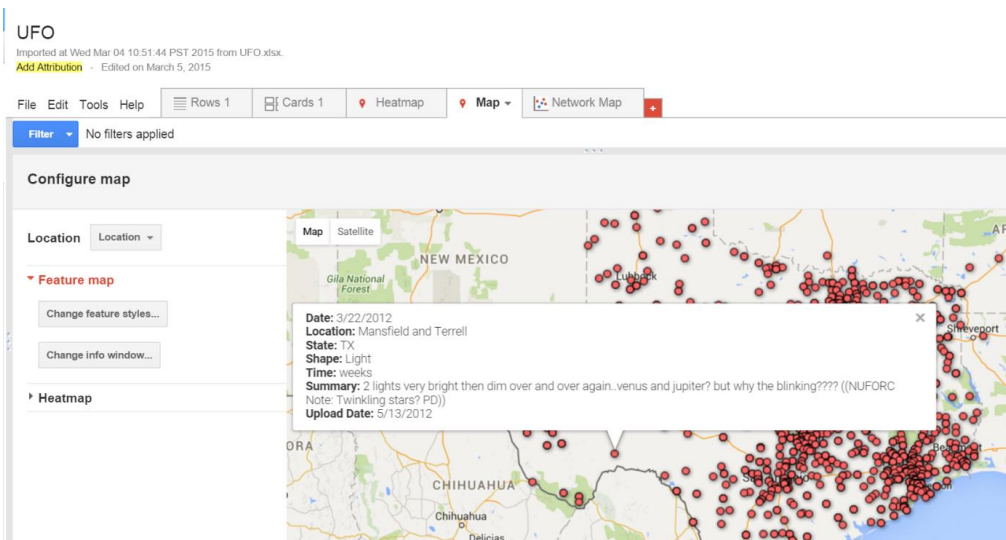
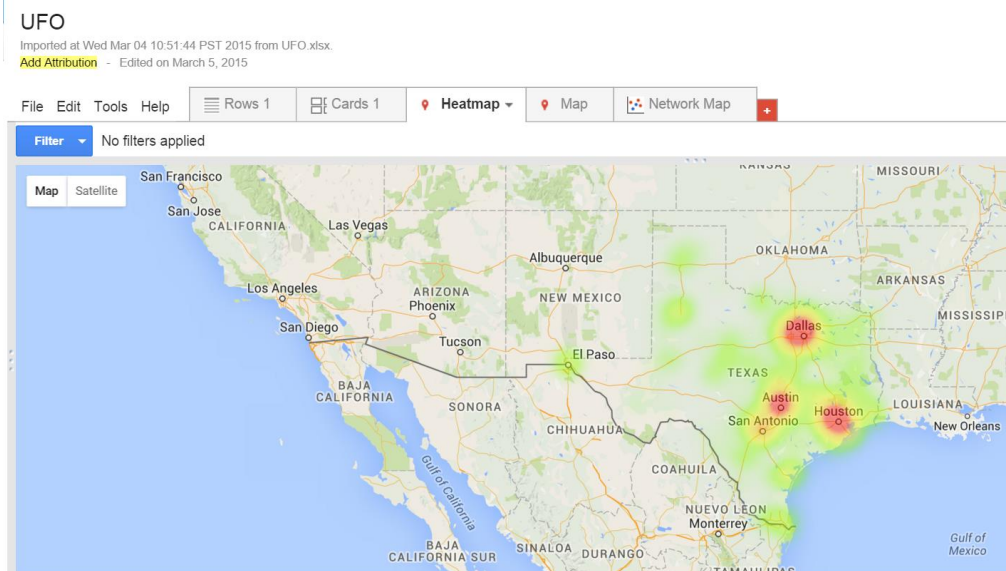
6. Create A Map.

- Press the red  button to create a new tab and select .

From here you can select options such the type of map. A **Feature Map** displays pins of all data points with associated data accessible by clicking on the point. A **Heat Map** generates a color coded map useful for observing density of events, but the individual data will no longer be accessible.

You can access an interactive version of this map at

<https://www.google.com/fusiontables/DataSource?docid=15319zrD0GibFzU1EWglhECZiQduo6PAjMO03KsRm>



Try this with your own data. Let us know what you create on Twitter [@HUBioinformatic](https://twitter.com/HUBioinformatic)