Analysis of Unidentified Flying Objects (UFO) Reports

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Introduction

Unidentified flying object (**UFO**) refers to any apparent aerial phenomenon whose cause cannot be easily or immediately identified by the observer.

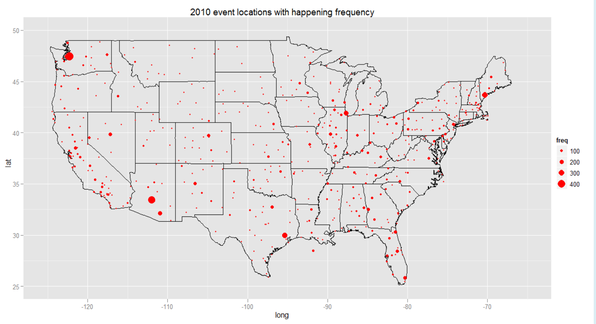
Goal: Explore the geographical features and time distribution of UFO sightings in the US and study the trend in the difference between posted time and reported time.

Dataset and Methodology

Data source and data cleaning:
UFO database: 1940- 2010
http://www.nuforc.org/webreports.html.
Longitude and latitude of US cities:
http://www.realestate3d.com/gps/latlong.htm.

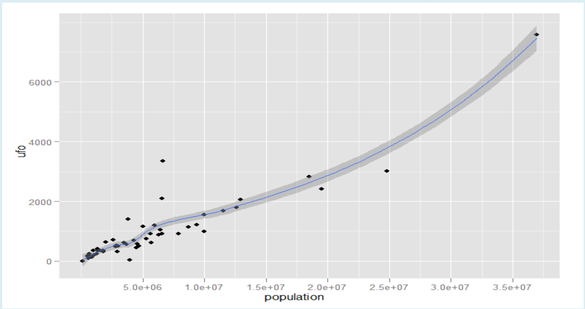
Geographical Features of UFOs

Where are UFOs reported in US?



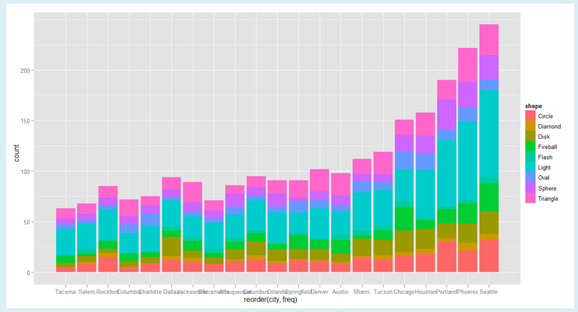
UFOs appear most in Chicago, Houston, Phoenix, Portland and Seattle

Linear model of UFOs based on Population



Although the number of UFO reports is positively correlated with the number of airports, it is highly possible that this is due to the correlation between number of airports and the population. However, the model that the number of report is positively correlated with population is statistically significant.

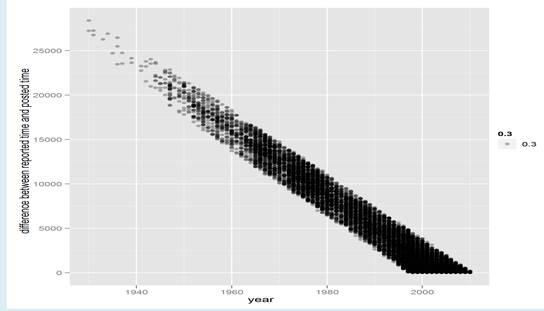
Different shapes of reported UFOs



- The most frequent UFO shape reported in the US is “light”.
- Other classic shapes include circles and triangles.

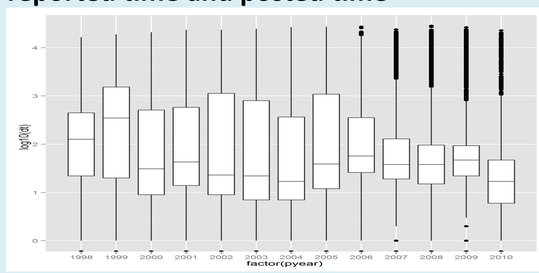
Trend of the Difference between Posted and Reported time

The difference between reported and posted time over the years



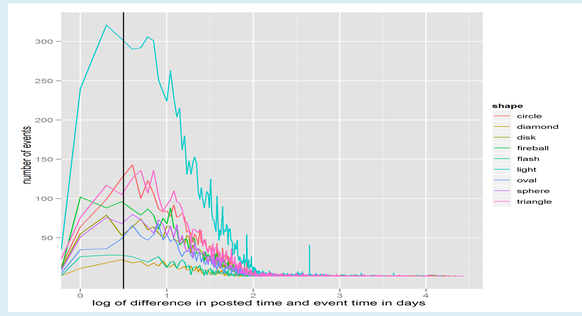
- There is an obvious linear relationship between the reporting time lag and the year.
- The range of time difference increases before 1960s, remains the same until 1998, the year when internet reporting started. The bandwidth decreases afterwards.

The variance in the difference between reported time and posted time



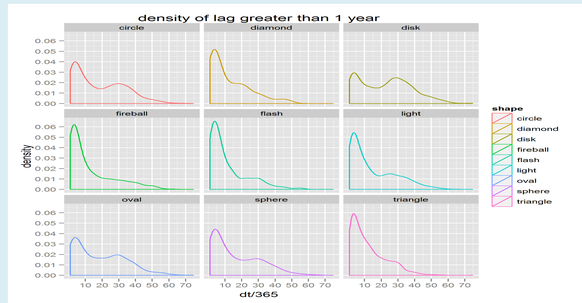
The variance in the difference between reported time and posted time decreased significantly because the internet has become more accessible.

Average Reporting Lag



The lag of posting peaks at 3 (=10^0.5) days for most shapes.

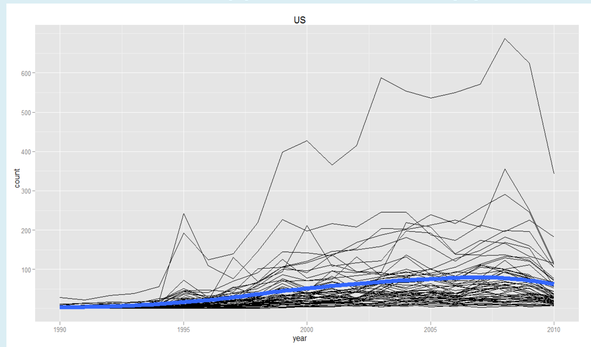
The Density Plot of Old Cases



We assume people will forget details about the UFO after many years and tend to report the most common conceived shape of UFO --- “round.” The graph shows a bimodal distribution for the shapes that are “round”. People tend to report more UFOs that were observed more than 20 years ago as “round objects.”

UFOs in different states

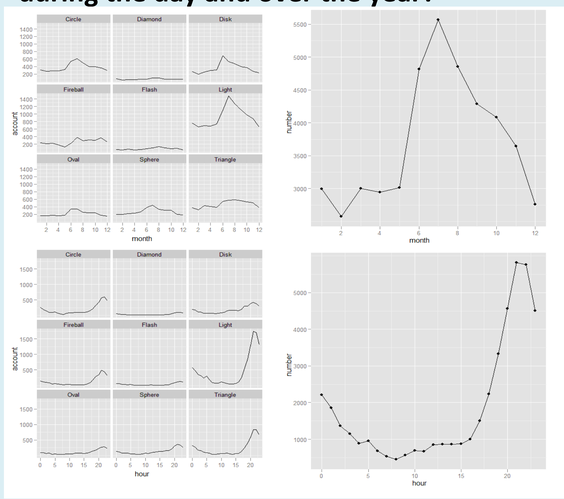
Trend of UFO appearance in US by years



UFOs are reported most frequently in California, Florida and Texas.

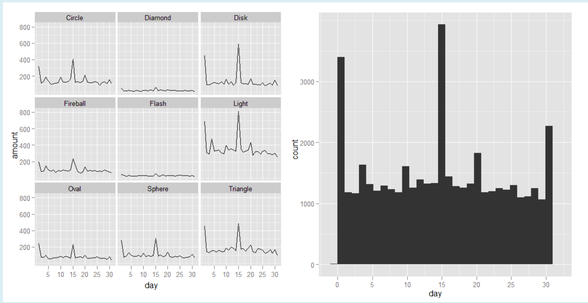
Time Analysis of the UFO

When are UFOs most frequently observed during the day and over the year?



Most UFOs were observed during summer nights.

On which days of the month are UFOs most frequently observed?



- UFOs appear mostly on the 1st and 15th of the month.
- This trend is universal for all shapes.

Conclusion

- UFOs are reported most frequently in five cities: Chicago, Houston, Phoenix, Portland and Seattle.
- Most common UFO shapes are light, circle and disk.
- The variance in the difference between reported time and posted time decreased recent years.
- There is an obvious linear relationship between the reporting time lag and the year.
- For most shapes, the lag of posting peaks at 3 (=10^0.5) days.
- Most UFOs were observed during summer nights.
- There is an obvious bimodal distribution for “round” UFOs.