
Finding Bigfoot
with
Redis + RediSearch
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## Dozens of witnesses have seen . . .

# BIGFOOT ROAMING THE WILDS — WITH A HUMAN CHILD!

By MIKE FOSTER / *Weekly World News*

**VANCOUVER, Canada — Excited researchers are combing the wilds of British Columbia in response to recent sightings of Bigfoot accompanied by a blond-haired boy!**

More than two dozen people claim to have seen the human youngster dressed in animal skins and loping along beside the towering man-beast. Investigators speculate that the mystery boy may be the missing survivor of a plane crash that occurred in the area 11 years ago, raised from childhood by Bigfoot.

"This is the most tantalizing development in Bigfoot research to take place in decades," said Dr. Rob Worrier, a zoologist involved in the hunt for the elusive forest creature.

"It suggests that Bigfoot is not some shambling monster as he is often depicted, but a gentle and intelligent being capable of nurturing behavior and compassion."

The boy, described by eyewitnesses as lean and wiry with long, matted hair, was first spotted in late March by dentist Dr. Arthur Gosten who was camping in the Rockies with his family.

The Vancouver man was awakened in the early morning by the frantic cries of his 12-year-old daughter. When he emerged from his tent, he saw her pointing into the woods.

ZOOLOGIST Dr. Rob Worrier, left, is leading the search for the feral child and Bigfoot first seen by dentist Dr. Arthur Gosten and his family.

1989 PHOTO of Marcel Dusoire.

## Researchers believe boy is baby who survived '89 plane crash!

"She said that a 'wild boy' was stealing our food," Dr. Gosten recalls. "I looked where she was pointing and saw this half-naked boy slinking off into the trees with an armful of canned goods."

Shouting after the child, Dr. Gosten gave chase and caught up with him at the edge of a clearing.

"I couldn't believe my eyes. The boy was standing next to an enormous, hairy, man-like creature at least 8 feet tall," Dr. Gosten said. "The thing took some of the boy's load, then they ambled off together into the woods, both of them walking with the same hunched-over, ape-like stride."

Since that sighting, at least 33 people have reported seeing the wild boy and his hairy companion. Witnesses have included clergymen, forest rangers and even members of the Royal Canadian Mounted Police.

In many cases, the mismatched duo have been heard exchanging guttural sounds as if talking.

"This youngster has all the earmarks of a feral child — a child that has had no human contact and has been raised by an animal," said the Seattle-based Dr. Worrier. "The fact that his gait is similar to the Bigfoot and that they can communicate is evidence that the creature is his surrogate parent."

Researchers believe that the wild-boy sightings may be connected to the 1989 crash of a private plane carrying a party of French tourists visiting the region. The crash left the pilot and four passengers dead — including young mother Madeleine Dusoire.

Madeleine's baby Marcel was missing and the remains of the 1-year-old infant were never found.

A HALF-NAKED boy stole an armload of food from Dr. Gosten's campsite, then ran off with an enormous, hairy, man-like creature.

STUDIES CLAIM:

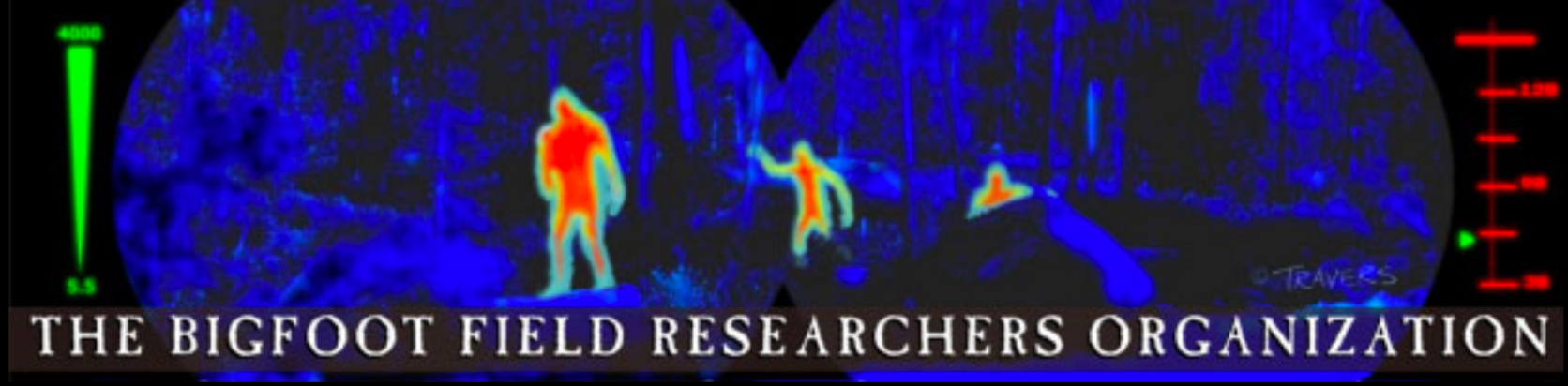
## Smoking makes you ugly!

**Forget about lung cancer, heart attacks and high blood pressure. Smoking makes you ugly!**

**Dozens of new scientific studies worldwide are finding a definite connection between cigarette smoking and the wrinkled, bleary hangdog facial skin known as "smoker's face." The symptoms are:**

- **A gray, orange, purple or red cast to the complexion.**
- **A leathery, gaunt appearance with sagging cheeks.**
- **Wrinkles, especially at the corners of the eyes or on the cheeks at right angles from the lips.**
- **Deep lines on the cheeks and lower jaw of the smoker.**


WE DON'T ALWAYS FIND BIGFOOT BUT WHEN WE DO
EVIDENCE
WE DON'T




**Founded in 1995 -- The only scientific research organization exploring the bigfoot/sasquatch mystery.**

**Contact us at ContactUs@BFRO.NET or Phone (408) 634-BFRO [408-634-2376]**

**The Comprehensive Sightings Database**


**Bigfoot Town Hall**

**Meetings in USA & Canada**

**Tim Renner**
@timothyrenner

Following

| FOLLOWERS | FOLLOWING | LIBRARY |
|---|---|---|
| 443 | 8 | 5 |

I do geo data science at HomeAway. Autistic. Obsessed with weird data.

HomeAway

http://timothyrenner.github.io

1–5 of 5 Any Sort

## Haunted Places

OPEN

Haunted places in the United States pulled from the Shadowlands Haunted Places Index.

Dataset • Updated Jan 28 • Public Domain License

paranormal, geography

4 Comment

## Bigfoot Sightings

OPEN

Full text and geocoded sighting reports from the Bigfoot Field Researchers Organization (BFRO).

Dataset • Updated Dec 2, 2017 • Public Domain License

geography, clustering, sasquatch

59 Comment

## UFO Sightings

OPEN

Full text and geocoded UFO sighting reports from the National UFO Research Center (NUFORC).

Dataset • Updated Oct 25, 2017 • Public Domain License

ufo, paranormal, geography

13 Comment

RECENT COMMENTS

Regarding the UFO sightings - MUFON is probably a good place to start - http://www.mufon.com/ It's possible they have a direct download available.
in Understanding Bigfoot Sightings/Understanding Bigfoot Sightings

Is the timestamp field in the CSV file incomplete? I was messing with this a while back and it seemed okay to me, but I didn't dig in too deep.
in Understanding Bigfoot Sightings/Analysis

Also, there's code for mapping sightings out in this notebook: https://github.com/timothyrenner/bfro_sightings_data/tree/master/notebooks I did a clustering analysis for my blog too: https://timothyrenner.github.io/datascience/2017/06/30/finding-bigfoot.html
in Understanding Bigfoot Sightings/Understanding Bigfoot Sightings

@ninja The JSON file has state and county fields, and it joins to the geolocated reports on the report number. That might be easier than a spatial join against a county/state shapefile.
in Understanding Bigfoot Sightings/Understanding Bigfoot Sightings

I'm glad you like it - I'm happy to join the conversation!
in Bigfoot Sightings/BFRO Sightings data

# Bigfoot Field Researchers Organization Data

| | |
|---|---|
| **ID** | 8086 |
| **Date** | 15-Jan-1958 |
| **Title** | A series of large, human-like footprints are found on a farm near Wayne National Forest |
| **Observed** | While during some yard chores, we noticed a series of tracks going into the hollow on our property. Upon examination… |
| **Classification** | Class B |
| **County** | Noble |
| **State** | Ohio |
| **Latitude** | 39.63382 |
| **Longitude** | -81.40079 |
| **Location Details** | Closest town was Harriettsville. Closest main road is State Route 145. Right on the border of Noble and Washington Counties. |

# Dark Sky Weather Data

| | |
|---|---|
| **High/Mid/Low Temperature** | 34.0 / 30.0 / 26.0 °F |
| **Humidity & Dew Point** | 93% / 31.2°F |
| **Cloud Cover** | 100% |
| **Moon Phase** | 86% |
| **Precipitation Intensity** | 6.7 mm/hr |
| **Precipitation Probability** | 100% |
| **Precipitation Type** | snow |
| **Air Pressure** | 1011.09 millibars |
| **Summary** | Light snow (< 1 in.) starting in the afternoon. |
| **UV Index** | 1 |
| **Visibility** | 2.62 miles |
| **Wind Bearing/Speed** | 344° @ 10.12 mph |

# Representing Data in Redis

**Strings**

```
> SET bigfoot:sighting:8086:classification "Class B"
> SET bigfoot:sighting:8086:state "Ohio"
> GET bigfoot:sighting:8086:classification
"Class B"
```

**Lists**

```
> LPUSH bigfoot:new:sightings "I saw Bigfoot in the woods."
> LPUSH bigfoot:new:sightings "I found a giant footprint down by the creek."
> RPOP bigfoot:new:sightings
"I saw Bigfoot in the woods."
```

**Sets**

```
> SADD bigfoot:sightings:by:state:Ohio 8086 7220 7085
> SADD bigfoot:sightings:by:state:Ohio 8086 7220 7085
> SISMEMBER bigfoot:sightings:by:state:Ohio 8086
(integer) 1
```

**Hashes**

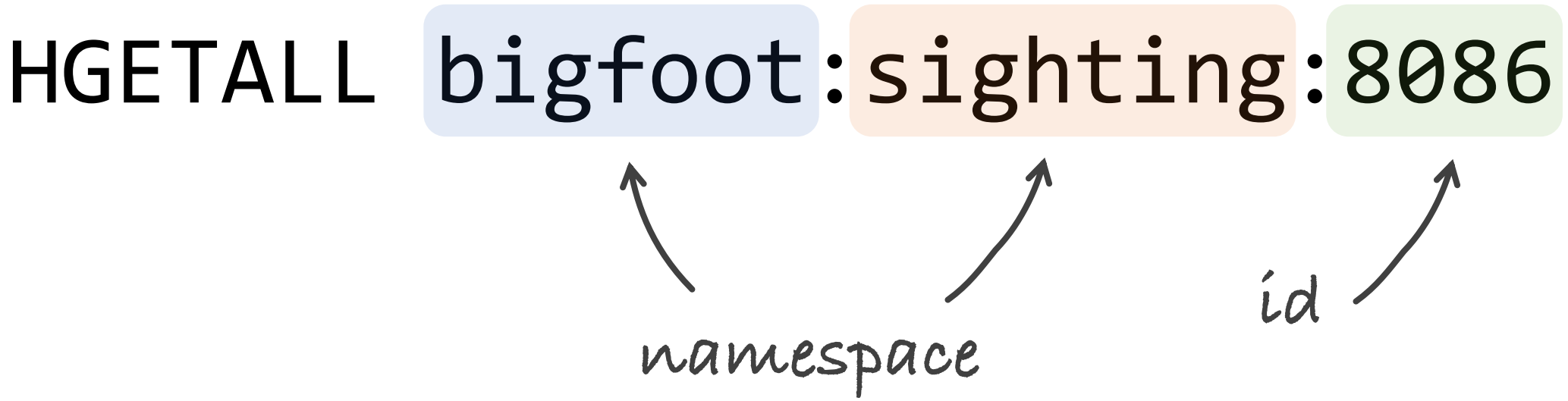
```
> HSET bigfoot:sighting:8086 classification "Class B"
> HSET bigfoot:sighting:8086 state "Ohio"
> HGET bigfoot:sighting:8086 classification
"Class B"
```

# Representing BFRO Data in Redis

## Hashes

```
> HSET bigfoot:sighting:8086
       date "15-Jan-1958"
       title "A series of large, human-like footprints are found on…"
       observed "While during some yard chores, we noticed a series of…"
       classification "Class B"
       county "Noble"
       state "Ohio"
       latitude 39.63382
       longitude -81.40079
       location_details "Closest town was Harriettsville. Closest main road…"
       temperature_high 34.0
       temperature_mid 30.0
       temperature_low 26.0
       …
```

# The Key to Finding Bigfoot



# Store Indices as Sets

**Sets**

```
> SADD "bigfoot:sightings:by:state:Ohio"
      38980 46578 23293 44861 10556 27941 2365 48811 27545 24976 1024 11998
      32377 55870 26605 13289 9407 1488 4624 31824 2383 30596 26173 2364
      37750 12641 24131 6632 1045 2389 27323 31443 2426 41776 16896 36229
      2381 2367 32589 8517 33322 24800 2382 28575 2390 22941 2429 24948 3253
      …

> SADD "bigfoot:sightings:by:class:Class B"
      22852 1567 4974 55573 658 18680 4981 46578 2468 31062 537 42647 42293
      942 17043 1966 2157 55171 2093 42148 4310 51499 15144 40293 1608 38165
      14887 37656 803 529 33264 1471 23811 23628 1579 1565 42967 2579 50965
      1227 44861 55541 8130 30483 25364 41880 42134 24264 6233 42742 25492
      …
```

# Using Sets as Indices

```
SMEMBERS
  bigfoot:sightings:by:state:Ohio

SUNION
  bigfoot:sightings:by:state:Ohio
  bigfoot:sightings:by:state:Kentucky

SINTER
  "bigfoot:sightings:by:state:Ohio"
  "bigfoot:sightings:by:class:Class B"
```


# 99 Problems: Indices is One of Them

```
> HSET bigfoot:sighting:8086
       state Kentucky
       classification "Class A"
```

```
> SREM
  bigfoot:sightings:by:state:Ohio 8086

> SADD
  bigfoot:sightings:by:state:Kentucky 8086
```

```
> SREM
  "bigfoot:sightings:by:class:Class B" 8086

> SADD
  "bigfoot:sightings:by:class:Class A" 8086
```


# 99 Problems: Atomicity is One of Them

```
> HSET bigfoot:sighting:8086
       state Kentucky
       classification "Class A"
```

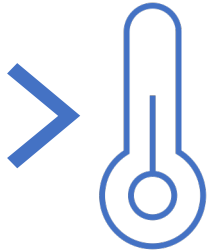
```
> SMEMBERS
  bigfoot:sightings:by:state:Ohio
```

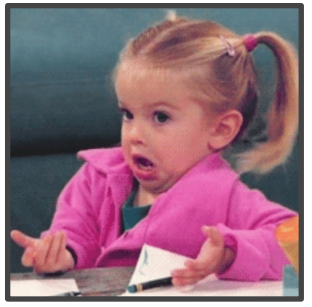
```
> SREM
  bigfoot:sightings:by:state:Ohio
  8086

> SADD
  bigfoot:sightings:by:state:Kentucky
  8086
```

# 99 Problems: Finding Bigfoot is One of Them

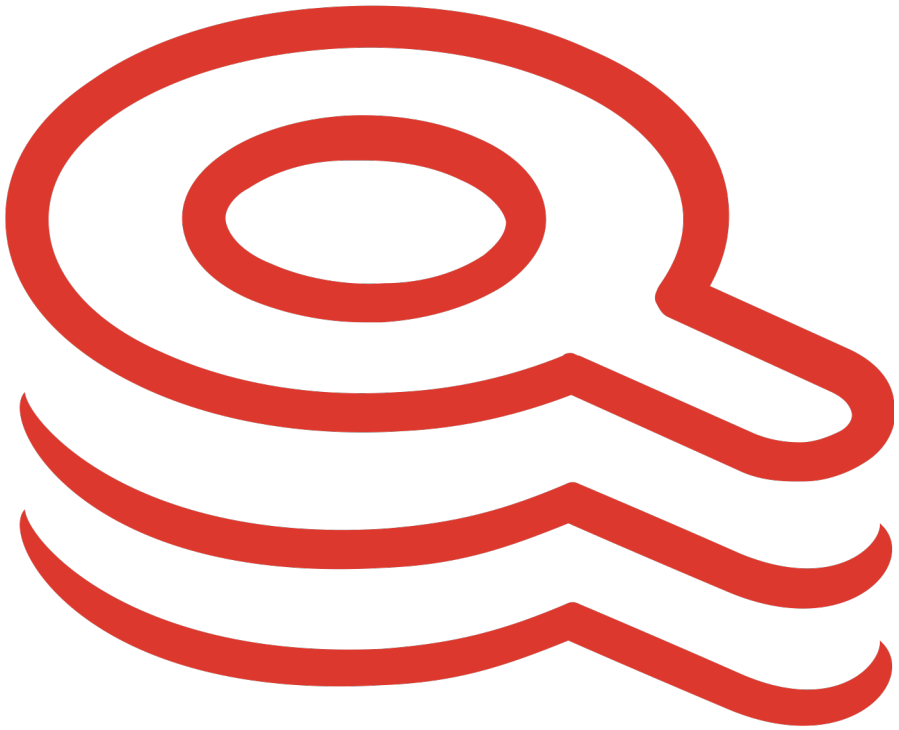
```
SUNION
  bigfoot:sightings:by:state:Ohio
  bigfoot:sightings:by:state:Kentucky
```

```
SUNIONSTORE bigfoot:temp:1234
    bigfoot:sightings:by:state:Ohio
    bigfoot:sightings:by:state:Kentucky
```



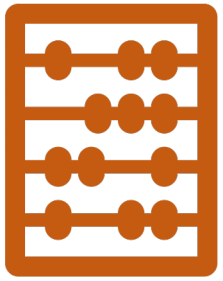



# RediSearch



Indexing

Full-text search



Aggregation

# Creating Indices

```
FT.CREATE bigfoot:sighting:index
ON hash
PREFIX 2 bigfoot:sighting: ufo:sighting:
SCHEMA
   observed TEXT     SORTABLE
   state    TAG      SORTABLE
   humidity NUMERIC  SORTABLE
   location GEO
```

# Find All the Bigfoots

```
FT.SEARCH bigfoot:sighting:index "*"
  LIMIT 0 3
  RETURN 2 id state
```

index

query

starting index

number of results

fields to return

# Four Ways to Find Bigfoot

Text

Tag


Numeric

Geo


# Texting Bigfoot

```
> FT.CREATE bigfoot:sighting:index
  ON hash PREFIX 1 bigfoot:sighting:
  SCHEMA
    title    TEXT
    observed TEXT
```

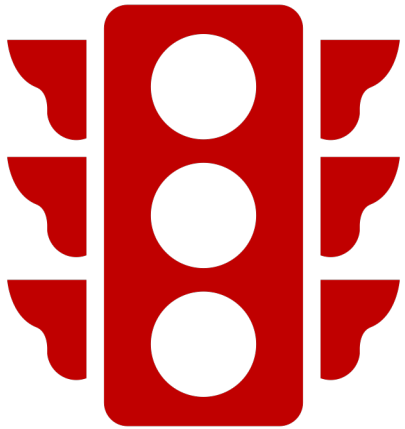
```
> FT.SEARCH bigfoot:sighting:index
      "creek"
      "creek river"
      "creek ~river"
      "creek | river"
      "(creek | river) stream"
      "(creek | river) -stream"
      "@title:creek @observed:river"
```


# Weighted Text

```
> FT.CREATE bigfoot:sighting:index
  ON hash PREFIX 1 bigfoot:sighting:
  SCHEMA
    title    TEXT WEIGHT 2
    observed TEXT WEIGHT 1
```

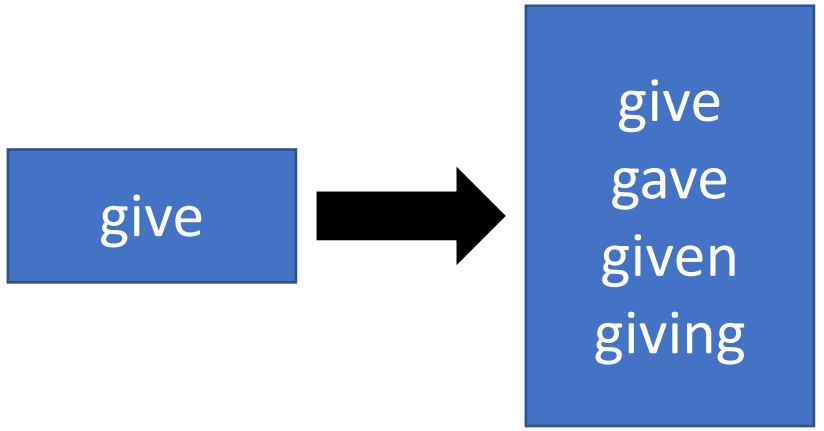
```
> FT.SEARCH bigfoot:sighting:index
      "creek"
      "creek river"
      "creek ~river"
      "creek | river"
      "(creek | river) stream"
      "(creek | river) -stream"
      "@title:creek @observed:river"
```


# Stopwords



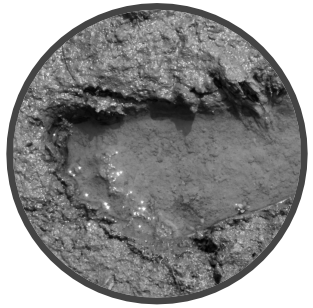
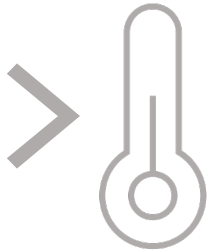
a, is, the, an, and, are, as, at, be, but, by, for, if, in, into, it, no, not, of, on, or, such, that, their, then, there, these, they, this, to, was, will, with


# Stemming




Arabic, Danish, Dutch, English, Finnish, French, German, Hungarian, Italian, Norwegian, Portuguese, Romanian, Russian, Spanish, Swedish, Tamil, Turkish, Chinese





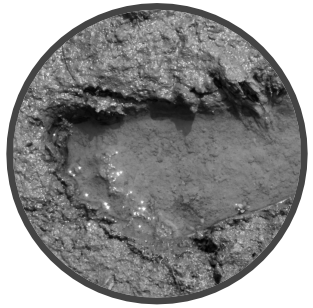
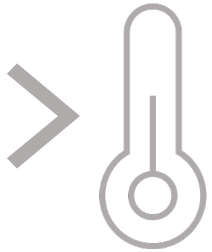
creek


# Tagging Bigfoot

```
> FT.CREATE bigfoot:sighting:index
  ON hash PREFIX 1 bigfoot:sighting:
  SCHEMA
    state          TAG
    classification TAG
```

```
> FT.SEARCH bigfoot:sighting:index
      "@state:{ Ohio }"
      "@state:{ Ohio | Kentucky }"
      "@state:{ West Virginia }"
      "@classification:{ Class\\ A }"
      "@classification:{ Class\\ A }
       @classification:{ Class\\ B }"
```

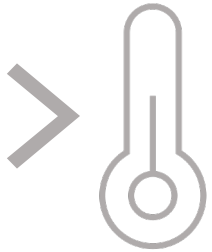




```
creek
@state:{ Ohio | Kentucky }
```





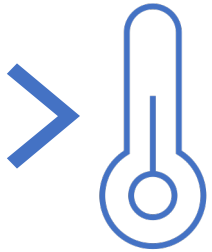
```
creek
@state:{ Ohio | Kentucky }
@classification:{ Class\\ B }
```


# The Number of the Beast

```
> FT.CREATE bigfoot:sighting:index
  ON hash PREFIX 1 bigfoot:sighting:
  SCHEMA
    temperature_high NUMERIC
    temperature_low  NUMERIC
```

```
> FT.SEARCH bigfoot:sighting:index
      "@temperature_high:[ 60 75 ]"
      "@temperature_high:[ 60 +inf ]"
      "@temperature_high:[ -inf 75 ]"
      "@temperature_high:[ -inf +inf ]"
      "@temperature_high:[ (60 (75 ]"
```





```
creek
@state:{ Ohio | Kentucky }
@classification:{ Class\\ B }
@temperature_high:[75 +inf]
```


# Punless Geolocation

```
> FT.CREATE bigfoot:sighting:index
  ON hash PREFIX 1 bigfoot:sighting:
  SCHEMA
    location GEO
```

longitude

-84.5120,39.1031

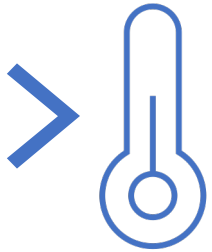
latitude


# Punless Geolocation

```
> FT.CREATE bigfoot:sighting:index
  ON hash PREFIX 1 bigfoot:sighting:
  SCHEMA
    location GEO
```

```
> FT.SEARCH bigfoot:sighting:index
     "@location:[ -84.5120 39.1031 50 mi ]"
     "@location:[ -84.5120 39.1031 100 ft ]"
     "@location:[ -84.5120 39.1031 25 m ]"
     "@location:[ -84.5120 39.1031 10 km ]"
```





```
creek
@state:{ Ohio | Kentucky }
@classification:{ Class\\ B }
@temperature_high:[75 +inf]
@location:[-84.5120 39.1031 50 mi]
```


# Putting It All Together

```
FT.SEARCH "bigfoot:sighting:index"
  "creek
   @state:{ Ohio | Kentucky }
   @temperature_high:[75 +inf]
   @location:[-84.5120 39.1031 50 mi]"
LIMIT 0 5
RETURN 2 id state
```

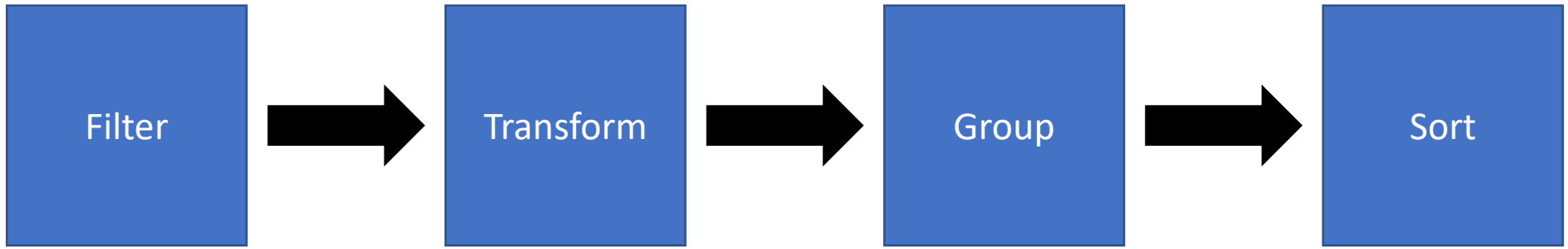
# Demo

# Some SQL Equivalents

| SQL | RediSearch |
|---|---|
| `WHERE x='foo' AND y='bar'` | `@x:foo @y:bar` |
| `WHERE x='foo' AND y!='bar'` | `@x:foo -@y:bar` |
| `WHERE x='foo' OR y='bar'` | `(@x:foo)\|(@y:bar)` |
| `WHERE x IN ('foo', 'bar','hello world')` | `@x:(foo\|bar\|"hello world")` |
| `WHERE y='foo' AND x NOT IN ('foo','bar')` | `@y:foo (-@x:foo) (-@x:bar)` |
| `WHERE x NOT IN ('foo','bar')` | `-@x:(foo\|bar)` |
| `WHERE num BETWEEN 10 AND 20` | `@num:[10 20]` |
| `WHERE num >= 10` | `@num:[10 +inf]` |
| `WHERE num > 10` | `@num:[(10 +inf]` |
| `WHERE num < 10` | `@num:[-inf (10]` |
| `WHERE num <= 10` | `@num:[-inf 10]` |
| `WHERE num < 10 OR num > 20` | `@num:[-inf (10] \| @num:[(20 +inf]` |
| `WHERE name LIKE 'john%'` | `@name:john*` |

# Aggregation

```
FT.AGGREGATE bigfoot:sighting:index "*"
```




# Filtering

```
FILTER
  "@temperature_high > 75"
FILTER
  "@humidity >= 80 || @temperature_high < 80"
FILTER
  "@humidity > 50 && @humidity % 2 == 0"
FILTER
  "exists(@temperature_high)"
FILTER
  "floor(@temperature_low) > 32"
FILTER
  "dayofweek(@timestamp) != 0"
```

# Filtering Functions

| Field | Numeric | String | Date/Time | Geolocation |
|---|---|---|---|---|
| exists(s) | log(x) | upper(s) | timefmt(x, [fmt]) | geodistance(field,field) |
| | abs(x) | lower(s) | parsetime(timesharing, [fmt]) | geodistance(field,"lon,lat") |
| | ceil(x) | startswith(s1,s2) | day(timestamp) | geodistance(field,lon,lat) |
| | floor(x) | contains(s1,s2) | hour(timestamp) | geodistance("lon,lat",field) |
| | log2(x) | substr(s, offset, count) | minute(timestamp) | geodistance("lon,lat","lon,lat") |
| | exp(x) | format(fmt, ...) | month(timestamp) | geodistance("lon,lat",lon,lat) |
| | sqrt(x) | matched_terms([max_terms=100]) | dayofweek(timestamp) | geodistance(lon,lat,field) |
| | | split(s, [sep=","], [strip=" "]) | dayofmonth(timestamp) | geodistance(lon,lat,"lon,lat") |
| | | | dayofyear(timestamp) | geodistance(lon,lat,"lon,lat") |
| | | | year(timestamp) | |
| | | | monthofyear(timestamp) | |

# Transforms

```
APPLY
  "@temperature_high" AS high_f
APPLY
  "@temperature_high * 5 / 9" AS high_c
APPLY
  "exists(@temperature_high)" AS high_exists
APPLY
  "monthofyear(@timestamp) + 1" AS month
```

# Transformation Functions

| Field | Numeric | String | Date/Time | Geolocation |
|---|---|---|---|---|
| exists(s) | log(x) | upper(s) | timefmt(x, [fmt]) | geodistance(field,field) |
| | abs(x) | lower(s) | parsetime(timesharing, [fmt]) | geodistance(field,"lon,lat") |
| | ceil(x) | startswith(s1,s2) | day(timestamp) | geodistance(field,lon,lat) |
| | floor(x) | contains(s1,s2) | hour(timestamp) | geodistance("lon,lat",field) |
| | log2(x) | substr(s, offset, count) | minute(timestamp) | geodistance("lon,lat","lon,lat") |
| | exp(x) | format(fmt, ...) | month(timestamp) | geodistance("lon,lat",lon,lat) |
| | sqrt(x) | matched_terms([max_terms=100]) | dayofweek(timestamp) | geodistance(lon,lat,field) |
| | | split(s, [sep=","], [strip=" "]) | dayofmonth(timestamp) | geodistance(lon,lat,"lon,lat") |
| | | | dayofyear(timestamp) | geodistance(lon,lat,"lon,lat") |
| | | | year(timestamp) | |
| | | | monthofyear(timestamp) | |

# Grouping

```
GROUPBY 2 @state @classification
  REDUCE COUNT 0 AS count
GROUPBY 2 @state @classification
  REDUCE COUNT 0 AS count
  REDUCE AVG 1 @temperature_high as avg_high
  REDUCE AVG 1 @temperature_low as avg_low
  REDUCE MAX 1 @temperature_high as max_temp
  REDUCE MIN 1 @temperature_low as min_temp
GROUPBY 0
  REDUCE MAX 1 @temperature_high AS high
  REDUCE MIN 1 @temperature_low AS low
  REDUCE QUANTILE 2 @temperature_mid 0.5
    AS median
```

# Reducers

| Reducer | Geolocation |
|---|---|
| COUNT | REDUCE COUNT 0 |
| COUNT_DISTINCT | REDUCE COUNT_DISTINCT 1 {property} |
| COUNT_DISTINCTISH | REDUCE COUNT_DISTINCTISH 1 {property} |
| SUM | REDUCE SUM 1 {property} |
| MIN | REDUCE MIN 1 {property} |
| MAX | REDUCE MAX 1 {property} |
| AVG | REDUCE AVG 1 {property} |
| STDDEV | REDUCE STDDEV 1 {property} |
| QUANTILE | REDUCE QUANTILE 2 {property} {quantile} |
| TOLIST | REDUCE TOLIST 1 {property} |
| FIRST_VALUE | REDUCE FIRST_VALUE {nargs} {property} [BY {property} [ASC\|DESC]] |
| RANDOM_SAMPLE | REDUCE RANDOM_SAMPLE {nargs} {property} {sample_size} |

# Sorting

```
SORTBY 2 @state @county
SORTBY 4 @state ASC @county DESC
SORTBY 2 @county @state MAX 5
```

# Some Fun Queries to Put it All Together

## (and to understand the data a little bit)

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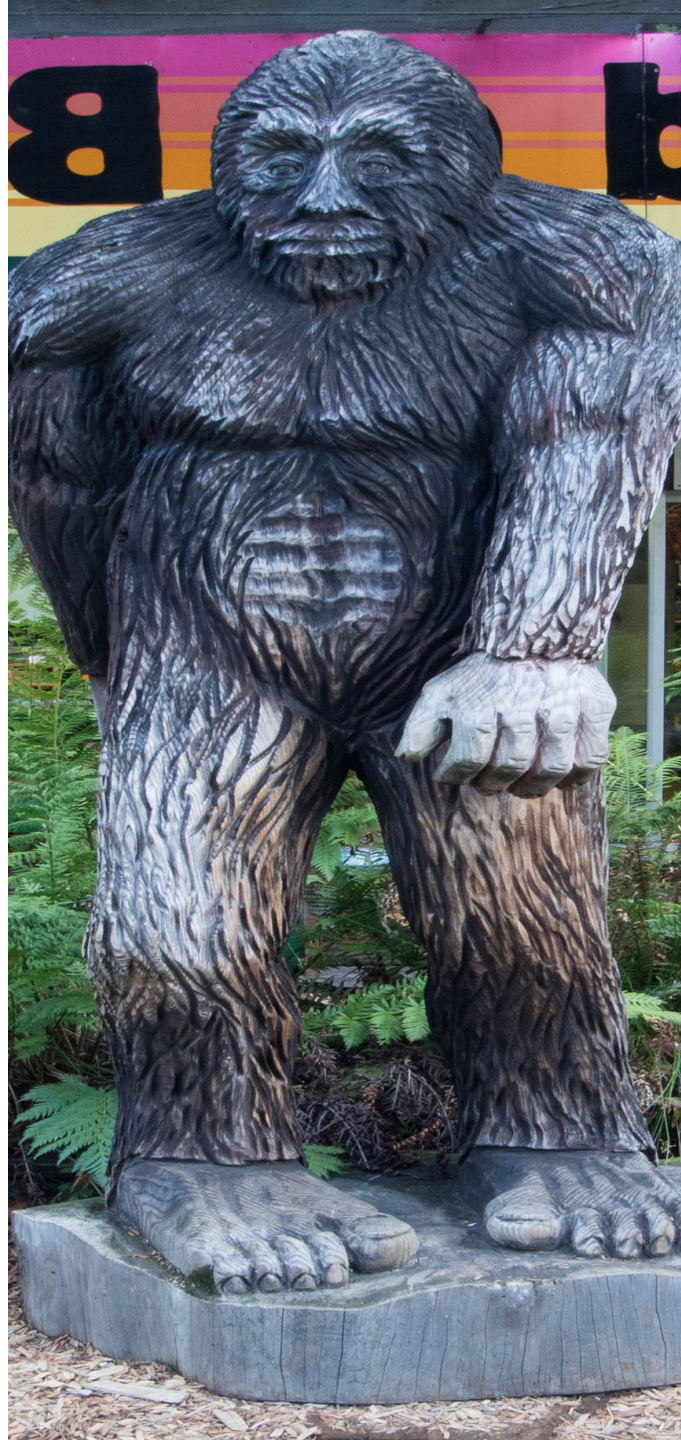
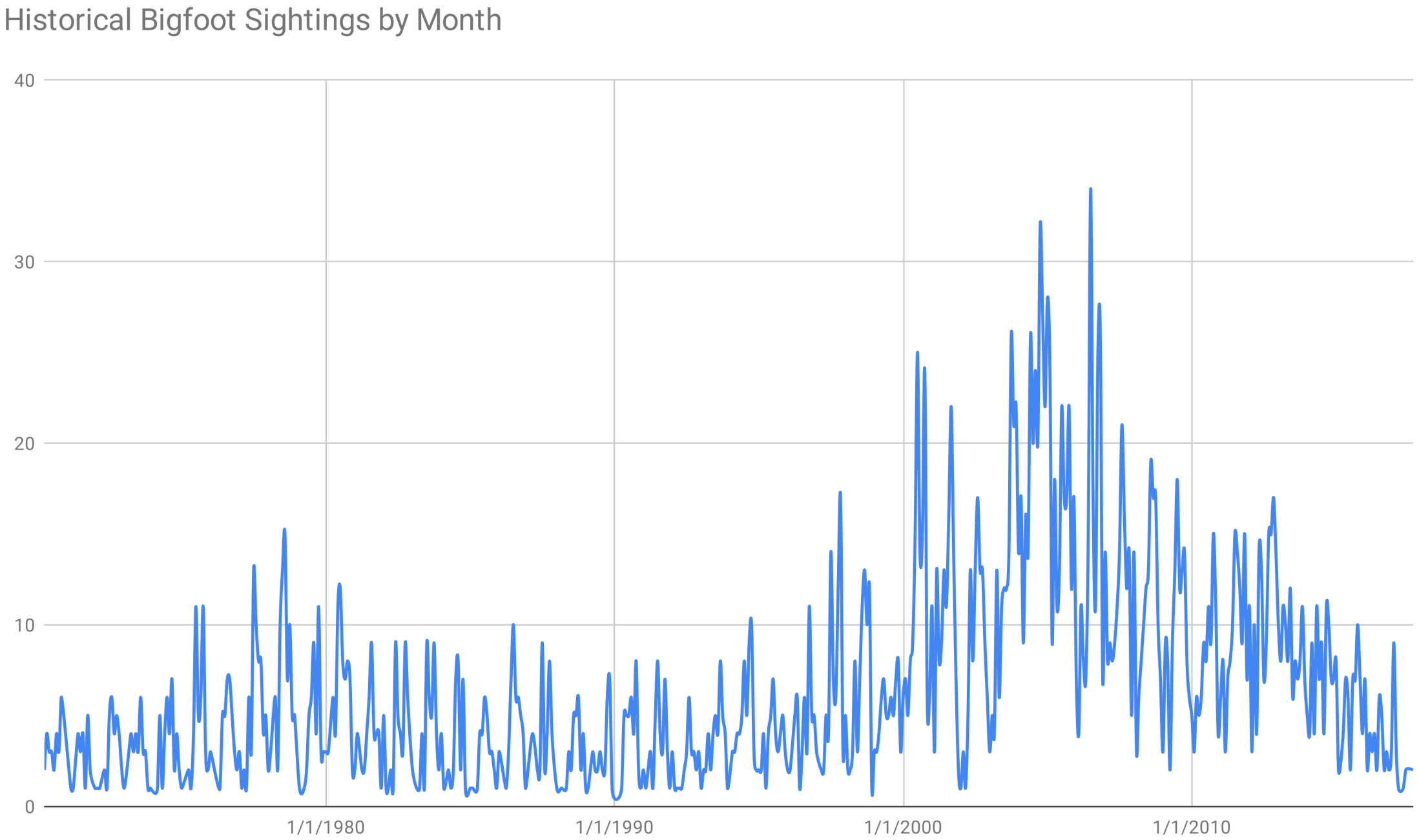
# Count All the Bigfoot Sightings by Year & Month

```
FT.AGGREGATE
  bigfoot:sighting:index
  "@timestamp:[0 +inf]"
    APPLY
      "year(@timestamp)" AS year
    APPLY
      "monthofyear(@timestamp) + 1" AS month
    GROUPBY 2 @year @month
      REDUCE COUNT 0 AS count
    SORTBY 2 @year @month
    LIMIT 0 10000
```

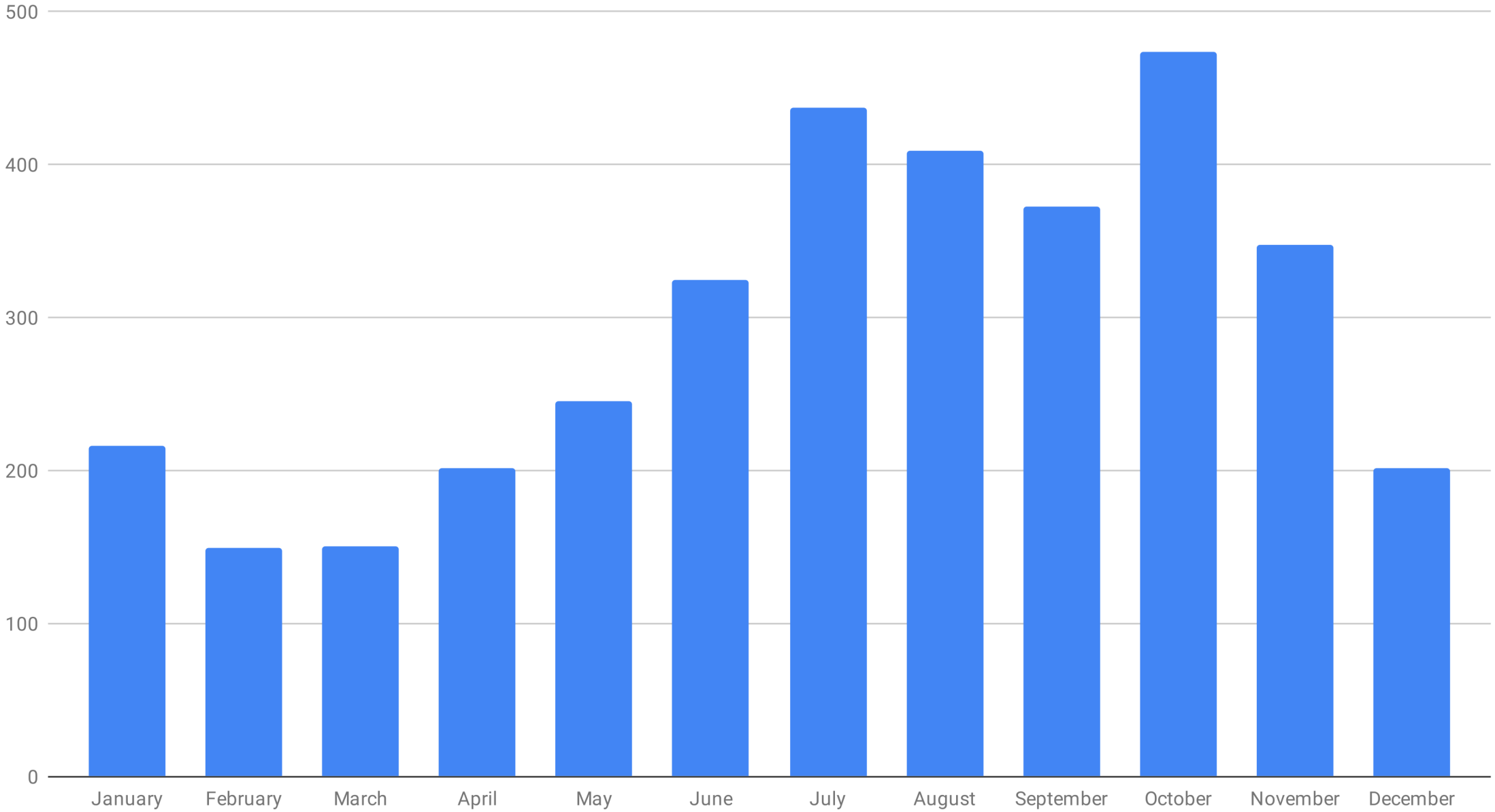



Historical Bigfoot Sightings by Month
40
30
20
10
0
1/1/1980
1/1/1990
1/1/2000
1/1/2010

# What Months Do Bigfoot Sightings Happen In?

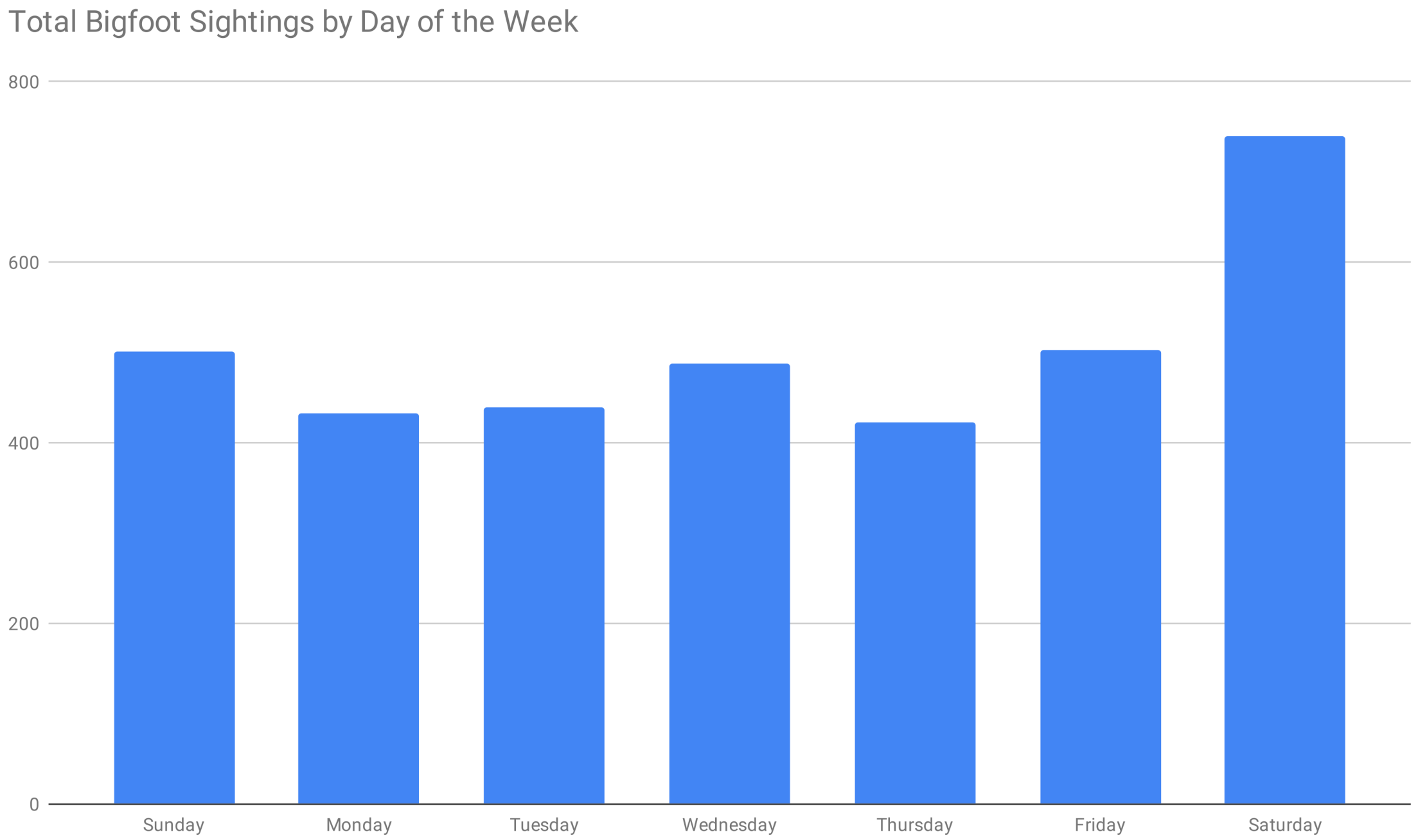
```
FT.AGGREGATE
  bigfoot:sighting:index
  "*"
    FILTER
      "exists(@timestamp) && @timestamp >= 0"
    APPLY
      "monthofyear(@timestamp) + 1" AS month
    GROUPBY 1 @month
      REDUCE COUNT 0 AS count
    SORTBY 1 @month
    LIMIT 0 12
```

# Total Bigfoot Sightings by Month



# When Do Bigfoot Sightings Happen?

```
FT.AGGREGATE
  bigfoot:sighting:index
  "*"
    FILTER
      "exists(@timestamp) && @timestamp >= 0"
    APPLY
      "dayofweek(@timestamp)" AS weekday
    GROUPBY 1 @weekday
      REDUCE COUNT 0 AS count
    SORTBY 1 @weekday
```


Total Bigfoot Sightings by Day of the Week
800
600
400
200
0
Sunday
Monday
Tuesday
Wednesday
Thursday
Friday
Saturday


# Demo


# Resources

**Redis**
https://redis.io

**RediSearch**
https://redisearch.io

**Redis Cloud**
https://redislabs.com/redis-enterprise-cloud/

**Bigfoot Field Researchers Organization**
http://bfro.net/

**Bigfoot Dataset**
https://data.world/timothyrenner/bfro-sightings-data

**Timothy Renner**
https://timothyrenner.github.io/

# Code and Slides

https://github.com/guyroyse/finding-bigfoot


Questions?

# Check Out Our Stuff

## Redis Discord Server

https://discord.gg/redis

## Redis on YouTube

https://youtube.com/redislabs

## Redis University

https://university.redislabs.com/

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