Shark Attacks in Canada, USA, and Mexico

From 2010 - 2018

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Data Collection & Clean Up

Data Collection

- Searched Google for potential datasets and decided on Global Shark Attacks from Kaggle (https://www.kaggle.com/datasets/teajay/global-shark-attacks)
- Filtered the data using MongoDB to remove the following unwanted columns:
  - Name
  - Age
  - Time
  - Species
  - Investigator or Source
  - Pdf
  - Href
  - Original Order
- Filtered the data further to only include attacks from 2010-2018 in Canada, USA, and Mexico which reduced the data from 6,302 to 507 events.
- Exported the filtered data to a JSON file.

Original Data: CSV File

```
Case Number,Date,Year,Type,Country,Area,Location,Activity,Name,Sex ,Age,Injury,Fatal (Y/N),Time,Species ,Investigator or Source,pdf,href formula,href,Case Number,Case Number,original order,,
2018.06.25,25-Jun-18,2018,Boating,USA,California,"Oceanside, San Diego County",Paddling,Julie Wolfe,F,57,"No injury to occupant, outrigger canoe and paddle damaged",N,18h00,White shark,"R. Collier, GSAF",20
2018.06.18,18-Jun-18,2018,Unprovoked,USA,Georgia,"St. Simon Island, Glynn County",Standing,Adyson McNeely ,F,11,Minor injury to left thigh,N,14h00  -15h00,,"K.McMurray, TrackingSharks.com",2018.06.18-McNeel
2018.06.09,9-Jun-18,2018,Invalid,USA,Hawaii,"Habush, Oahu",Surfing,John Denges,M,48,Injury to left lower leg from surfboard skeg,N,07h45,,"K.McMurray, TrackingSharks.com",2018.06.09-Denges.pdf,http://sharka
2018.06.08,8-Jun-18,2018,Unprovoked,AUSTRALIA,New South Wales,Arrawarra Headland,Surfing,male,M,,Minor injury to lower leg,N,,2 m shark,"B. Myatt, GSAF",2018.06.08-Arrawarra.pdf,http://sharkattackfile.net/s
2018.06.04,4-Jun-18,2018,Provoked,MEXICO,Colima,La Ticla,Free diving,Gustavo Ramos ,M,,Lacerations to leg & hand shark PROVOKED INCIDENT,N,,"Tiger shark, 3m",A .Kipper,2018.06.04-Ramos.pdf,http://sharkattac
2018.06.03.b,3-Jun-18,2018,Unprovoked,AUSTRALIA,New South Wales,"Flat Rock, Ballina",Kite surfing,Chris …,M,,"No injury, board bitten",N,,,"Daily Telegraph, 6/4/2018",2018.06.03.b-FlatRock.pdf,http://sharka
2018.06.03.a,3-Jun-18,2018,Unprovoked,BRAZIL,Pernambuco,"Piedade Beach, Recife",Swimming,Jose Ernesto da Silva ,M,18,FATAL,Y,Late afternoon,Tiger shark,"Diario de Pernambuco, 6/4/2018",2018.06.03.a-daSilva.
2018.05.27,27-May-18,2018,Unprovoked,USA,Florida,"Lighhouse Point Park, Ponce Inlet, Volusia County",Fishing,male,M,52,Minor injury to foot. PROVOKED INCIDENT,N,,"Lemon shark, 3'","K. McMurray, TrackingShar
2018.05.26.b,26-May-18,2018,Unprovoked,USA,Florida,"Cocoa Beach, Brevard  County",Walking,Cody High,M,15,Lower left leg bitten,N,17h00,"Bull shark, 6'","K.McMurray, TrackingSharks.com",2018.05.26.b-High.pdf
2018.05.26.a,26-May-18,2018,Unprovoked,USA,Florida,"Daytona Beach, Volusia County",Standing,male,M,12,Minor injury to foot,N,14h00,,"K. McMurray, Tracking Sharks.com",2018.05.26.a-DaytonaBeach.pdf,http://sh
2018.05.24,24-May-18,2018,Provoked,AUSTRALIA,Queensland,Cairns Aquarium,Feeding sharks,male,M,32,Minor bite to hand by captive shark. PROVOKED INCIDENT,N,Morning,Grey reef shark,"ABC.net.au ,05/24/2018",201
2018.05.21,21-May-18,2018,Unprovoked,USA,South Carolina,"Isle of Palms,  Charleston County",Boogie boarding,Trey de Boer,M,10,Injuries to lower right leg and foot,N,,,"C. Creswell, GSAF",2018.05.21-deBoer.p
2018.05.13.b,13-May-18,2018,Unprovoked,USA,South Carolina,"Hilton Head Island, Beaufort County",Swimming,Jei Turrell,M,10,Severe bite to right forearm,N,15h00,,"C. Creswell, GSAF & K. McMurray TrackingShark
2018.05.13.a,13-May-18,2018,Invalid,ENGLAND,Cornwall,Off Land's End,Fishing,Max Berryman,M,21,Injured by teeth of a dead porbeagle shark he was tossing overboard.,N,08h15,Invalid incident,"K. McMurray, Trac
2018.05.00,May-18,2018,Provoked,AUSTRALIA,Westerm Australia,Dugong Bay,Feeding sharks,Melisa Brunning,F,34,Shallow lacerations to finger PROVOKED INCIDENT,N,,"Tawny nurse shark, 2m","Perth Now, 6/30/2018",2
2018.05.12,12-May-18,2018,Unprovoked,SOUTH AFRICA,Eastern Cape Province,"Nahoon Beach, East London",Surfing,male,M,,"Minor injury, marks on board",N,11h00,,"B.Jacob, Dispatch Live, 5/12/2018",2018.05.12-Eas
2018.05.09,9-May-18,2018,Questionable,AUSTRALIA,New South Wales,"Sharpes Beach, Ballina",Surfing,male,M,,"No injury, surfboard damaged",N,10h30,Shark involvement not confirmed,"B. Myatt, GSAF",2018.05.09-Sh
2018.04.30.R,Reported 30-Apr-2018,2018,Unprovoked,THAILAND,Hua Hin,Sai Noi Beach,Swimming,female,M,,Minor injury to ankle,N,,,"K. McMurray, TrackingSharks.com",2018.04.30.R-Thailand.pdf,http://sharkattackfi
2018.04.28.b,28-Apr-18,2018,Unprovoked,COSTA RICA,Cocos Island,Manuelita,Scuba diving,male,M,30,"No injury, shark bit scuba gear",N,10h40,Tiger shark,Costa Rica Star. 4/28/2018,2018.04.28.b-CostaRica.pdf,ht
2018.04.28.a,28-Apr-18,2018,Unprovoked,AUSTRALIA,Western Australia,Gearys Beach,Surfing,Adam Murray,M,,"No injury, knocked off board by shark",N,16h50,,"B. Myatt, GSAF",2018.04.28.a-Murray.pdf,http://sharka
2018.04.25.b,25-Apr-18,2018,Questionable,AUSTRALIA,New South Wales,Lennox Head,Surfing,Matthew Lee,M,,No injury,N,07h00,Questionable,"B. Myatt, GSAF",2018.04.25.b-Lee.pdf,http://sharkattackfile.net/spreadsh
2018.04.25.a,25-Apr-18,2018,Unprovoked,AUSTRALIA,Western Australia,"Surfers Point, Prevelly",Surfing,Rob Bruce,M,60,"No injury, knocked off board by shark",N,09h30,3 m shark,"B.Myatt, GSAF",2018.04.25.a-Bru
2018.04.24,24-Apr-18,2018,Unprovoked,AUSTRALIA,Western Australia,"South Point, Gracetown",Surfing,Nathan Burch,M,,"No injury, shark struck his leg",N,Afternoon,"White shark, 3.5 m","B. Myatt, GSAF",2018.04.
2018.04.23,23-Apr-18,2018,Unprovoked,MALDIVES,Alifu Alifu Atoll,Madoogali,Fishing,Ahmed Rasheed,M,32,5-inch cut to hand,N,21h50,Tiger shark,"K. McMurray, TrackingSharks.com",2018.04.23-Maldives.pdf,http://s
2018.04.22,22-Apr-18,2018,Unprovoked,SOUTH AFRICA,Western Cape Province,"Robberg Beach, Plettenberg Bay",Paddle-skiing,male,M,33,"No injury, shark bit hole in ski",N,09h40,"White shark, 2.5 m","Africa News
2018.04.19,19-Apr-18,2018,Unprovoked,USA,Hawaii,"Shipwreck's Beach, Keoneloa Bay, Kauai",Body boarding,Dylan McWilliams,M,29,Lacerations to right lower leg,N,,6' shark,"The Garden Island, 4/19/2018",2018.04
2018.04.15.d,15-Apr-18,2018,Unprovoked,THAILAND,Hua Hin,Sai Noi Beach,Swimming,Werner Danielsen,M,54,Lacerations to foot and ankle,N,,Juvenile bull shark,"Straits Times, 4/16/2018",2018.04.15.d-Thailand.pdf
2018.04.15.c,15-Apr-18,2018,Unprovoked,BRAZIL,Pernambuco,Piedade,Swimming,Pablo de Melo,M,34,"Multiple severe injuries to arms and leg, leg subsequently surgically amputated",,,,"Globo, 4/16/2018",2018.04.1
2018.04.15.b,15-Apr-18,2018,Unprovoked,AUSTRALIA,Western Australia,"Lefthanders, Margaret River Area",Surfing,Jason Longrass,M,41,Laceration to right thigh,N,,,"B.Myatt, GSAF",2018.04.15.b-Longrass.pdf,http
2018.04.15.a,15-Apr-18,2018,Unprovoked,AUSTRALIA,Western Australia,"Cobblestones, Margaret River Area",Surfing,Alejandro Travaglini,M,37,Lacerations to legs,N,08h00,,"B.Myatt, GSAF",2018.04.15.a-Travaglini.
2018.04.14,14-Apr-18,2018,Unprovoked,BAHAMAS,New Providence,Nirvana Beach,Surfing,Bruce Rowan,M,,No Injury. Shark swam away with the surf board,N,09h30,Tiger shark,"Tribune242,",2018.04.14-Rowan.pff,http://
```

Weather API to Get Coordinates

- The Global Shark Attacks dataset from Kaggle only included the location name and country, no coordinates.
- Used a combination of the exported JSON data (with unwanted columns removed), Python, Jupyter Notebook, and the Open Weather Map API to add the latitude and longitude to the dataset. Not all locations mapped to a latitude and longitude point so our dataset was reduced to 265 events.
- API base url = http://api.openweathermap.org/data/2.5/weather?
- Exported the final cleaned data to a JSON file.

Clean JSON Data

- Final/clean JSON data with unwanted columns removed.
- Added latitude and longitude coordinates to the data.
- Removed the word "Reported" in front of several dates.

```
[{
  "_id": {
    "$oid": "64c08d4b96c159958ed56184"
  },
  "": 0,
  "Case Number": "2018.06.25",
  "Date": "25-Jun-18",
  "Year": 2018,
  "Country": "USA",
  "Type": "Boating",
  "Location": "Oceanside, San Diego County",
  "Activity": "Paddling",
  "Injury": "No injury to occupant, outrigger canoe and paddle damaged",
  "Fatal": "N",
  "Link": "http://sharkattackfile.net/spreadsheets/pdf_directory/2018.06.25-Wolfe.pdf",
  "Lat": 33.1959,
  "Lng": -117.3795
},
```
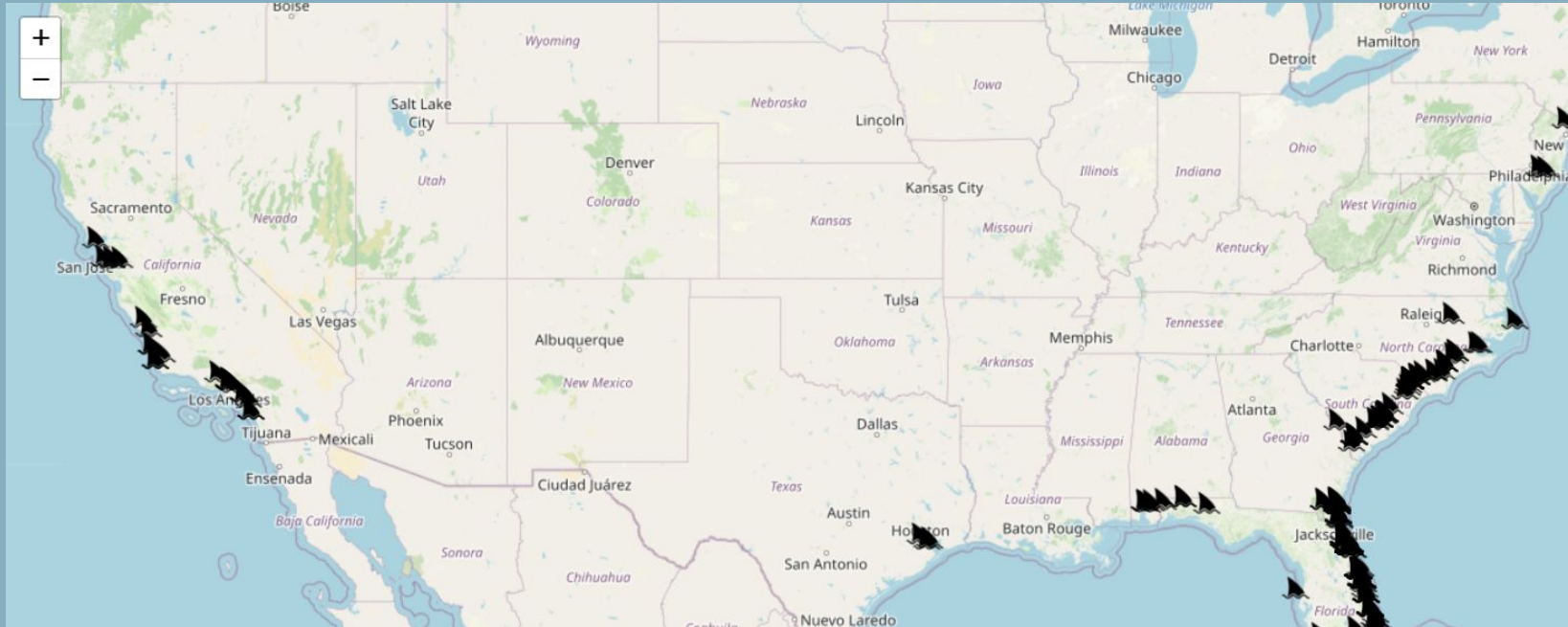
JavaScript Libraries
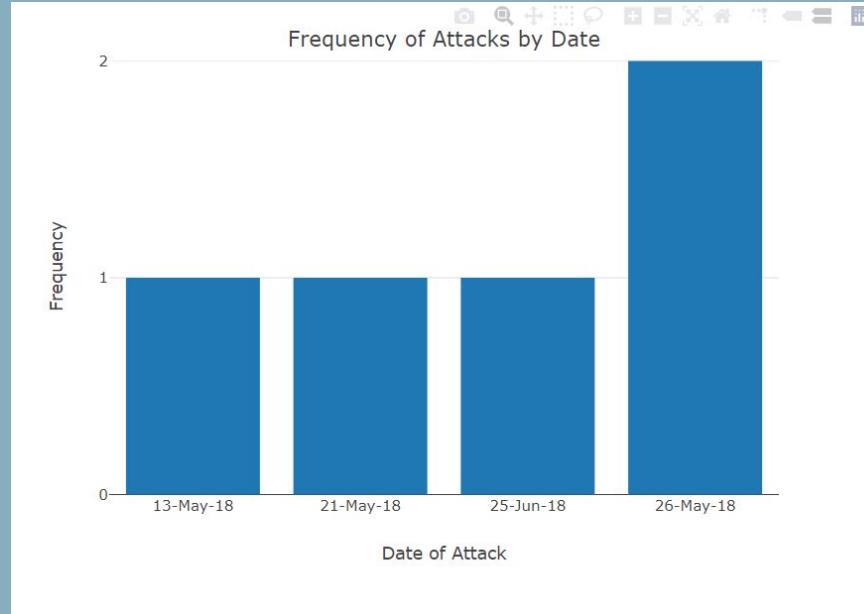
Javascript Library - Leaflet

- Leaflet (https://leafletjs.com/)
  - Utilized Leaflet to create the interactive map that ties to the selected dropdowns.

Javascript Library - Plotly

- Plotly (https://plotly.com/)
  - Utilized Ploty to create the bar chart that updates according to the selected dropdowns.

Javascript Libraries - New Library - DataTables

- ## DataTables (https://datatables.net/) (a JQuery Plugin)
  - ○ Utilized DataTables to create the interactive chart that ties to the selected dropdowns.

Date ⬍	Location ⬍	Type of Attack ⬍	Activity ⬍
29-Jul-2013	Valentin Imperial Maya, Riviera Maya, Mexico	Unprovoked	Wading
30-Jul-2013	Isle of Palms, Charleston County, South Carolina	Unprovoked	Swimming
02-Sep-2013	Ormond Beach, Volusia County, Florida	Unprovoked	Swimming
04-Sep-2010	New Smyrna Beach, Volusia County, Florida	Unprovoked	Surfing
07-Sep-2013	New Smyrna Beach, Volusia County, Florida	Provoked	Surfing
07-Sep-2013	New Smyrna Beach, Volusia County, Florida	Unprovoked	Standing
12-Sep-2013	New Smyrna Beach, Volusia County, Florida	Unprovoked	Surfing
14-Sep-2013	Casino Beach, Pensacola, Escambia County, Florida	Unprovoked	Swimming
21-Sep-2013	Ormond Beach, Volusia County, Florida	Unprovoked	Swimming
25-Sep-2013	Panama City, Bay County, Florida	Unprovoked	Standing
01-Jan-15	Windsor Beach, Indian River County, Florida	Unprovoked	Unknown

Showing 1 to 265 of 265 entries

Additional Notes

Website Details

In the HTML file, added the **<link** code below to the **<head>** so the <u>shark icon</u> would appear in the browser tab:

```
<head>
  <meta charset="UTF-8">
  <meta name="viewport" content="width=device-width, initial-scale=1.0">
  <meta http-equiv="X-UA-Compatible" content="ie=edge">
  <link rel="shortcut icon" href="shark-fin.png" type="image/x-icon">
  <title>Shark Attack Data</title>
```

In the JavaScript file, created a variable to hold the <u>shark icon</u> that would appear as the marker on the map:

```
var sharkIcon = L.icon({
  iconUrl: 'https://static.thenounproject.com/png/1220701-200.png',

  iconSize:     [35, 35], // size of the icon
  iconAnchor:   [22, 34], // point of the icon which will correspond to marker's location
  popupAnchor:  [-1, -20] // point from which the popup should open relative to the iconAnchor
```
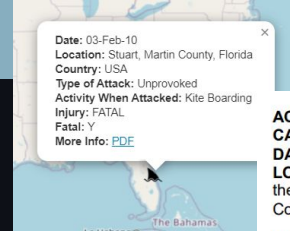
Additional Information About Attacks

- When a marker is clicked a popup box will appear with information about the attack. The dataset includes a PDF link with additional information on each attack (if available).

Date: 03-Feb-10
Location: Stuart, Martin County, Florida
Country: USA
Type of Attack: Unprovoked
Activity When Attacked: Kite Boarding
Injury: FATAL
Fatal: Y
More Info: PDF

```
var marker = L.marker([feature.Lat, feature.Lng],
{icon: sharkIcon}).addTo(map);
this.mapMarkers.push(marker);
marker.bindPopup(`<b>Date:</b> ${feature.Date}
  <br><b>Location:</b> ${feature.Location}
  <br><b>Country:</b> ${feature.Country}
  <br><b>Type of Attack:</b> ${feature.Type}
  <br><b>Activity When Attacked:</b> ${feature.Activity}
  <br><b>Injury:</b> ${feature.Injury}
  <br><b>Fatal:</b> ${feature.Fatal}
  <br><b>More Info:</b> <a href=${feature.Link} target="_blank">PDF</a>
<br>`);
```

ACTIVITY: Kiteboarding
CASE: GSAF 2010.02.03
DATE: Wednesday February 3, 2010
LOCATION: The attack took place in the Atlantic Ocean at Stuart, Martin County, Florida, USA.

NAME: Stephen Howard Schafer.
DESCRIPTION: He was a 38-year-old male from Stuart.

BACKGROUND
WEATHER / SEA CONDITIONS: There was a stiff wind.
MOON PHASE: Waning Gibbous, 69% of the moon was illuminated.
SEA CONDITIONS: The sea was rough. Waves were four to six feet in height.
DISTANCE FROM SHORE: A quarter-mile
TIME: 15h44

Stephen Schafer at the reception for his father, artist Howard Schafer, at the Court House Cultural Center on Jan. 15, 2010.

NARRATIVE: Lifeguard, Daniel Lund, looking through his binoculars, spotted the man lying on his sail about a quarter-mile offshore in an unguarded stretch of ocean. Lund paddled to him on a rescue board. When he was within 20 yards of the man he realized there was a lot of blood in the water and he saw several sharks circling. Lund pulled the man onto his board and carried him back to shore.

INJURY: Fatal. Rescue workers performed CPR before paramedics brought him to Martin

Challenges with the Dataset

- The responses are not standardized therefore leading to inconsistencies in how the data is reported.
- Victims report their shark attacks using the form displayed to the right, via this website:
  https://www.sharkattackfile.net/index.htm

Global Shark Attack File
Project Director : Lewis Levine, M.D

Please use the reporting form below. Answer as many of the questions as possible. Because this is a generic questionnaire some questions may not apply to this incident. When you are unable to answer a question, simply leave it blank and move on to the next question. If you need clarification about any of the questions, do not hesitate to contact SRI-Headquarters at (609) 921-3522 or Email: GSAF@sharks.org

Your name:
Your Address:
Your evening telephone number:
Your daytime telephone number:
Your E-Mail address: @

SECTION 1: SHARK ATTACK VICTIM
Name of the victim:
Address:
Evening telephone number:
Daytime telephone number:
EMail address: @
Age when bitten: Height: Weight: Sex:
Birthdate: (Day, month, year): / /
Date of Attack: / /
Description of all clothing victim was wearing when attacked (include colors, and if victim was wearing a wetsuit, include material and thickness of wetsuit).

Description and location of jewelry worn:
Did victim have any injuries prior to the attack?
If female, did victim have her menstrual period?
What was the victim doing immediately before the attack (resting on the surface, treading water, ascending to the surface, taking fish off a spear, etc).

Time of attack: Length of time victim in water before the attack:
What direction was victim facing when attacked (seaward, shoreward):
From what direction did the shark approach?
Water activity victim was engaged in when attacked (board-riding, swimming, diving, kayaking, other):

If victim was surfing, body-boarding or windsurfing
Length of board: Manufacturer of board:
Color of board's upper surface: Undersurface:
Number of fins: Color of fins: Was victim wearing a leash?
If yes, what color leash and where was it attached to the victim?

Links

- Git repository: https://github.com/amonnerie/Project-3
- Live website: https://amonnerie.github.io/