Allocating Resources After a Major Weather Event

Content:

Background and Scope

Import the Data

To import the required file in the MATLAB workspace:

1. Double-click the file through your matlab window only, to import it, in our case it is (.csv) type file.
2. While we are working on (.csv) type file we can import the perticular column in our script, or we can import the file as it is.
3. After this we are all set to analyse our data.

Two States Most Impacted by Harvey

To filter out the Harvey related events we created a variable ***`HarveyRelatedEvents`*** containing the data of events occured from "17th of Aug" to "3rd of Sept", by this we have successfully filtered out the duration of events in which the Harvey occured.

To filter the data for more accurate assumption we have filtered the state where Harvey occured and stored that in the variable ***`HarveyEvents`***. After this filtering we also removed the state with undefined entries in tthe ***`HarveyEvents`***.

Now to extract the state name from the table I first use the groupsummary() function to and then sort the table with respect to GroupCount in descending order. Then created two variables named state1 and state2 to store the first twi values of the sorted data.

```
HarveyRelatedEvents = StormEvents2017finalProject(StormEvents2017finalProject.Begin_Date_Time >
HarveyEvents = HarveyRelatedEvents(ismember(HarveyRelatedEvents.State,{'ARKANSAS','KENTUCKY','L
HarveyEvents = HarveyEvents(~ismissing(HarveyEvents.State),:);
HarveyState = groupsummary(HarveyEvents,'State');
HarveyState = sortrows(HarveyState,'GroupCount','descend')
```

HarveyState = 7×2 table

	State	GroupCount
1	TEXAS	275
2	LOUISIANA	86
3	NORTH C...	59
4	ARKANSAS	53
5	TENNESSEE	46
6	MISSISS...	39
7	KENTUCKY	21

```
State1 = HarveyState.State(1)
```

State1 = *categorical*
TEXAS

```
State2 = HarveyState.State(2)
```

State2 = *categorical*
LOUISIANA

Table of Events for Two Most Impacted States

I named a variable ***EventsOnMostImpactedState*** to store a table containing inforation about the two states which are heavily affected by the harvey, I filltered the categorical variable state by applying conditional operation. The other useless categories of variable state were removed by the function ***removecats()*** and overted on the same table variable ***EventsOnMostImpactedState***

```
EventsOnMostImpactedState = HarveyEvents(HarveyEvents.State == State1 | HarveyEvents.State == S
EventsOnMostImpactedState.State = removecats(EventsOnMostImpactedState.State);
EventsOnMostImpactedState.Event_Type = removecats(EventsOnMostImpactedState.Event_Type)
```

EventsOnMostImpactedState = 361×8 table

...

	State	Event_Type	CZ_Name	Begin_Date_Time	End_Date_Time	Property_Cost
1	TEXAS	Tropical Storm	MONTGOM...	2017-08-25 1...	2017-08-30 ...	7.0000e+09
2	TEXAS	Tropical Storm	FORT BEND	2017-08-26 0...	2017-08-30 ...	8.0000e+09
3	TEXAS	Tropical Storm	GALVESTON	2017-08-25 1...	2017-08-30 ...	1.0000e+10

	State	Event_Type	CZ_Name	Begin_Date_Time	End_Date_Time	Property_Cost
4	TEXAS	Tropical Storm	SAN JAC...	2017-08-25 1...	2017-08-30 ...	350000000
5	TEXAS	Tropical Storm	WALKER	2017-08-25 1...	2017-08-30 ...	600000000
6	TEXAS	Tropical Storm	POLK	2017-08-25 1...	2017-08-30 ...	300000000
7	TEXAS	Flash Flood	EL PASO	2017-08-23 1...	2017-08-23 ...	0
8	TEXAS	Thunderstorm...	EL PASO	2017-08-25 1...	2017-08-25 ...	0
9	TEXAS	Flash Flood	EL PASO	2017-08-25 1...	2017-08-25 ...	0
10	TEXAS	Flash Flood	HARDIN	2017-08-27 1...	2017-08-30 ...	600000000
11	TEXAS	Flash Flood	JASPER	2017-08-29 2...	2017-08-30 ...	85000000
12	TEXAS	Flash Flood	NEWTON	2017-08-29 2...	2017-08-30 ...	45000000
13	TEXAS	Flash Flood	FORT BEND	2017-08-26 0...	2017-08-26 ...	0
14	TEXAS	Thunderstorm...	MIDLAND	2017-08-22 2...	2017-08-22 ...	NaN
15	TEXAS	Thunderstorm...	BRISCOE	2017-08-20 1...	2017-08-20 ...	10000
16	TEXAS	Thunderstorm...	JASPER	2017-08-30 2...	2017-08-30 ...	5000
17	TEXAS	Flood	ORANGE	2017-08-30 1...	2017-08-31 ...	0
18	TEXAS	Flash Flood	MONTGOM...	2017-08-26 0...	2017-08-26 ...	0
19	TEXAS	Thunderstorm...	ECTOR	2017-08-25 1...	2017-08-25 ...	8000
20	TEXAS	Flash Flood	JEFFERSON	2017-08-27 0...	2017-08-30 ...	3.0000e+09
21	TEXAS	Flash Flood	GALVESTON	2017-08-26 0...	2017-08-29 ...	0
22	LOUISIANA	Heat	CADDO	2017-08-19 0...	2017-08-20 ...	0
23	LOUISIANA	Heat	BOSSIER	2017-08-19 0...	2017-08-20 ...	0
24	LOUISIANA	Heat	DE SOTO	2017-08-19 0...	2017-08-20 ...	0
25	LOUISIANA	Heat	RED RIVER	2017-08-19 0...	2017-08-20 ...	0
26	TEXAS	Thunderstorm...	SWISHER	2017-08-22 1...	2017-08-22 ...	0
27	LOUISIANA	Tropical Storm	SABINE	2017-08-30 1...	2017-08-30 ...	0
28	TEXAS	Flash Flood	ANGELINA	2017-08-30 1...	2017-08-30 ...	0
29	TEXAS	Flash Flood	ANGELINA	2017-08-29 1...	2017-08-29 ...	0
30	TEXAS	Flash Flood	ANGELINA	2017-08-29 0...	2017-08-29 ...	0
31	TEXAS	Flash Flood	ANGELINA	2017-08-29 0...	2017-08-29 ...	0
32	TEXAS	Flash Flood	SAN JAC...	2017-08-27 1...	2017-08-28 ...	0
33	TEXAS	Flash Flood	GALVESTON	2017-08-26 2...	2017-08-29 ...	0
34	LOUISIANA	Heat	BIENVILLE	2017-08-19 0...	2017-08-20 ...	0
35	LOUISIANA	Heat	WEBSTER	2017-08-19 0...	2017-08-20 ...	0
36	LOUISIANA	Heat	CLAIBORNE	2017-08-19 0...	2017-08-20 ...	0
37	LOUISIANA	Heat	LINCOLN	2017-08-19 0...	2017-08-20 ...	0

	State	Event_Type	CZ_Name	Begin_Date_Time	End_Date_Time	Property_Cost
38	LOUISIANA	Heat	JACKSON	2017-08-19 0...	2017-08-20 ...	0
39	TEXAS	Thunderstorm...	LUBBOCK	2017-08-22 1...	2017-08-22 ...	500
40	LOUISIANA	Tropical Storm	NATCHIT...	2017-08-30 1...	2017-08-30 ...	0
41	LOUISIANA	Tropical Storm	UNION	2017-08-30 1...	2017-08-30 ...	0
42	TEXAS	Flash Flood	ANGELINA	2017-08-29 0...	2017-08-29 ...	0
43	TEXAS	Flash Flood	SWISHER	2017-08-22 1...	2017-08-22 ...	0
44	TEXAS	Thunderstorm...	HOCKLEY	2017-08-22 1...	2017-08-22 ...	42000
45	TEXAS	Thunderstorm...	CLAY	2017-08-19 1...	2017-08-19 ...	0
46	TEXAS	Flash Flood	GALVESTON	2017-08-26 1...	2017-08-26 ...	0
47	LOUISIANA	Heat	UNION	2017-08-19 0...	2017-08-20 ...	0
48	LOUISIANA	Heat	OUACHITA	2017-08-19 0...	2017-08-20 ...	0
49	LOUISIANA	Heat	CALDWELL	2017-08-19 0...	2017-08-20 ...	0
50	LOUISIANA	Heat	WINN	2017-08-19 0...	2017-08-20 ...	0
51	LOUISIANA	Heat	LA SALLE	2017-08-19 0...	2017-08-20 ...	0
52	TEXAS	Tropical Storm	KENEDY	2017-08-25 1...	2017-08-25 ...	0
53	TEXAS	Flash Flood	HOCKLEY	2017-08-22 1...	2017-08-22 ...	0
54	TEXAS	Thunderstorm...	LYNN	2017-08-22 1...	2017-08-22 ...	0
55	TEXAS	Heavy Rain	HOCKLEY	2017-08-22 1...	2017-08-22 ...	0
56	TEXAS	Flash Flood	SABINE	2017-08-30 1...	2017-08-31 ...	0
57	TEXAS	Flash Flood	SAN AUG...	2017-08-30 1...	2017-08-31 ...	0
58	TEXAS	Flash Flood	SABINE	2017-08-30 1...	2017-08-31 ...	0
59	TEXAS	Flash Flood	SABINE	2017-08-30 1...	2017-08-31 ...	0
60	TEXAS	Flash Flood	ANGELINA	2017-08-30 1...	2017-08-30 ...	0
61	TEXAS	Flash Flood	ANGELINA	2017-08-30 1...	2017-08-30 ...	0
62	TEXAS	Flash Flood	ANGELINA	2017-08-30 1...	2017-08-30 ...	0
63	TEXAS	Flash Flood	SABINE	2017-08-30 1...	2017-08-31 ...	0
64	TEXAS	Flash Flood	SABINE	2017-08-30 1...	2017-08-31 ...	0
65	TEXAS	Flash Flood	SABINE	2017-08-30 1...	2017-08-31 ...	0
66	TEXAS	Flash Flood	SABINE	2017-08-30 1...	2017-08-31 ...	0
67	TEXAS	Flash Flood	SABINE	2017-08-30 1...	2017-08-31 ...	0
68	TEXAS	Flash Flood	ANGELINA	2017-08-30 1...	2017-08-30 ...	0
69	TEXAS	Hail	SHERMAN	2017-08-17 1...	2017-08-17 ...	0
70	TEXAS	Flash Flood	HARRIS	2017-08-26 2...	2017-08-29 ...	0
71	TEXAS	Flash Flood	HARRIS	2017-08-26 2...	2017-08-29 ...	0

	State	Event_Type	CZ_Name	Begin_Date_Time	End_Date_Time	Property_Cost
72	LOUISIANA	Heat	GRANT	2017-08-19 0...	2017-08-20 ...	0
73	LOUISIANA	Heat	NATCHIT...	2017-08-19 0...	2017-08-20 ...	0
74	LOUISIANA	Heat	SABINE	2017-08-19 0...	2017-08-20 ...	0
75	TEXAS	Heat	CASS	2017-08-19 2...	2017-08-20 ...	0
76	TEXAS	Flash Flood	SHELBY	2017-08-30 2...	2017-08-31 ...	0
77	TEXAS	Flash Flood	SHELBY	2017-08-30 2...	2017-08-31 ...	0
78	TEXAS	Flash Flood	SABINE	2017-08-30 1...	2017-08-31 ...	0
79	LOUISIANA	Flash Flood	SABINE	2017-08-30 1...	2017-08-31 ...	0
80	LOUISIANA	Flash Flood	SABINE	2017-08-30 1...	2017-08-31 ...	0
81	LOUISIANA	Flash Flood	SABINE	2017-08-30 1...	2017-08-31 ...	0
82	LOUISIANA	Flash Flood	RED RIVER	2017-08-30 1...	2017-08-31 ...	0
83	LOUISIANA	Flash Flood	SABINE	2017-08-30 1...	2017-08-31 ...	0
84	LOUISIANA	Flash Flood	RED RIVER	2017-08-30 1...	2017-08-31 ...	0
85	LOUISIANA	Flash Flood	SABINE	2017-08-30 1...	2017-08-31 ...	0
86	LOUISIANA	Flash Flood	NATCHIT...	2017-08-30 1...	2017-08-31 ...	0
87	LOUISIANA	Flash Flood	NATCHIT...	2017-08-30 1...	2017-08-31 ...	0
88	TEXAS	Hail	HUTCHIN...	2017-08-17 1...	2017-08-17 ...	0
89	TEXAS	Thunderstorm...	RANDALL	2017-08-17 1...	2017-08-17 ...	0
90	TEXAS	Thunderstorm...	HARTLEY	2017-08-27 2...	2017-08-27 ...	0
91	TEXAS	Flash Flood	AUSTIN	2017-08-28 0...	2017-08-28 ...	0
92	TEXAS	Heat	MARION	2017-08-19 2...	2017-08-20 ...	0
93	TEXAS	Heat	HARRISON	2017-08-19 2...	2017-08-20 ...	0
94	TEXAS	Heat	GREGG	2017-08-19 2...	2017-08-20 ...	0
95	TEXAS	Heat	RUSK	2017-08-19 2...	2017-08-20 ...	0
96	LOUISIANA	Flash Flood	SABINE	2017-08-30 1...	2017-08-31 ...	0
97	LOUISIANA	Flash Flood	SABINE	2017-08-30 1...	2017-08-31 ...	0
98	LOUISIANA	Flash Flood	NATCHIT...	2017-08-30 1...	2017-08-31 ...	0
99	LOUISIANA	Flash Flood	NATCHIT...	2017-08-30 1...	2017-08-31 ...	0
100	LOUISIANA	Flash Flood	SABINE	2017-08-30 1...	2017-08-31 ...	0

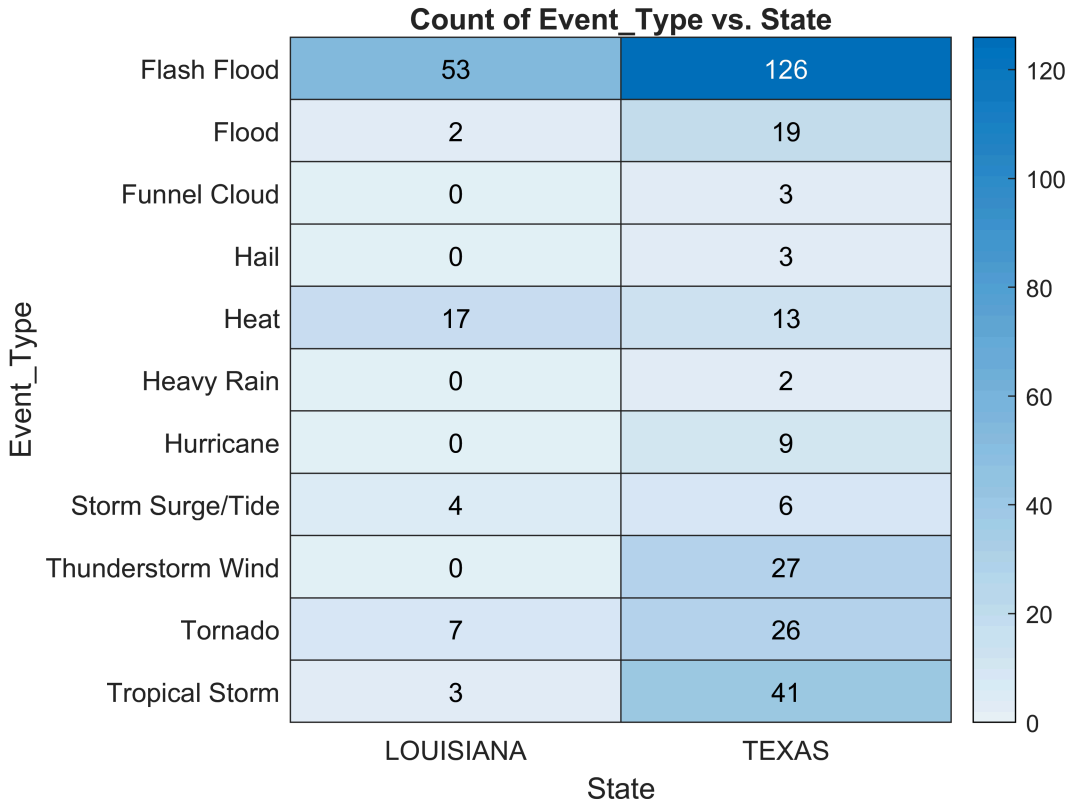
⋮

Visualizations

Figure of Event Types

I used the heat map function to generate a figure of events perfectly explainig the data and giving a clear idea about the states affected by the harvey.

```
heatmap(EventsOnMostImpactedState,'State','Event_Type')
```



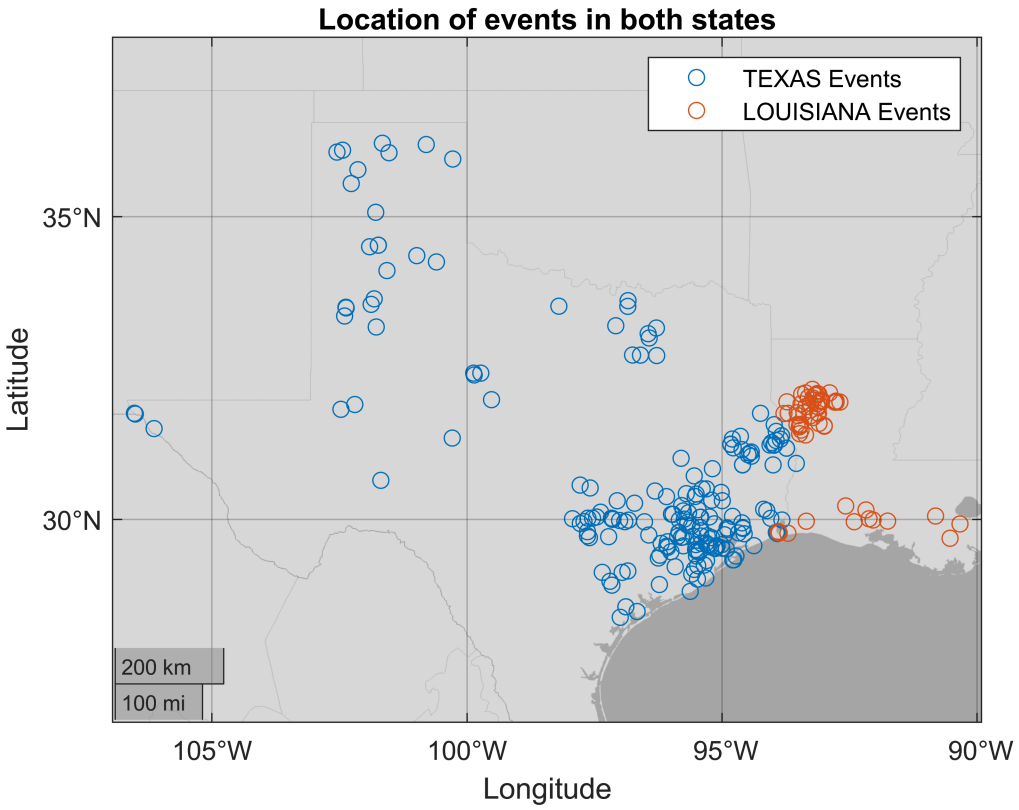

```
ans =
  HeatmapChart (Count of Event\_Type vs. State) with properties:

      SourceTable: [361×8 table]
        XVariable: 'State'
        YVariable: 'Event_Type'
    ColorVariable: ''
      ColorMethod: 'count'

  Show all properties
```

Figure of Event Locations

To show the location of the events, I first created two different variable to differentiate the Longitude and latitude of the states. Then used the geoscatter plot to plot the locations, now to plot them with different colour I used hod function to do this.

```
TEvent = EventsOnMostImpactedState.State == "TEXAS";
geoscatter(EventsOnMostImpactedState.Begin_Lat(TEvent),EventsOnMostImpactedState.Begin_Lon(TEve
hold on
LEvent = EventsOnMostImpactedState.State == "LOUISIANA";
```

```
geoscatter(EventsOnMostImpactedState.Begin_Lat(LEvent),EventsOnMostImpactedState.Begin_Lon(LEve
legend({'TEXAS Events','LOUISIANA Events'})
hold off
title('Location of events in both states');
```



Analysis

Three Counties with Most Events in State 1

The blow code creates a table contaning the name of the top three counties in state 1 with the most events in the descending order.

```
CountiesState1 = EventsOnMostImpactedState(EventsOnMostImpactedState.State == State1,:);
Counties = groupsummary(CountiesState1,"CZ_Name");
Counties = sortrows(Counties,'GroupCount','descend');
Counties([1,2,3],:)
```

ans = 3×2 table

	CZ_Name	GroupCount
1	HARRIS	21
2	GALVESTON	17
3	FORT BEND	13

Three Counties with Most Events in State 2

The blow code creates a table contaning the name of the top three counties in state 2 with the most events in the descending order.

```
CountiesState2 = EventsOnMostImpactedState(EventsOnMostImpactedState.State == State2,:);
Counties2 = groupsummary(CountiesState2,"CZ_Name");
Counties2 = sortrows(Counties2,'GroupCount','descend');
Counties2([1,2,3],:)
```

ans = 3×2 table

	CZ_Name	GroupCount
1	NATCHIT...	21
2	SABINE	15
3	RED RIVER	9

Three Counties with Highest Property Cost in State 1

Blow code creates a table names PropCosCounties containg the name of Top three counties of state 1 where highest property Cost occured in the descending order of Property Cost and lso contain the Total Property Cost data.

```
CountiesPropCosState1 = EventsOnMostImpactedState(EventsOnMostImpactedState.State == State1,:);
PropCosCounties = groupsummary(CountiesPropCosState1,"CZ_Name","sum","Property_Cost");
PropCosCounties = sortrows(PropCosCounties,'sum_Property_Cost','descend');
PropCosCounties(:,"GroupCount") = [];
PropCosCounties([1,2,3],:)
```

ans = 3×2 table

	CZ_Name	sum_Property_Cost
1	GALVESTON	2.0000e+10
2	FORT BEND	1.6004e+10
3	MONTGOM...	1.4000e+10

Three Counties with Highest Property Cost in State 2

Blow code creates a table names PropCosCounties2 containg the name of Top three counties of state 2 where highest property Cost occured in the descending order of Property Cost and lso contain the Total Property Cost data

```
CountiesPropCosState2 = EventsOnMostImpactedState(EventsOnMostImpactedState.State == State2,:);
PropCosCounties2 = groupsummary(CountiesPropCosState2,"CZ_Name","sum","Property_Cost");
PropCosCounties2 = sortrows(PropCosCounties2,'sum_Property_Cost','descend');
PropCosCounties2(:,"GroupCount") = [];
PropCosCounties2([1,2,3],:)
```

ans = 3×2 table

	CZ_Name	sum_Property_Cost
1	CALCASIEU	60000000
2	BEAUREG...	15000000
3	ACADIA	200000

Conclusions and Recommendations

Analysis of the storm Data 2017 obtained in this Project tells that the insurance company send people to Harris, Galveston, Fort Bend and Montgomery of Texas and Natchotoches, Sabine, Red River, Calcasieu, Beauregard, Acadia from Louisiana.

Insurance company should take Galvenston and Fort Bend from Texas on top priorities as highest property cost and high number of Harvey Events occured there. As reference, This can be observed from the Analysis block where the table shows the record of top three counties with most events and hight property cost from state 1.