USA Asian Hate Crimes:

Here, for our visualization we have used python code along with the “pandas” library. Mapping API is used to obtain the US map. Our dataset was formatted in the .csv file. It contains several fields where we just took “STATE NAME”, “BIAS_DESC” and “DATA_YEAR” into consideration. To calculate the Anti-Asian rate, we performed the following operation.

```
df2['Anti-Asian-rate'] = df2['Anti-Asian-count']/df2['BIAS_DESC']
```

Then, We calculated the Mean by performing following operation.

```
df3 = df2.query('DATA_YEAR>=2009 &
DATA_YEAR<=2018').groupby(['STATE_NAME']).agg('mean')
```

Then we calculated the P(O|M) as follows,

```
df4['P(O|M)']=1-abs(df4['Model_2009-2018']-df4['Observed_2019'])
```

Then we calculated the P(M|O) as follows,

```
df4['P(M|O)']=df4['P(O|M)']*df4['Model_2009-2018']
```

Finally, we obtained the signed surprise by performing the following operation.

```
df4['Signed_Surprise']= df4['P(M|O)']*np.log(df4['P(M|O)']/df4['Model_2009-
2018'])*np.sign(df4['Model_2009-2018']-df4['Observed_2019'])
```