assignment2-21bce7976

September 13, 2023

[ ]:
```
pip install seaborn
```

```
Requirement        already        satisfied:        seaborn        in
/usr/local/lib/python3.10/distpackages (0.12.2)
Requirement already satisfied: numpy!=1.24.0,>=1.17 in
/usr/local/lib/python3.10/dist-packages (from seaborn) (1.23.5)
Requirement       already       satisfied:       pandas>=0.25       in
/usr/local/lib/python3.10/distpackages (from seaborn) (1.5.3)
Requirement already satisfied: matplotlib!=3.6.1,>=3.1 in
/usr/local/lib/python3.10/dist-packages (from seaborn) (3.7.1)
Requirement already satisfied: contourpy>=1.0.1 in
/usr/local/lib/python3.10/dist-packages (from matplotlib!=3.6.1,>=3.1-
>seaborn) (1.1.0)
Requirement       already       satisfied:       cycler>=0.10       in
/usr/local/lib/python3.10/dist-
packages (from matplotlib!=3.6.1,>=3.1->seaborn) (0.11.0)
Requirement already satisfied: fonttools>=4.22.0 in
/usr/local/lib/python3.10/dist-packages (from matplotlib!=3.6.1,>=3.1-
>seaborn)
(4.42.1)
Requirement already satisfied: kiwisolver>=1.0.1 in
/usr/local/lib/python3.10/dist-packages (from matplotlib!=3.6.1,>=3.1-
>seaborn)
(1.4.5)
Requirement already satisfied: packaging>=20.0 in
/usr/local/lib/python3.10/dist-packages (from matplotlib!=3.6.1,>=3.1-
>seaborn)
(23.1)
Requirement       already       satisfied:       pillow>=6.2.0       in
/usr/local/lib/python3.10/distpackages  (from  matplotlib!=3.6.1,>=3.1-
>seaborn) (9.4.0)
Requirement already satisfied: pyparsing>=2.3.1 in
/usr/local/lib/python3.10/dist-packages (from matplotlib!=3.6.1,>=3.1-
>seaborn)
(3.1.1)
Requirement already satisfied: python-dateutil>=2.7 in
/usr/local/lib/python3.10/dist-packages (from matplotlib!=3.6.1,>=3.1-
>seaborn) (2.8.2)
```

```
Requirement already satisfied: pytz>=2020.1 in
/usr/local/lib/python3.10/distpackages (from pandas>=0.25->seaborn)
(2023.3.post1)
Requirement already satisfied: six>=1.5 in
/usr/local/lib/python3.10/distpackages (from python-dateutil>=2.7-
>matplotlib!=3.6.1,>=3.1->seaborn) (1.16.0)
```

[5]:

```
import seaborn as sns

# Load the car crashes dataset
crashes = sns.load_dataset('car_crashes')
```

[ ]:

```
crashes
```

[ ]:

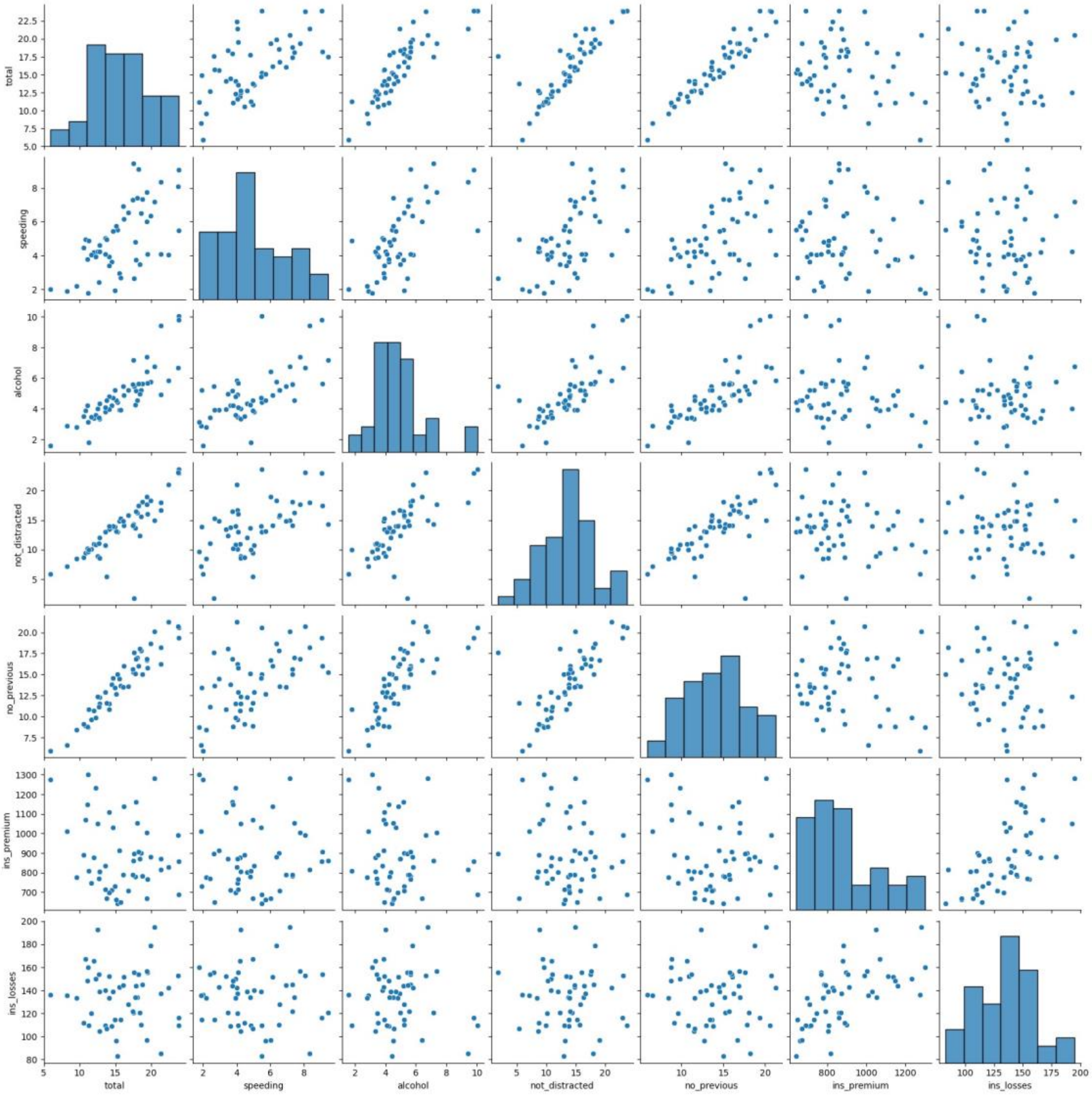
```
 total speeding alcohol not_distracted no_previous ins_premium \
0  18.8  7.332  5.640  18.048  15.040  784.55  1  18.1  7.421  4.525
16.290 17.014 1053.48
2    18.6    6.510 5.208 15.624      17.856      899.47
3    22.4    4.032 5.824 21.056      21.280      827.34
4    12.0    4.200 3.360 10.920      10.680      878.41
5    13.6  5.032  3.808  10.744  12.920  835.50  6  10.8  4.968  3.888  9.396
     8.856 1068.73 7 16.2 6.156 4.860 14.094 16.038 1137.87
8     5.9    2.006 1.593 5.900 5.900 1273.89
9     17.9    3.759 5.191 16.468      16.826      1160.13
10    15.6    2.964 3.900 14.820      14.508      913.15
11    17.5    9.450 7.175 14.350      15.225      861.18
12    15.3    5.508 4.437 13.005      14.994      641.96
13    12.8    4.608 4.352 12.032      12.288      803.11
14    14.5    3.625 4.205 13.775      13.775      710.46
15    15.7    2.669 3.925 15.229      13.659      649.06
16    17.8    4.806 4.272 13.706      15.130      780.45
17    21.4  4.066  4.922  16.692  16.264  872.51  18  20.5  7.175  6.765  14.965
      20.090  1281.55
19    15.1    5.738 4.530 13.137      12.684      661.88
20    12.5    4.250 4.000 8.875 12.375      1048.78
21    8.2     1.886 2.870 7.134 6.560 1011.14
22    14.1    3.384 3.948 13.395      10.857      1110.61
23    9.6     2.208 2.784 8.448 8.448 777.18
24    17.6    2.640 5.456 1.760 17.600      896.07
25    16.1    6.923 5.474 14.812      13.524      790.32
26    21.4    8.346 9.416 17.976      18.190      816.21
27    14.9  1.937  5.215  13.857  13.410  732.28  28  14.7  5.439  4.704  13.965
      14.553  1029.87
29   11.6    4.060 3.480 10.092      9.628 746.54
30   11.2    1.792 3.136 9.632 8.736 1301.52
31   18.4    3.496 4.968 12.328      18.032      869.85
```

```
32   12.3    3.936 3.567 10.824      9.840 1234.31
33   16.8    6.552 5.208 15.792      13.608      708.24
34   23.9    5.497 10.038      23.661      20.554      688.75
35   14.1    3.948 4.794 13.959      11.562      697.73
36   19.9    6.368 5.771 18.308      18.706      881.51
37   12.8    4.224 3.328 8.576 11.520      804.71
38   18.2    9.100 5.642 17.472      16.016      905.99
39   11.1    3.774 4.218 10.212      8.769 1148.99
40   23.9    9.082 9.799 22.944      19.359      858.97
41   19.4    6.014 6.402 19.012      16.684      669.31
42   19.5 4.095 5.655 15.990 15.795 767.91 43 19.4 7.760 7.372 17.654
     16.878 1004.75
44   11.3    4.859 1.808 9.944 10.848      809.38
45   13.6    4.080 4.080 13.056      12.920      716.20
46   12.7    2.413 3.429 11.049      11.176      768.95
47   10.6    4.452 3.498 8.692 9.116 890.03
48   23.8    8.092 6.664 23.086      20.706      992.61
49   13.8    4.968 4.554 5.382 11.592      670.31
50   17.4    7.308 5.568 14.094      15.660      791.14

    ins_losses abbrev
0       145.08     AL
1       133.93     AK
2       110.35     AZ
3       142.39     AR
4       165.63     CA
5       139.91     CO
6       167.02     CT
7       151.48     DE
8       136.05     DC
9       144.18     FL
10      142.80     GA
11      120.92     HI
12      82.75 ID 13 139.15 IL
14      108.92     IN
15      114.47     IA
16      133.80     KS
17      137.13     KY
18      194.78     LA
19      96.57 ME 20 192.70 MD
21      135.63     MA
22      152.26     MI
23      133.35     MN
24      155.77     MS
25      144.45     MO
```

```
26      85.15 MT 27 114.82 NE
28      138.71     NV
29      120.21     NH
30      159.85     NJ
31      120.75     NM
32      150.01     NY

33      127.82    NC
34      109.72    ND
35      133.52    OH
36      178.86    OK
37      104.61    OR
38      153.86    PA
39      148.58    RI
40      116.29    SC
41       96.87    SD
42      155.57    TN
43      156.83    TX
44      109.48    UT
45      109.61    VT
46      153.72    VA
47      111.62    WA
48      152.56    WV
49      106.62    WI
50      122.04    WY
```

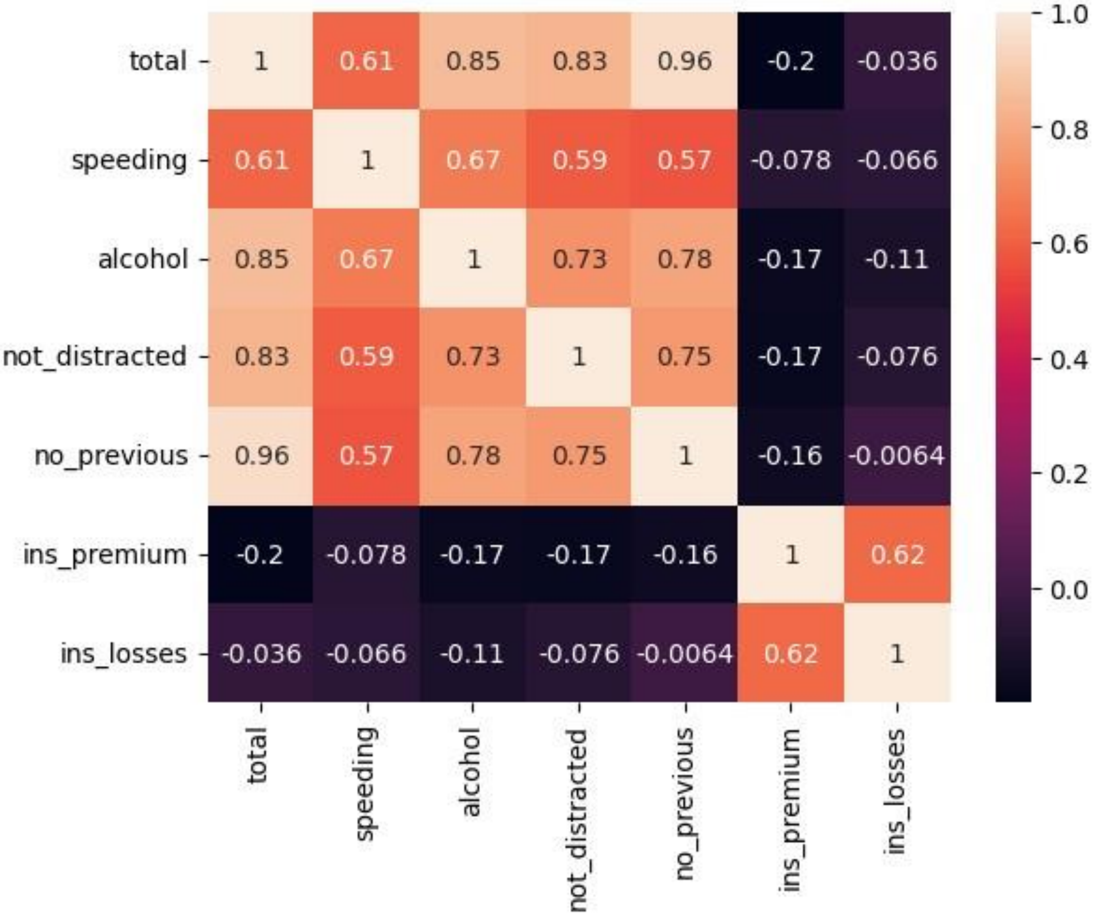
[6]:

```python
import matplotlib.pyplot as plt
sns.pairplot(crashes)
plt.show()
```



Inference: The pairplot allows us to visualize the relationships between all numeric variables in the dataset.We can see scatter plots for the numeric variables and histograms for the individual variables along the diagonal. It’s useful for identifying potential correlations and distributions.

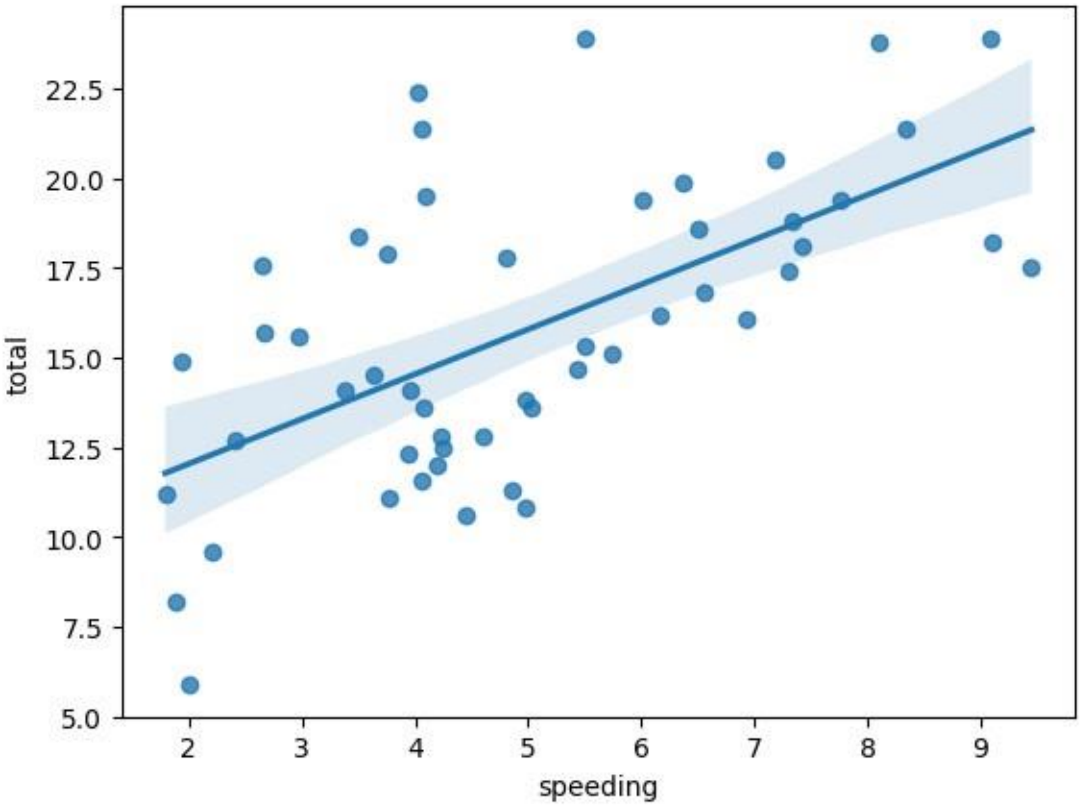
[8]:
```
correlation = crashes.corr(numeric_only=True)
sns.heatmap(correlation, annot=True)
plt.show()
```



	total	speeding	alcohol	not_distracted	no_previous	ins_premium	ins_losses
total	1	0.61	0.85	0.83	0.96	-0.2	-0.036
speeding	0.61	1	0.67	0.59	0.57	-0.078	-0.066
alcohol	0.85	0.67	1	0.73	0.78	-0.17	-0.11
not_distracted	0.83	0.59	0.73	1	0.75	-0.17	-0.076
no_previous	0.96	0.57	0.78	0.75	1	-0.16	-0.0064
ins_premium	-0.2	-0.078	-0.17	-0.17	-0.16	1	0.62
ins_losses	-0.036	-0.066	-0.11	-0.076	-0.0064	0.62	1

Inference: The heatmap shows the correlation between numeric variables. A value close to 1 indicates a strong positive correlation, while a value close to -1 indicates a strong negative correlation.
This helps us understand which variables are most strongly related.

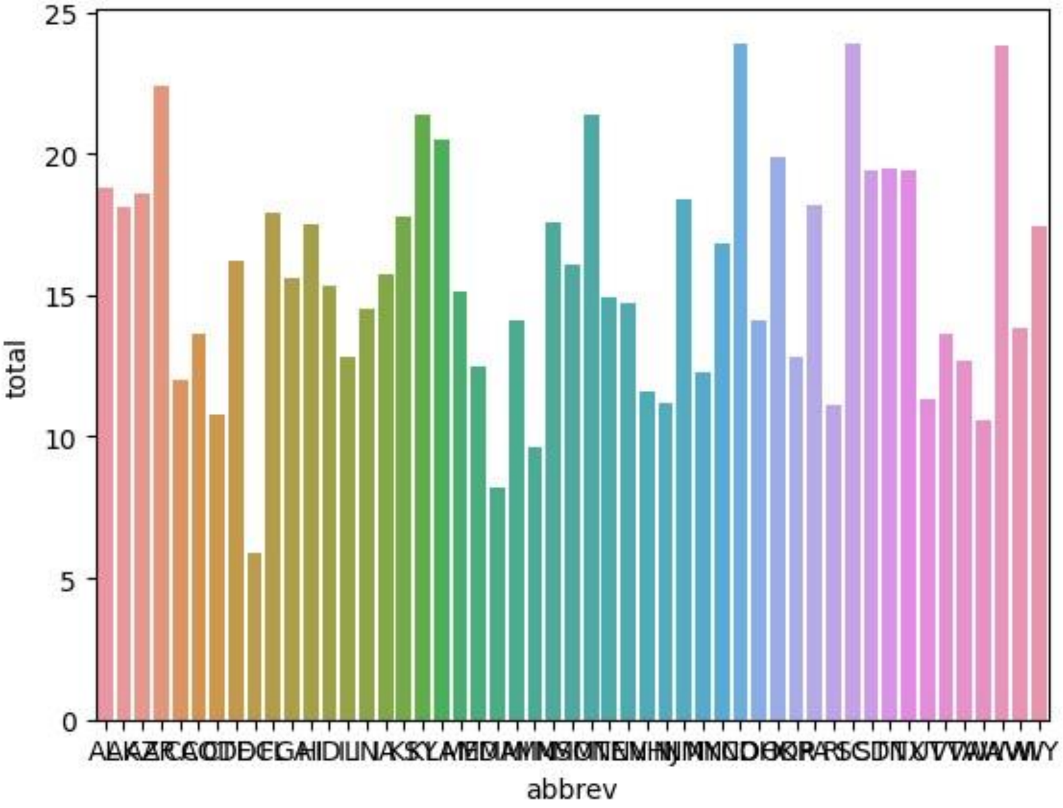
[9]:
```
sns.regplot(x='speeding',  ='total', data=crashes)
plt.show()
```



Inference: This regression plot shows the relationship between speeding and total number of crashes. It also includes a regression line which helps us understand the trend.

[10]:

```
sns.barplot(x='abbrev',  ='total', data=crashes)
plt.show()
```



Inference: This bar plot shows the total number of crashes for each state. It allows us to compare the crash counts between different states