Business Problem

Every Year many people loose their valuable lives because of collisions happening on roads. We have data collected everywhere from police department , if we are able to analyze the data and create awareness among the people we can avoid many collisions.

Seattle one of the busiest cities in USA reports 1.3 million crashes every year, analyzing this crashes and taking measures will definitely help in reducing the crashes.

The target audience will be the citizens of USA or Seattle where we will try to educate them about the causes of collisions and how can we avoid them for better lives and safety of the Driver as well as opposite vehicle or pedestrians.

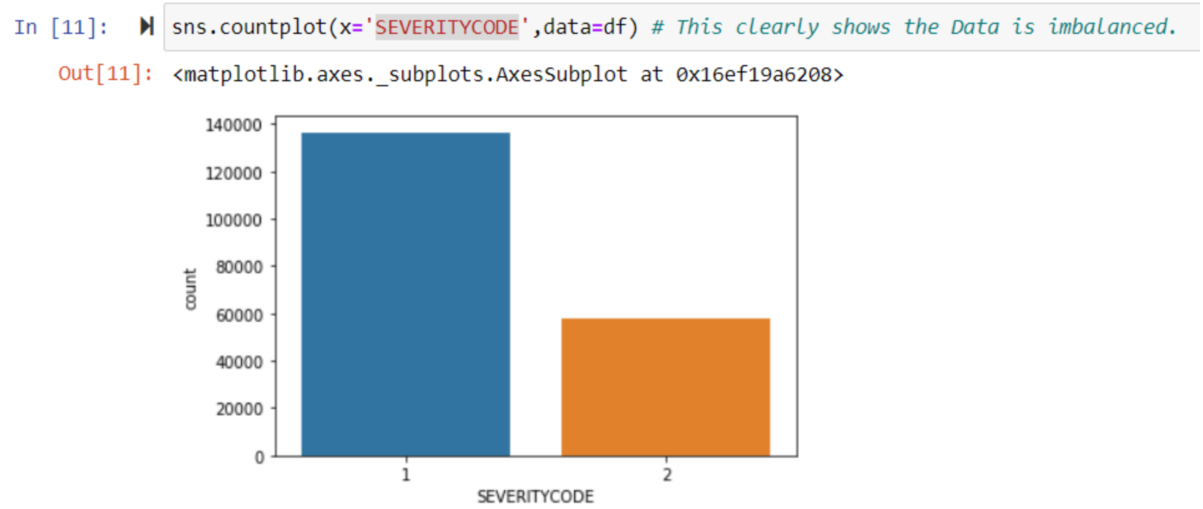
Complete lifecycle steps followed here

1. Dataset was provided by the courseera in the form of CSV. Pandas module is used to load the data into DataFrame.
2. Initial analysis showed the Dataset target variable is too much imbalanced.
3. The Dataset is balanced by under sampling technique.
4. Then the feature Engineering part was done to convert the categorical values into numerical models.
5. Missing values are droppped as we have plenty of Data.
6. Train test split was done using the SKlearn module of Python
7. Three models KNN, Logistic Regression, Decision tree models are applied.
8. Visualization are done using Seaborn package.

Approach Followed for Analysis

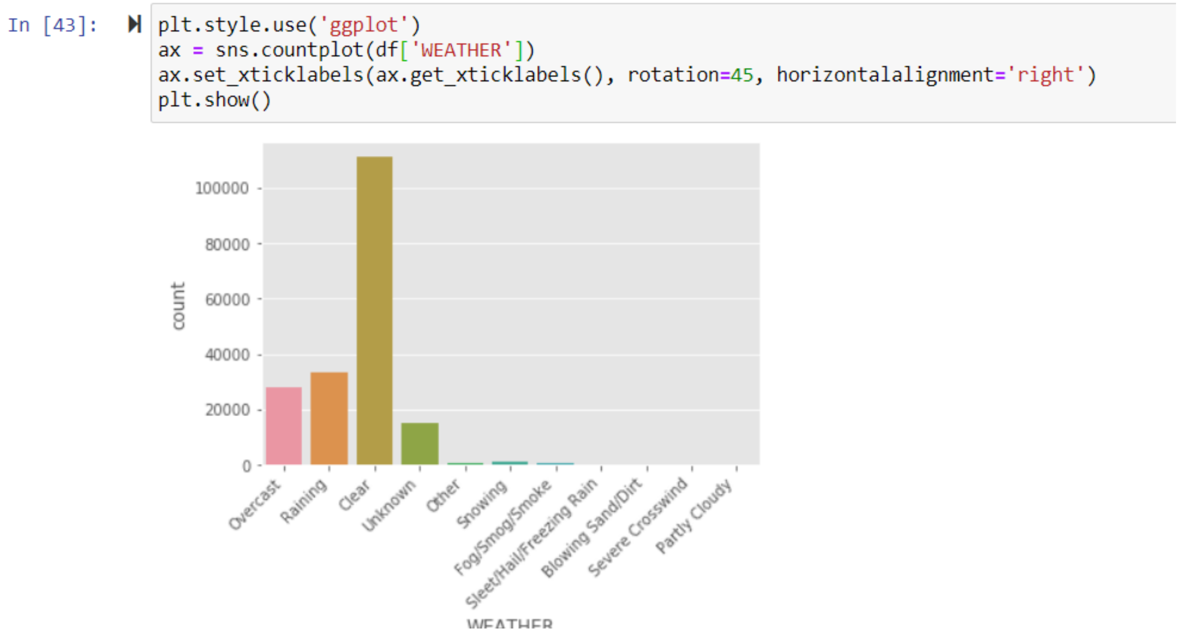
Here I am going to use the dataset given as part of course by CourseEra which is part of real data from Seattle collisions. The dataset consists of 38 columns with very less information about the features.

The Data is highly imbalanced Data , so we need to balance the data so the model dont get biased to the the Majority class.



```
In [11]:  sns.countplot(x='SEVERITYCODE',data=df) # This clearly shows the Data is imbalanced.
  Out[11]: <matplotlib.axes._subplots.AxesSubplot at 0x16ef19a6208>
```

Fig: This shows the Imbalance between the classes.



```
In [43]:  plt.style.use('ggplot')
          ax = sns.countplot(df['WEATHER'])
          ax.set_xticklabels(ax.get_xticklabels(), rotation=45, horizontalalignment='right')
          plt.show()
```

fig: This shows the weather conditions on various days, so weather has very less effect on the crashes.

Feature Engineering and Null value Handling

All categorical columns are encoded using the numerical values.

Missing values are dropped as we have huge dataset and cleaning missing values does not have any impact.

Train test split is done using Sklearn and Random forest classifier is applied.

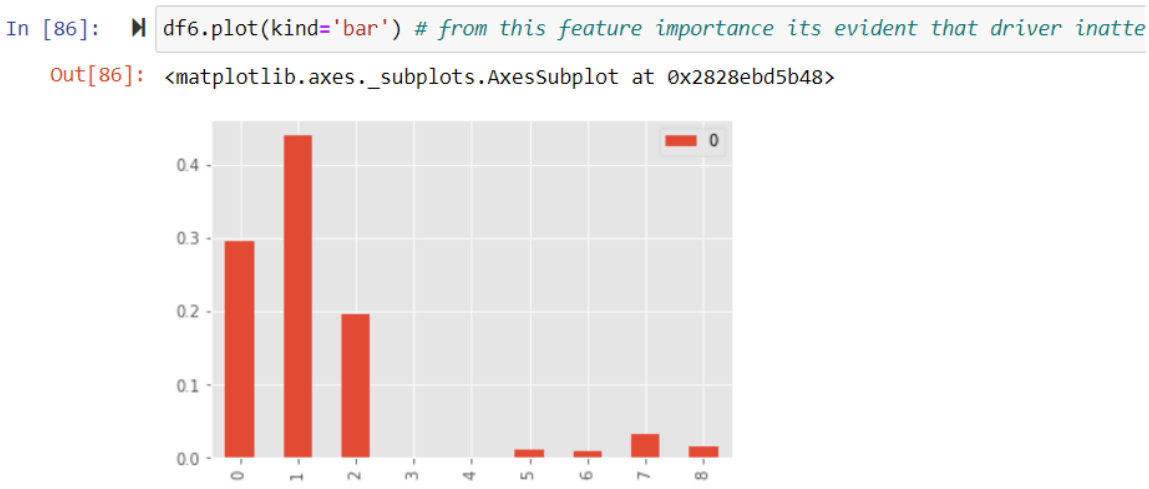
since the Dataset is imbalanced accuracy is very less.

Further analysis

Driver inattentive is the major cause for many collisions we can create awareness sessions among the drives and reduce collisions.

Lot of feature engineering needs to be done with experts so model performance can be improved a lot.

Driver Inattentiveness seems to be the major factor for causing crashes, if we educate the drivers by conducting awareness sessions most crashes can be reduced.



```
In [86]:  df6.plot(kind='bar') # from this feature importance its evident that driver inatte
Out[86]: <matplotlib.axes._subplots.AxesSubplot at 0x2828ebd5b48>
```