IBM

APPLIED DATA SCIENCE CAPSTONE - DATA COLLISIONS

1)INTRODUCTION

I examined data before suggest to business problem. Fill NaN values with correct values that the way I think it is right. This infos been in own cells. Data has accident by Traffic Records. I evaluate here how accident is happened, how many people dead or get injured, how many vehicle included accident, collisions type of vehicles, as so many parameters in that data. There are some factors about driver that get drunk or alcohol. Weather, road and light condition about accident. Location of accident. All that parameters will be examined in detail. If an accident occur anywhere , data has information about there. I said "there" is that mean all info about cars, peoples,weather condition namely all factors may affect the accident.

2)BUSINESS PROBLEM

where did the accident occur ? why did the accident happen ? which factors affect the accident weather, light or road condition or all of them ? was driver drunk? was driver too speedly? I think ours target is that questions answer. I want to see factors that affect the accident. Collisions type and collisions address is interest each other. If interest , how we explain this ? which time interval is have high accident rate and why is that? then maybe find some solution about accident problem. Maybe it is road problem or psychological problem or we don’t discover yet that any new problem that we will discover with this data.

3)DATA

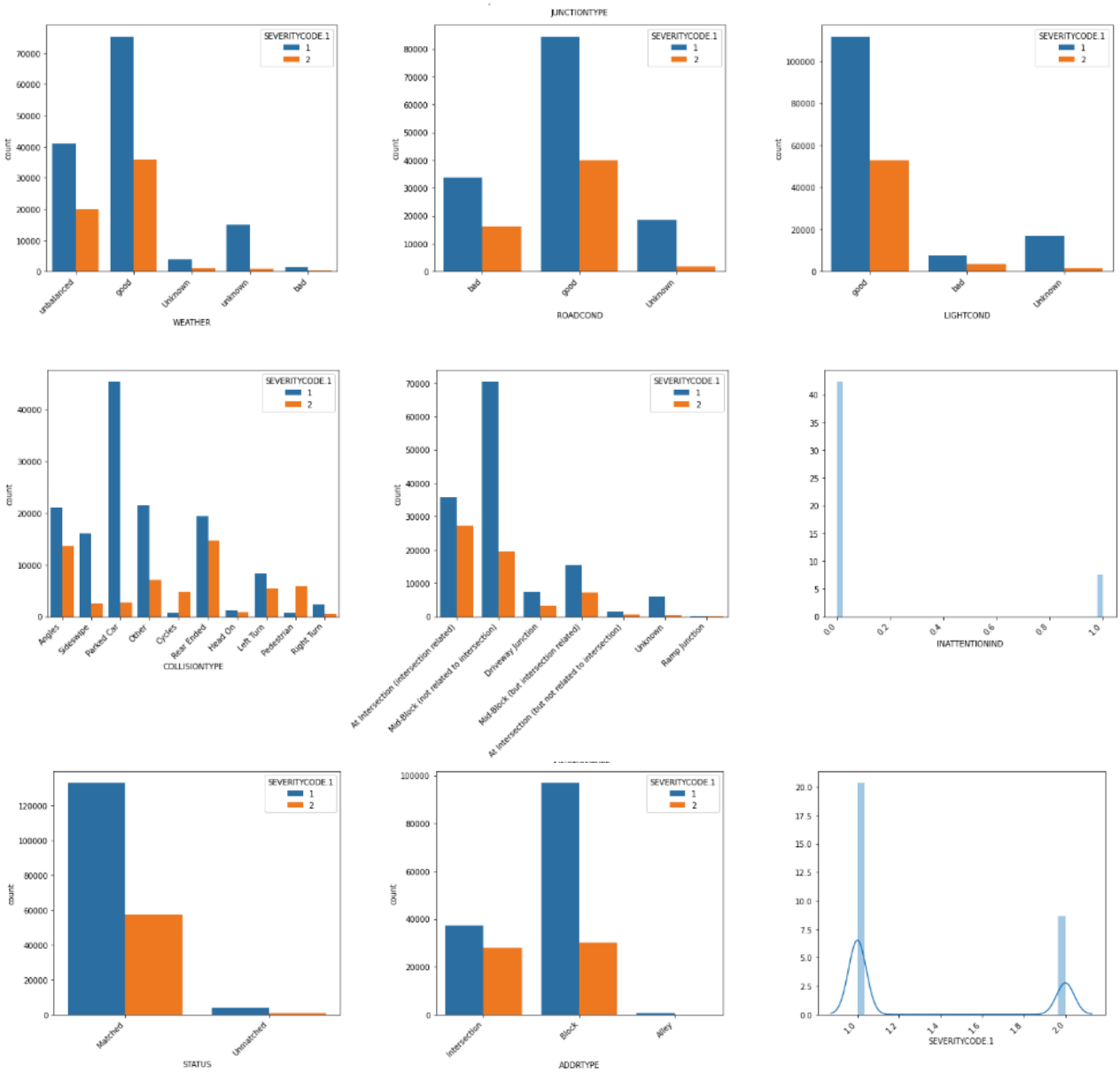
Data include accident that have some factors about driver, pedestrian, road cond, weather cond, road type, collisions type, accident time, location, severity, injuries, dead. How occur accident and its explanation as briefly. I did some adjustment about unknown situations. I will do some feature engineering and add some new attributes in that data. Maybe detect the location in that occur accident frequently. And below I explain data in detail and do some changing about missing values and thought to be wrong values.

3.1) Data Understanding

The dataset has 194673 rows with a total of 38 different columns, each detailing some variable inherent to the accident. A summary information about variables been in notebook. I adjusted “ADDRTYPE”, “ROADCOND”, “LIGHTCOND”, “WEATHER”, “UNDERINFL”, “COLLISIONTYPE”, “JUNCTIONTYPE” variables. I did some explanation about that adjustment in notebook. This adjustment generally about fixed some deficient infos in independent variables. And I prepared this independent variables for machine learning algorithm as correctly.

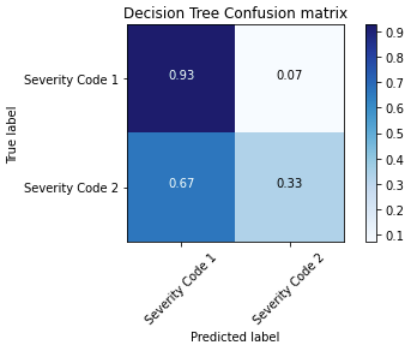
3.2)Data Preparation

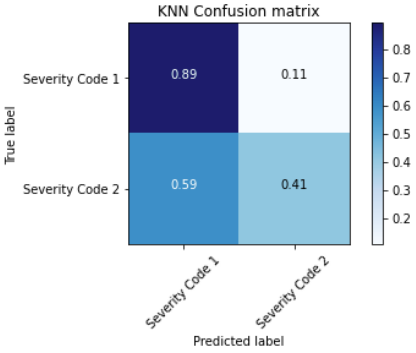
There are some wrongly writing values. For example; “N” that means no and as same meaning “0” is different be written and so I adjust this values for “0” other one is “1”. And then I use that values with dummy variables for machine learning. Then I want to categorize some values in independent variables as “good condition”, “bad condition” and “normal condition”. Sometimes that names be different because of independent variables’s values. I did this adjustemnt because I want prepare independent variable for machine learning algorithms. And then I realised that independr variables in dataset is generally categorical. So I will use machine learning algorithm according to that.

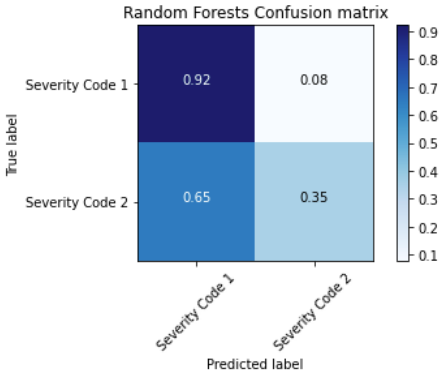


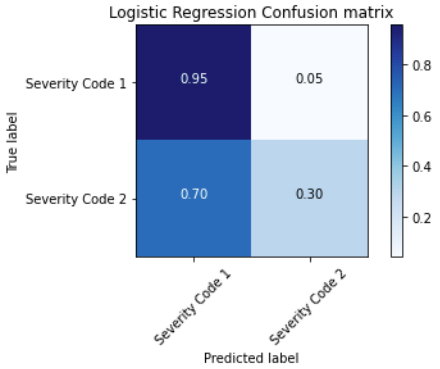
4) METHODOLOGY

There are 4 different model that I used. That models are KNN, Decision Tree, Linear Regression, Random Forests , such as easy implementation, good description and thats are highly interpretable. I explained data understanding and preparation above. And now I am explaining the algorithm which I used for detect which severity is that accident. I used decision tree with dummy variables that I adjust. ex. “LIGHTCOND”, “ROADCOND” etc. thats are dummy variable "STATUS", "ADDRTYPE", "COLLISIONTYPE", "JUNCTIONTYPE", "SDOT_COLCODE", "WEATHER", "ROADCOND", "LIGHTCOND", "UNDERINFL". And concat that with numeric variables and train the algorithm.



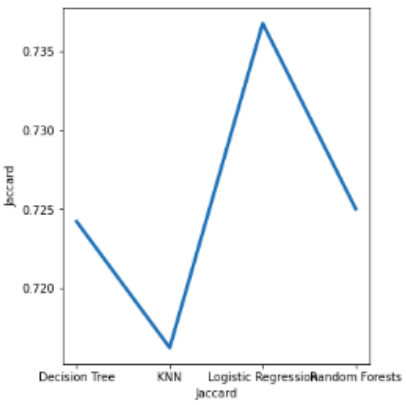


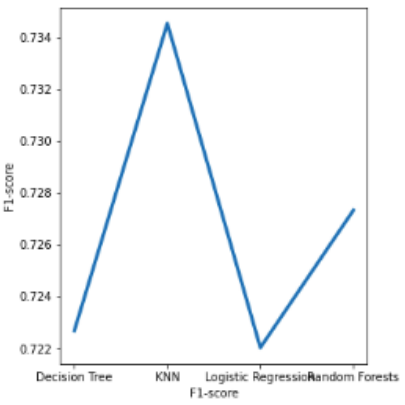


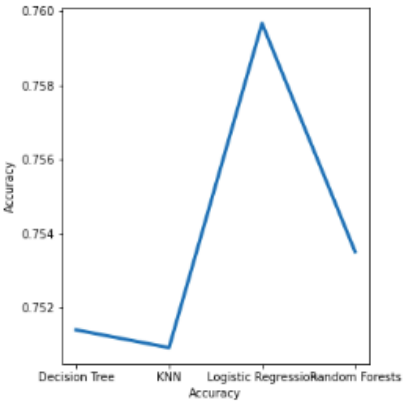


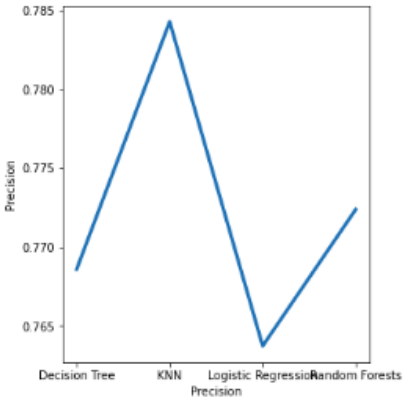
5) RESULTS - CONCLUSIONS

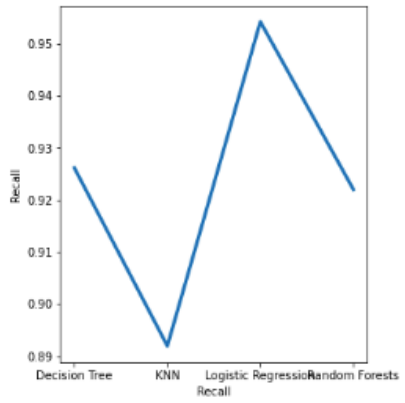
I wonder factors that effect the accident. And done some coding for explain that my wonder. I did some crosstab metods for look values for collisins type and addrtype. I examine correlation between independents variables. I did some visualize for good sense for dataset and how can I explain that. And I did decision tree. I saw the conclusion. This set prediction for ”1” is 84% probability and “2” is 44% probability. Maybe later may do some trimming for improve the probability. Used 4 different model and its results in terms of jaccard similarity, F1 score, accuracy, precision and recall and we can see that values in below that represent graphics.

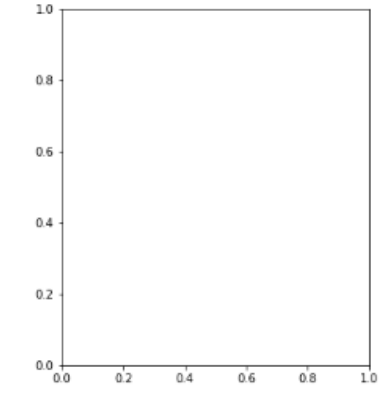

Jaccard
0.735
0.730
0.725
0.720
Decision Tree
KNN
Logistic Regressio
Random Forests
Jaccard


F1-score
0.734
0.732
0.730
0.728
0.726
0.724
0.722
Decision Tree
KNN
Logistic Regressio
Random Forests
F1-score


Accuracy
0.760
0.758
0.756
0.754
0.752
Decision Tree
KNN
Logistic Regressio
Random Forests
Accuracy


Precision
0.785
0.780
0.775
0.770
0.765
Decision Tree
KNN
Logistic Regressio
Random Forests
Precision


Recall
0.95
0.94
0.93
0.92
0.91
0.90
0.89
Decision Tree
KNN
Logistic Regressio
Random Forests
Recall


1.0
0.8
0.6
0.4
0.2
0.0
0.0
0.2
0.4
0.6
0.8
1.0