SEVERITY OF CAR ACCIDENTS

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BACKGROUND

- Car accidents cost millions of lives loss and billions of money loss every year.
- The severity of a car accident is the most important factor in categorizing car accidents
- Determining the severity of a car accident will include the location of the accident, weather conditions, car speeding, road conditions, number of people and vehicles involved in the accident

DATA SET

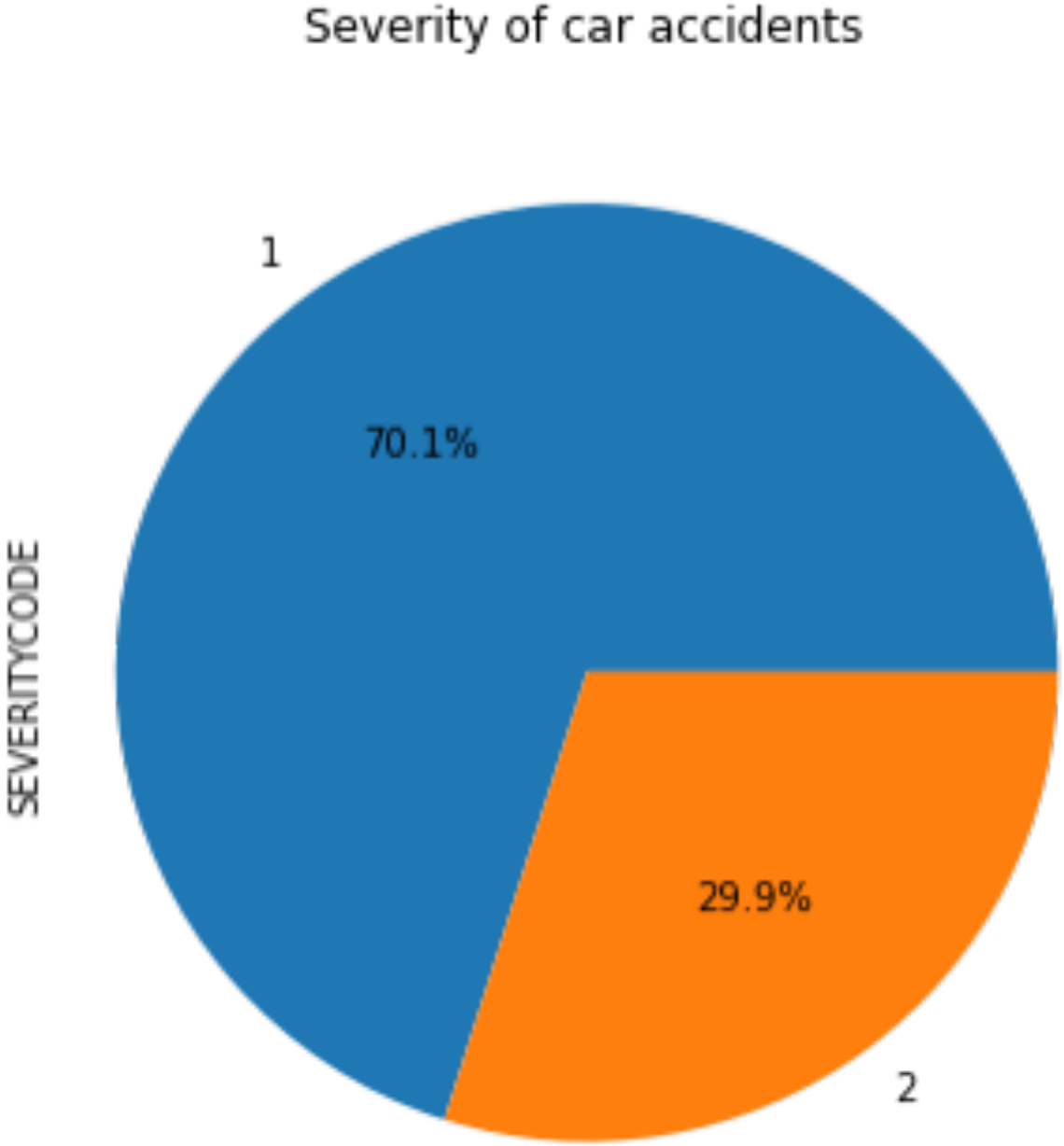
- The data for this project has been provided by the Seattle Police Department and recorded by Traffic Records which has been shared to us via link by Coursera
- A detailed data base of car accidents that happened in Seattle from 2004 till now can be found here.
- There are 194673 observations in the file with a target attribute is the severity of the accident which is categorial variable with only two values, 1 for moderate and 2 for severe

Feature	Meaning
SEVERITYCODE	The severity of the accident
X	The x coordinate of the accident
Y	The y coordinate of the accident
ROADCOND	The condition of the road
WEATHER	The weather condition
JUNCTIONTYPE	The type of the junction where the accident took place
PERSONCOUNT	No of people involved
VEHCOUNT	
INCDATE	Date of the accident
ADDTYPE	The Type of the address (Alley, Block, Intersection)
COLLISIONTYPE	Collision Type

FEATURE SELECTION

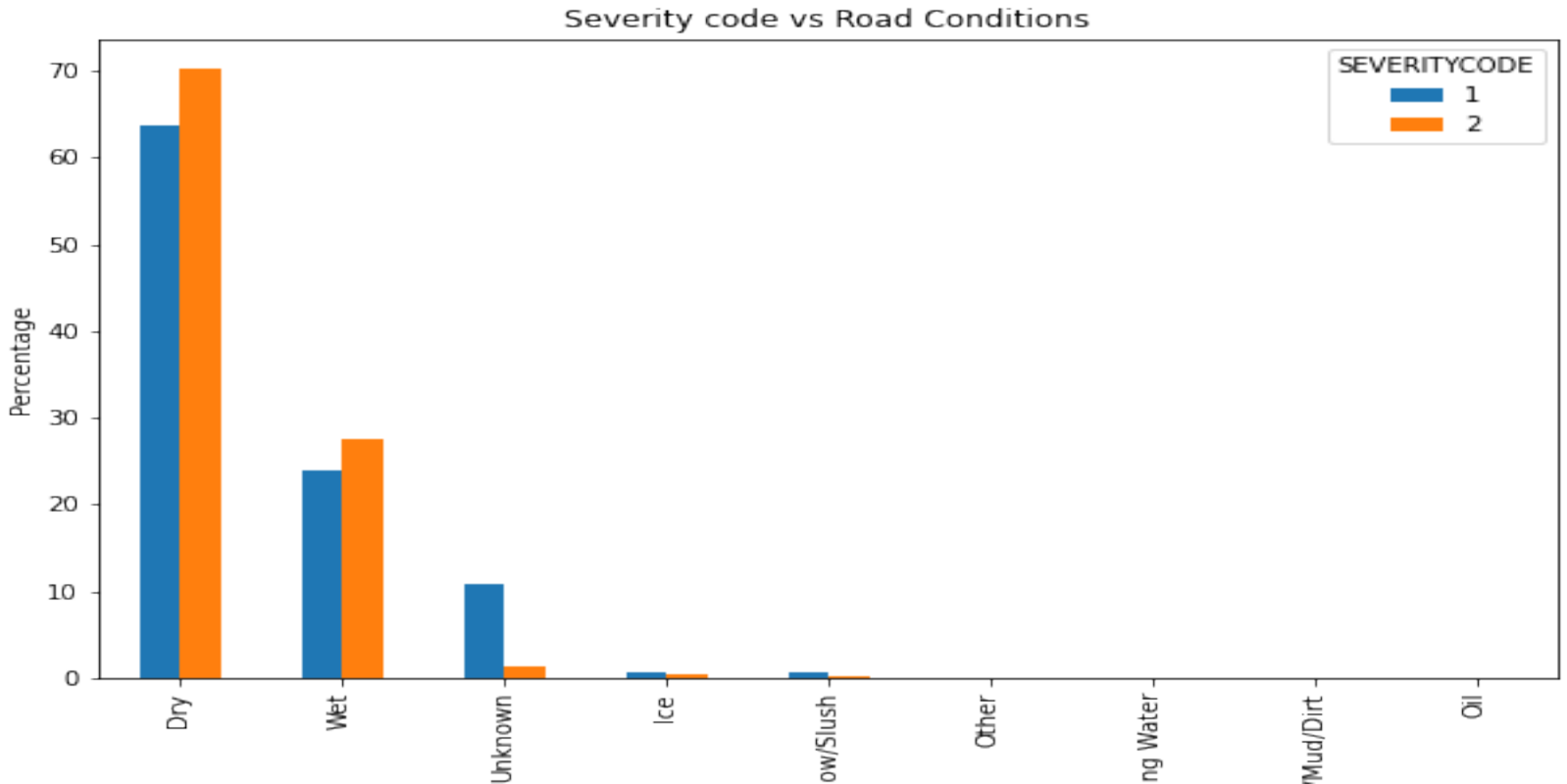
- Target variable is SEVERITYCODE

THE TARGET VARIABLE



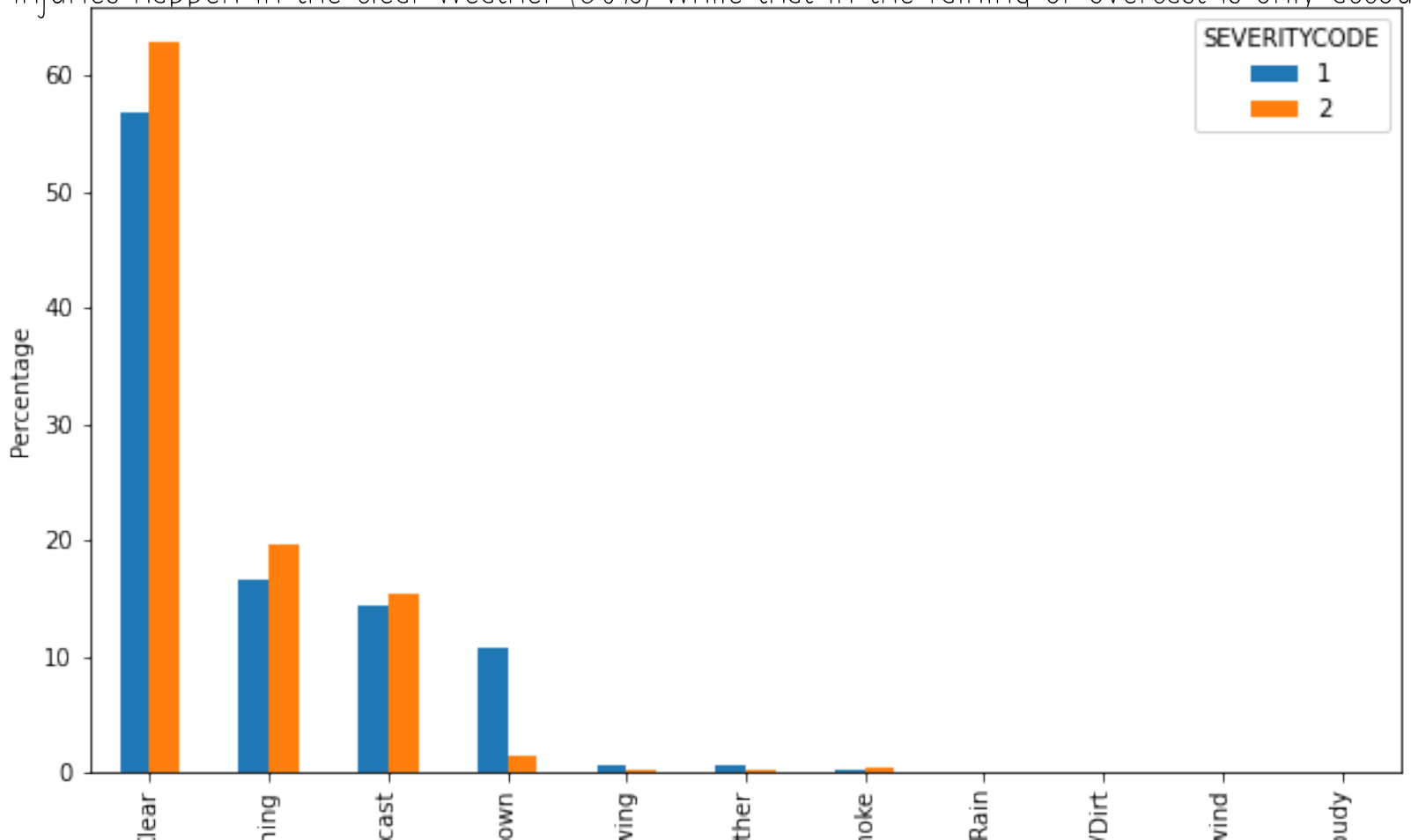
RELATIONSHIP BETWEEN SEVERITY AND ROAD CONDITIONS

- As in Figure below we notice that the most two road conditions with incidents are Wet(30%) and Dry(70%). To some extend, we would expect more sever injuries associated with the wet road conditions.



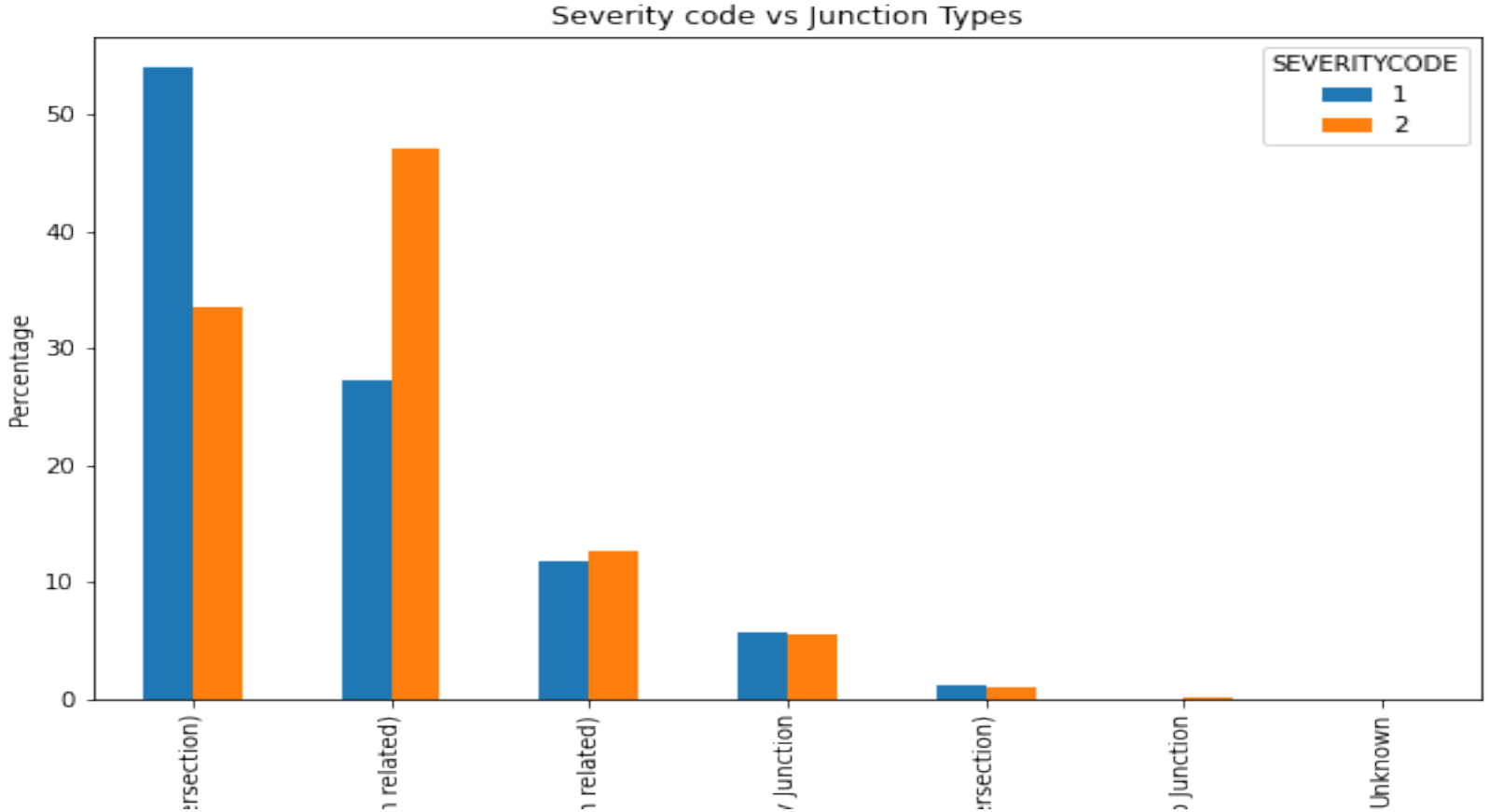
RELATIONSHIP BETWEEN SEVERITY AND WEATHER CONDITIONS

- The sever injuries happen in the clear weather (60%) while that in the raining or overcast is only accountable for 40%.



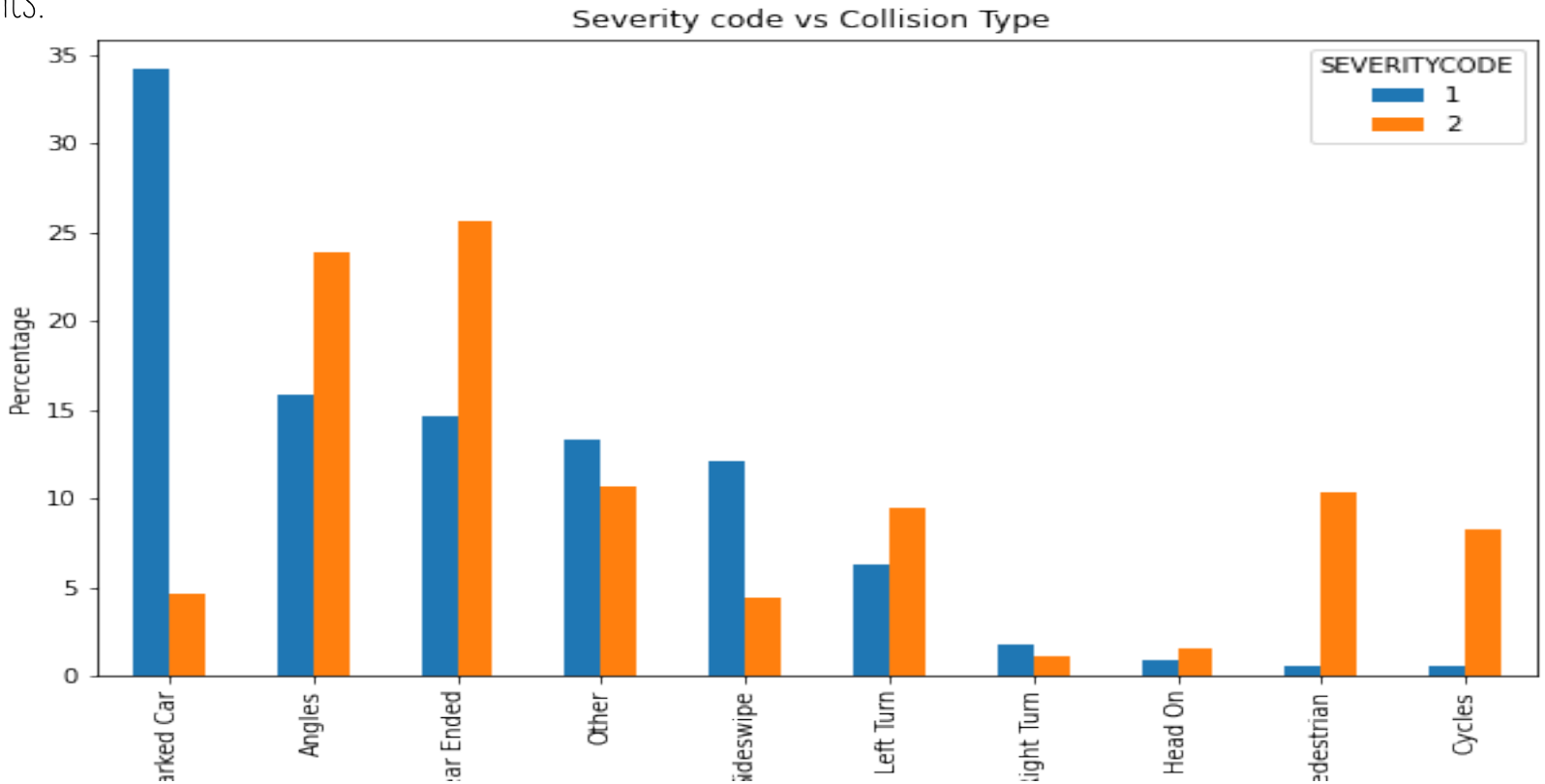
RELATIONSHIP BETWEEN SEVERITY AND JUNCTION TYPES

- The severe injuries occur in intersection and intersection related junction or in the driveway



RELATIONSHIP BETWEEN SEVERITY AND COLLISION TYPE

- Accidents involve pedestrians and bicyclists result in severe injuries. In addition, rear-end and angles accidents are also sever accidents.



PREDICATED MODELS

- Data were split into 80% training dataset and 20% testing dataset
- 3 main models were built and trained using the data set with the attribute mentioned the previous slides, namely K-nearest neighbor, decision tree, and logistic regression.
- 3 metrics were calculated for each model (F1-score, Jaccord, and LogLoss)

ACCURACY OF THE ML MODELS

Algorithm	Jaccard	F1-score	LogLoss
KNN	0.744266	0.69749	NA
Decision Tree	0.752459	0.689341	NA
SVM	NA	NA	NA
LogisticRegression	0.702941	0.585244	0.589575

RESULTS

- Severity of an accident depends mainly on wet road conditions.
- Severity of an accident depends on rainy and overcast weather condition the most and happens in the intersections related road.
- If an accident happened in the rear part of the car, the severity of the injury is most likely to happen
- The built model can predict the severity of an accident given the factors of the road condition, weather condition, junction type, collision type