Introduction

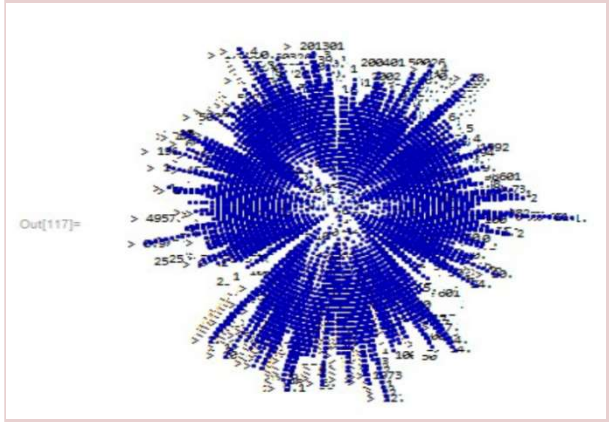
- **Worked on Tornado (1950-2015) dataset.**
- It contains data with two different measures
  - Fujita scale (1950 to 1995)
  - Enhanced Fujita Scale(1995-2015)
- **The goal is to predict the magnitude of the Tornado based on the F-scale rating**
- **Major points in Data pre-processing**
  - Performed interpolation to fill the missing cells.
  - Combined Property Loss and Crop Loss as Total Loss.
  - Combined Injuries and Fatalities as Human Loss.
  - Modified each column such that they have same format.
- **Algorithms applied**
  - Decision Tree
  - Neural network
  - Naïve Bayes

Algorithms

DECISION TREE	NEURAL NETWORK	NAÏVE BAYES
• Decision trees are one of the major Machine Learning algorithms utilized to classify the data based on flow-chart like structure. • Utilized AVCDecisionTree to implement the classification on the dataset. • The algorithm forms nodes with each label at every level and makes a decision in that stage.	• Neural networks are the algorithms inspired from the biological system. • They learn about the things in layers. • At each node, it utilizes threshold value to move to the next layer of learning • We utilized the method “Neural Networks” available in the Classify function to apply on the training dataset.	• Naïve Bayes is one of the basic algorithm useful for multi-class classification. • It utilizes conditional probability to decide the class of the data. • Naïve Bayes classifiers are highly scalable. • It utilizes the property “Maximum-Likelihood” to decide the class of newly arrived data. • It was chosen as it has very less chances of overfitting.

Evaluations

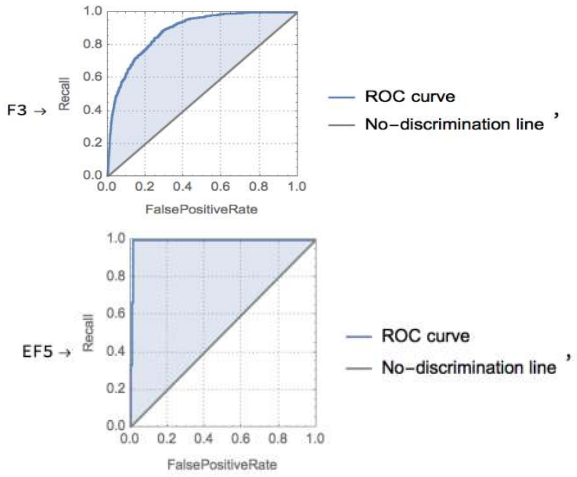
DECISION TREE



{"EF0",Precision}:0.700909
{"EF0“,Recall}:0.299091
{"F3“,Precision}:0.215164
{"F3",Recall}:0.784836

Accuracy Achieved = 54.4838%

NEURAL NETWORK

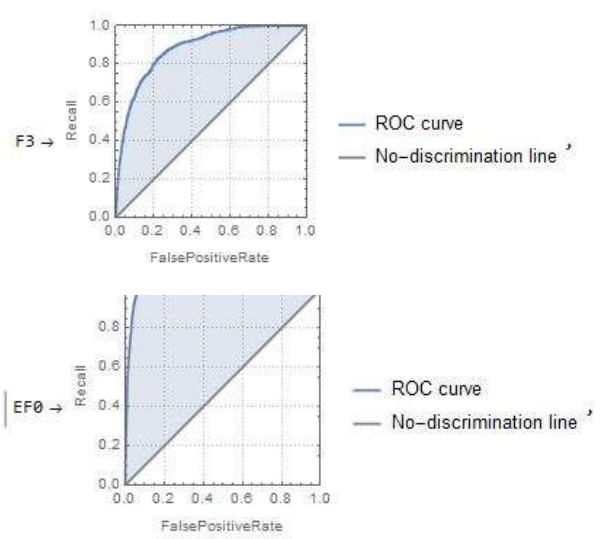



```
In[48]:= ClassifierMeasurements[classifier2, testing, "Precision"]
Out[48]= ⟨| EF0 → 0.710912, EF1 → 0.512821, EF2 → 0.405405,
  EF3 → 0.454545, EF4 → Indeterminate, EF5 → Indeterminate, F0 → 0.632327,
  F1 → 0.472322, F2 → 0.396396, F3 → 0.402817, F4 → 0.574468, F5 → 0. |⟩

In[54]:= ClassifierMeasurements[classifier2, testing, "Recall"]
Out[54]= ⟨| EF0 → 0.793636, EF1 → 0.46729, EF2 → 0.322581, EF3 → 0.333333, EF4 → 0., EF5 → 0.,
  F0 → 0.779132, F1 → 0.413773, F2 → 0.301934, F3 → 0.293033, F4 → 0.203008, F5 → 0. |⟩
```

Accuracy = 56.0764%

NAÏVE BAYES




```
ClassifierMeasurements[NBclassifier, testing, "Precision"]
⟨| EF0 → 0.721943, EF1 → 0.509402, EF2 → 0.343558, EF3 → 0.346939, EF4 → 0.294118, EF5 → 0.4,
  F0 → 0.700467, F1 → 0.480979, F2 → 0.365227, F3 → 0.376093, F4 → 0.314516, F5 → 0.0638298 |⟩

ClassifierMeasurements[NBclassifier, testing, "Recall"]
⟨| EF0 → 0.783636, EF1 → 0.464174, EF2 → 0.301075, EF3 → 0.283333, EF4 → 0.357143, EF5 → 0.666667,
  F0 → 0.697829, F1 → 0.468006, F2 → 0.416719, F3 → 0.264344, F4 → 0.293233, F5 → 0.1875 |⟩
```

Accuracy = 56%