MACHINE LEARNING MODEL

COMPARISON BASED ON SOME METRICS

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I. SUPPORT VECTOR MACHINE

Kernels = linear, poly, rbf, sigmoid

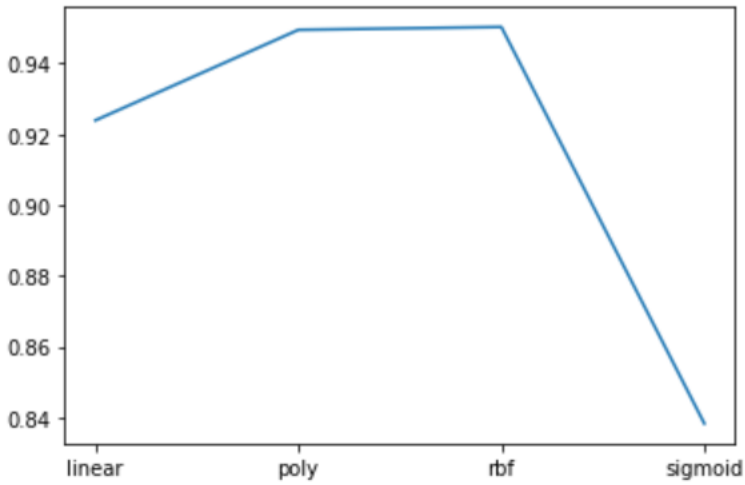
C = 1, 2, 3, 4, 5

Degree = 1, 2, 3, 4, 5, 6

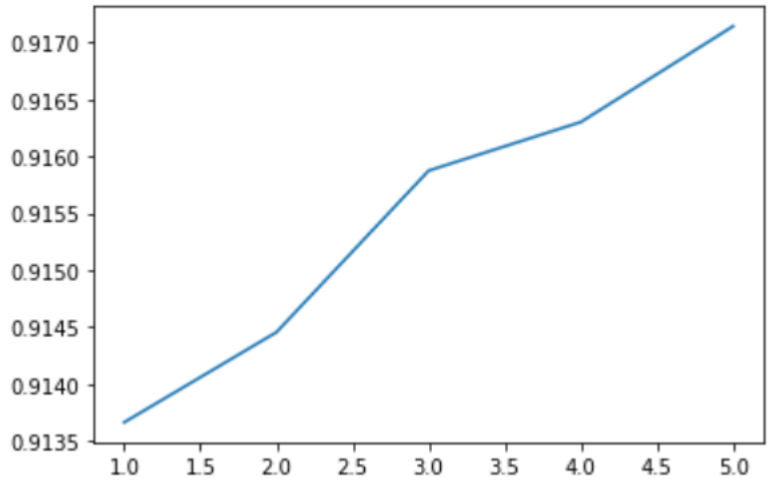
Gamma = scale, auto

Decision function shape = ovo, ovr

Kernel vs Accuracy



C vs Accuracy



II. LINEAR SUPPORT VECTOR MACHINE

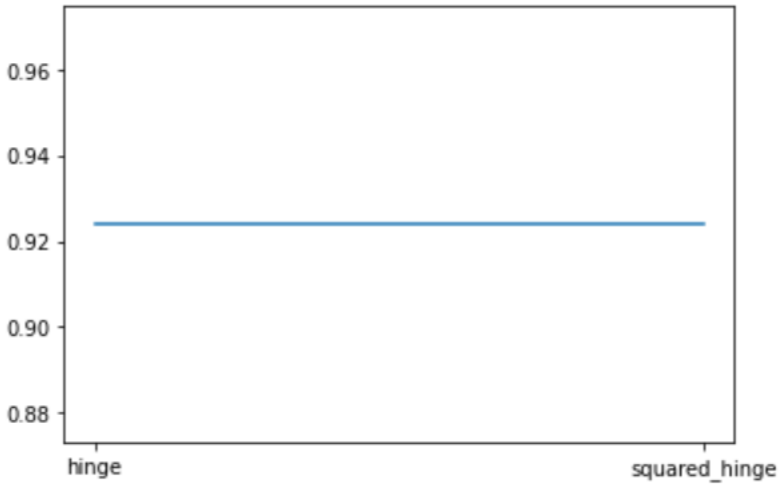
Losses = hinge, squared hinge

Penalty = l2

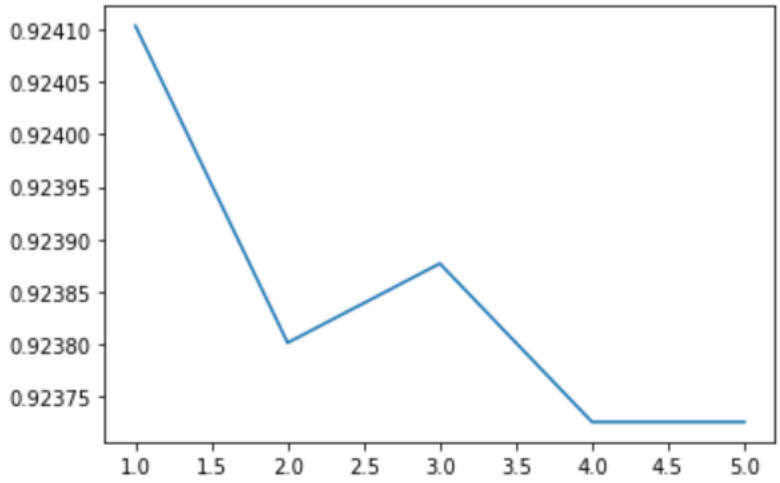
C = 1, 2, 3, 4, 5

Multi Class = ovr, crammer singer

Loss vs Accuracy



C vs Accuracy



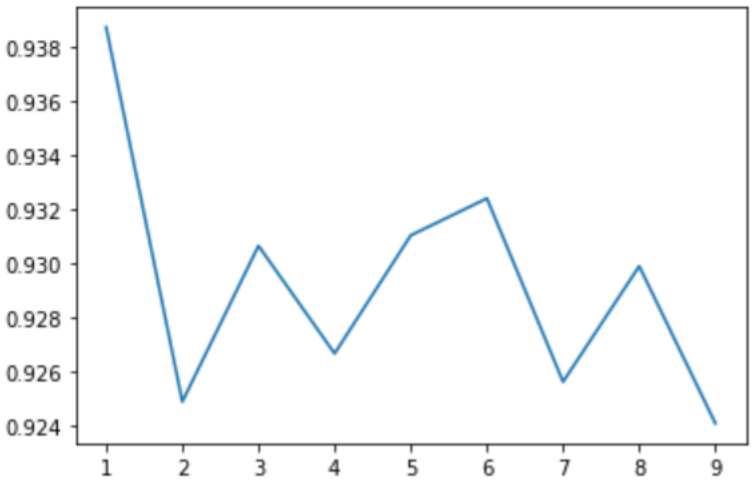
III. K – NEAREST NEIGHBORS

K = 1,2,3,4,5,6,7,8,9,10

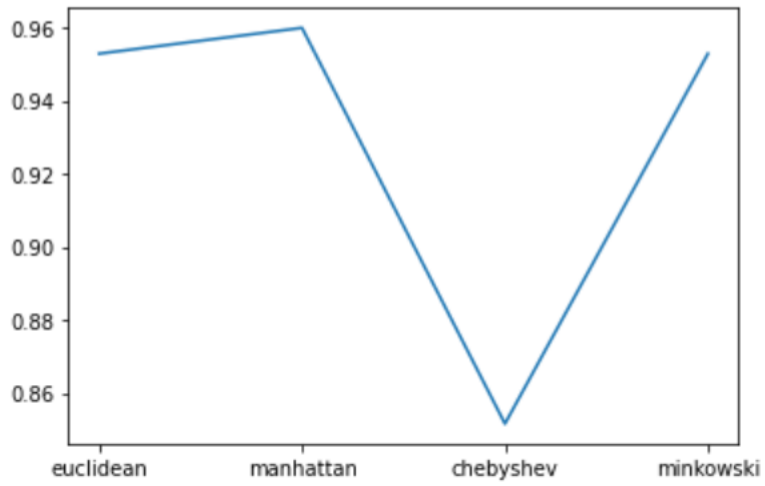
Weights = uniform, distance

Metric = euclidean, manhattan, chebyshev, minkowski

K vs Accuracy



Mertic vs Accuracy



VI. BERNOULLI NAIVE BAYES CLASSIFIER

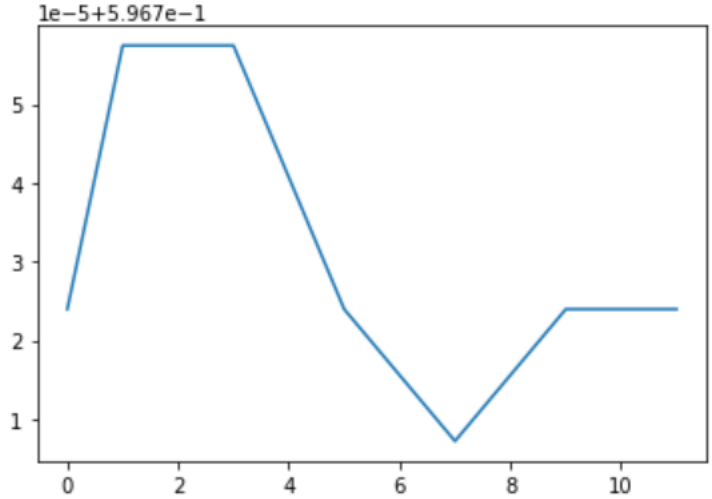
Bernoulli Naive Bayes Classifier:

Alpha = 0, 1, 2, 3, 4, 5, 7, 9, 11

Binarize = 0, 1, 2, 3, 4, 5, 7, 9, 11

Fit prior = True, False

Alpha vs Accuracy



VII. RANDOM FOREST CLASSIFIER

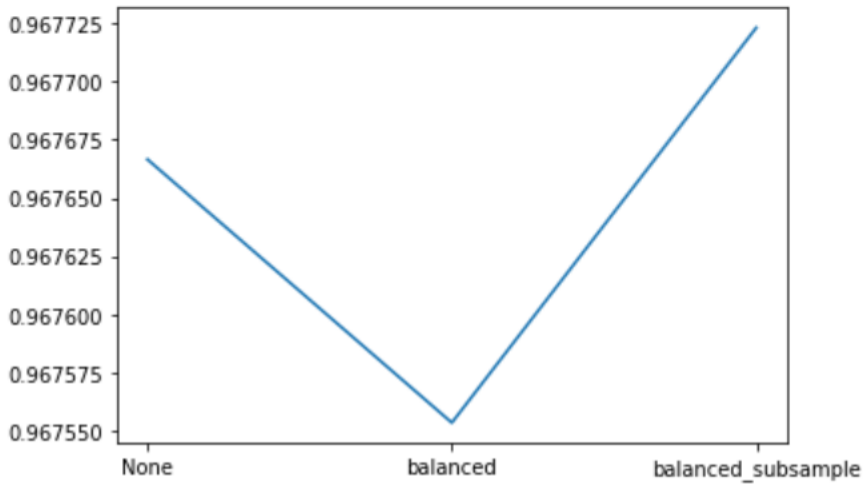
Max features = None, auto, sqrt, log2

Criterion = gini, entropy

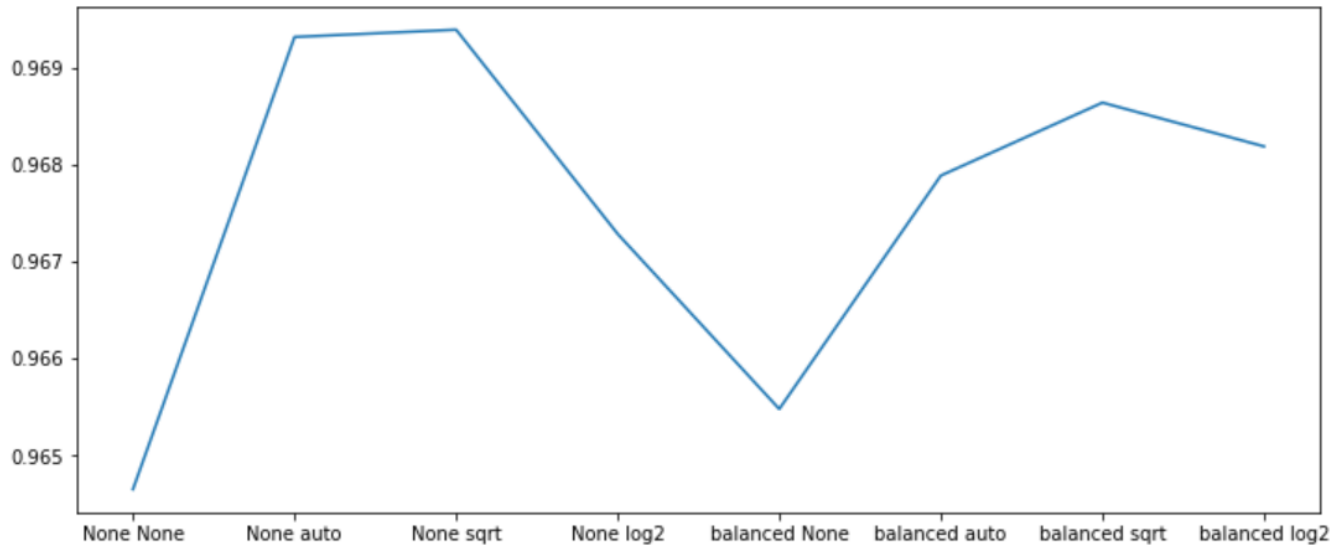
Class_weight = None, balanced, balanced_subsample

Warm start = True, False

Class Weight vs Accuracy



(Max Features + Class Weight) vs Accuracy



VIII. DEEP LEARNING WITH TENSORFLOW

Optimizers = 'sgd', 'rmsprop', 'adam', 'adadelta', 'adagrad', 'adamax', 'nadam', 'ftrl'

Loss = 'binary_crossentropy', 'categorical_crossentropy', 'hinge', 'squared_hinge', 'huber'

Activation = 'softplus', 'softsign', 'selu', 'elu', 'exponential', 'tanh', 'sigmoid', 'relu'

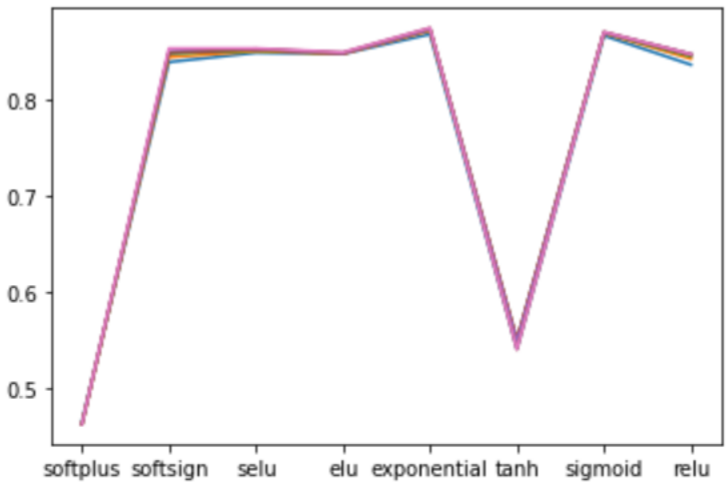
A. Results of the Deep Network:

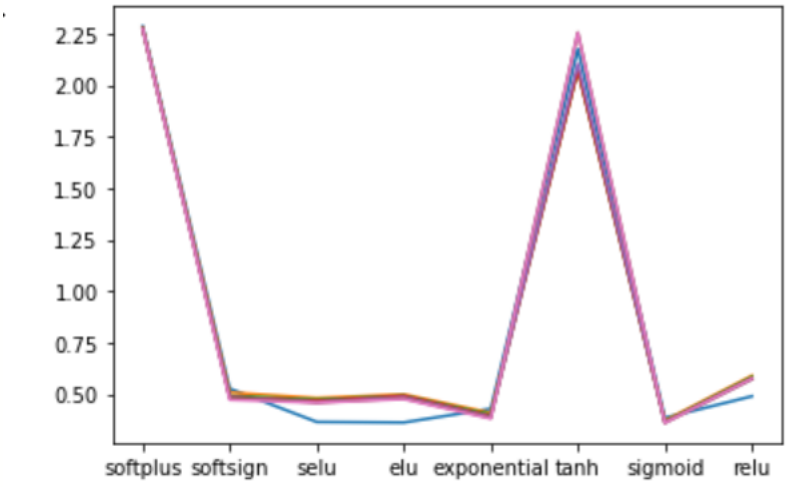
Input Layer: Dense (64, kernel_regularizer=l2, activation = relu, input_shape = (30,2))

Deep Layers: Dense (128, kernel_regularizer=l2, activation = relu), Dense (128, kernel_regularizer=l2, activation = relu), Dense (128, kernel_regularizer=l2, activation = relu), Dense (256, kernel_regularizer=l2, activation = relu),

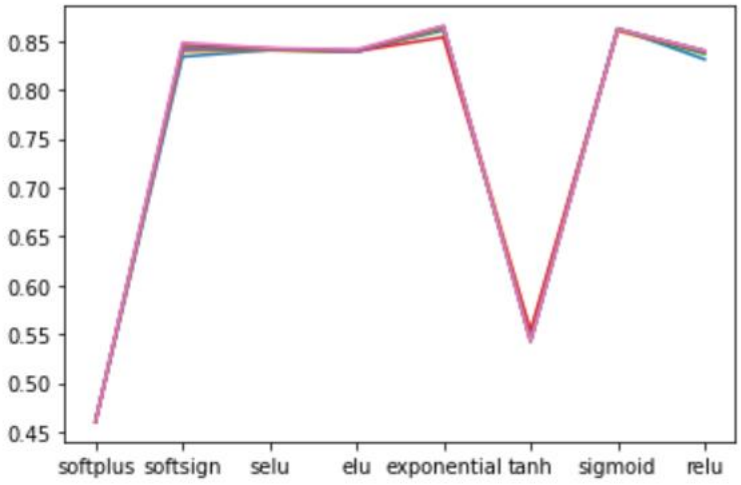
Output Layer: Dense (1, activation=softplus)

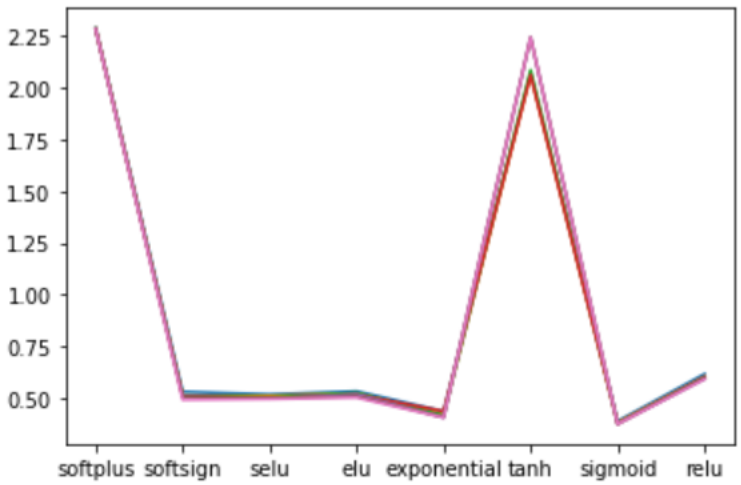
B. Validation Accuracy and Losses:





C. Validation Accuracy and Losses:





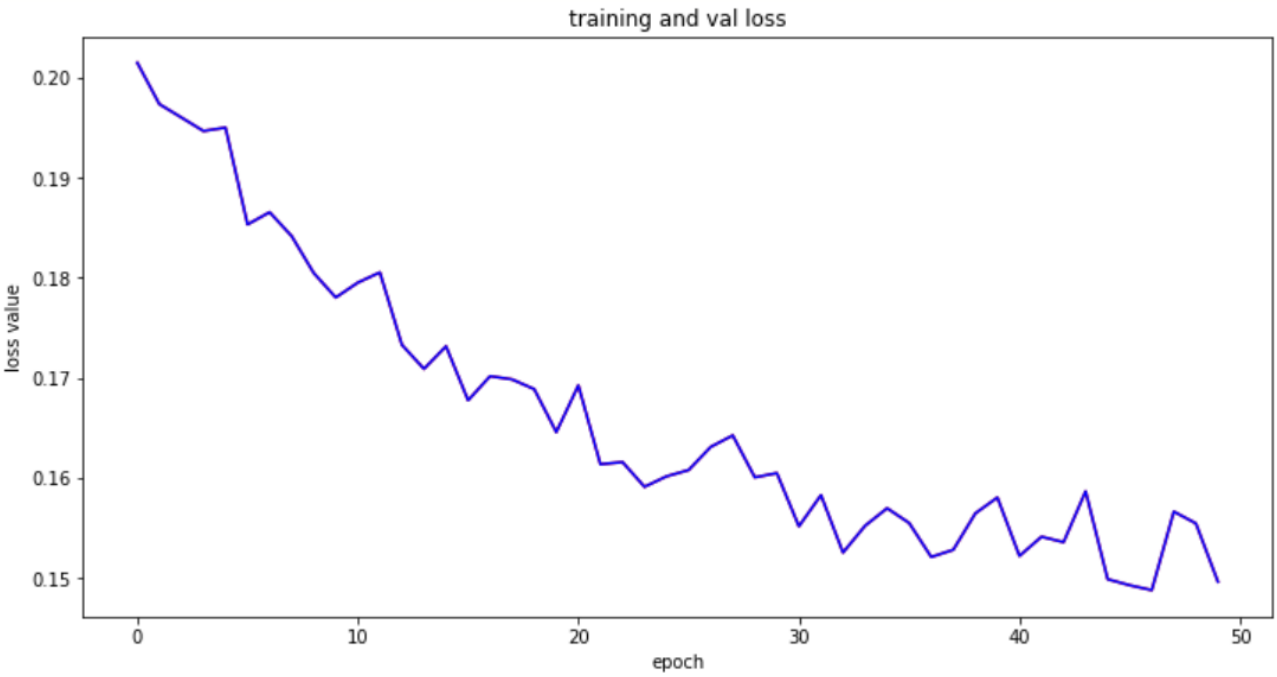
IX. CONVOLUTIONAL NEURAL NETWORKS

```
keras.layers.Conv2D(32,(1,1), activation='relu',input_shape=(2,5,3))

keras.layers.MaxPool2D(2,2)

keras.layers.Conv2D(64,(1,1),activation='relu')

keras.layers.Conv2D(128,(1,1),activation='relu')

keras.layers.Conv2D(128,(1,1),activation='relu')

keras.layers.Flatten()

keras.layers.Dense(512,activation='relu')

keras.layers.Dense(1,activation='sigmoid')
```

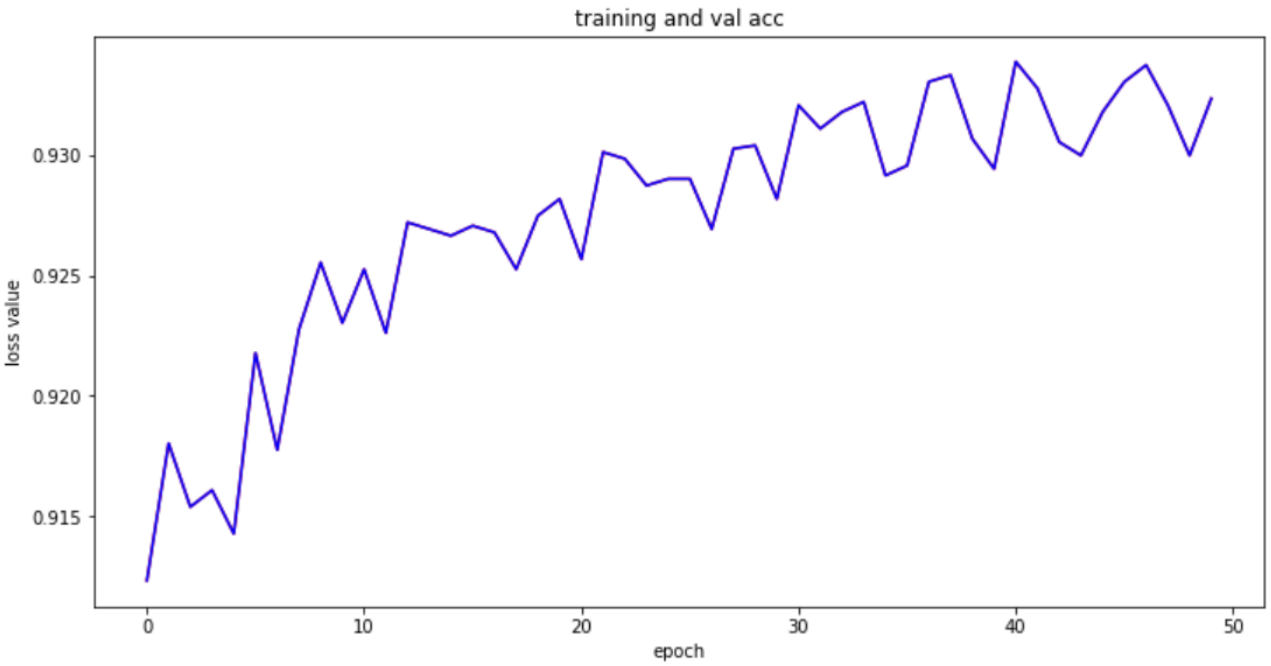
Best Accuracy = 83.89%

Average Accuracy = 83.40%

A. Loss:



B. Accuracy:



C. Adaboost Classifier:

N_estimators = 1000

Accuracy = 94.26%

D. Ensemble Learning:

Stacking Classifier

Parameters

Estimators = RandomForestClassifier(), LinearSVC()

Final Estimator = KNNClassifier()

Accuracy = 96.16%

E. Class Distribution Visualization: