random forest train on spindle non spindle spectrograms

January 9, 2018

```
In [1]: from mne.decoding import Vectorizer
        import os
        import pickle
        from sklearn.model_selection import StratifiedKFold
        from sklearn.ensemble import RandomForestClassifier
        from sklearn.pipeline import Pipeline
        import numpy as np
        from sklearn import metrics
        from keras.utils import np_utils
        import matplotlib.pyplot as plt
        %matplotlib inline
```

```
Using TensorFlow backend.
```

```
In [2]: os.chdir('/media/ning/UBUNTU 17_0/neural net')
```

```
In [3]: X_validation,y_validation = pickle.load(open('data/validation/validation.p','rb'))
```

X_train,y_train = [],[] for ii in range(10): X_train_,y_train_ = pickle.load(open('data/train/train%d.p'%(ii),'rb')) X_train.append(X_train_) y_train.append(y_train_) del X_train_,y_train_ X_train = np.concatenate(X_train,axis=0) y_train = np.concatenate(y_train,axis=0)

```
In [4]: def make_clf():
            clf = []
            clf.append(('vectorizer',Vectorizer()))
            clf.append(('estimator',RandomForestClassifier(n_estimators=50,max_depth=50,random_
            clf = Pipeline(clf)
            return clf
```

```
In [13]: clf = make_clf()
         for ii in range(10):
             X_train_,y_train_ = pickle.load(open('data/train/train%d.p'%(ii),'rb'))
             random_inputs = np.random.rand(X_train_.shape[0],32,16,192)
             random_labels = [0]*X_train_.shape[0]
             random_labels = np_utils.to_categorical(random_labels,2)
             X_train_ = np.concatenate([X_train_,random_inputs],axis=0)
```

```
            y_train_ = np.concatenate([y_train_,random_labels],axis=0)
            clf.fit(X_train_,y_train_)
            pred_ = clf.predict(X_validation)
            print(metrics.classification_report(y_validation,pred_))
            plt.figure()
            plt.hist(clf.predict_proba(random_inputs)[0][:,-1])
```

```
             precision    recall  f1-score   support

          0       0.80      0.84      0.82       614
          1       0.85      0.76      0.80       599

avg / total       0.82      0.80      0.81      1213
```

```
             precision    recall  f1-score   support

          0       0.76      0.90      0.83       614
          1       0.89      0.67      0.77       599

avg / total       0.83      0.79      0.80      1213
```

```
             precision    recall  f1-score   support

          0       0.77      0.88      0.82       614
          1       0.88      0.71      0.78       599

avg / total       0.82      0.80      0.80      1213
```

```
             precision    recall  f1-score   support

          0       0.81      0.84      0.82       614
          1       0.84      0.77      0.80       599

avg / total       0.82      0.80      0.81      1213
```

```
             precision    recall  f1-score   support

          0       0.80      0.84      0.82       614
          1       0.83      0.76      0.80       599

avg / total       0.82      0.80      0.81      1213
```

```
             precision    recall  f1-score   support

          0       0.77      0.88      0.82       614
          1       0.87      0.69      0.77       599

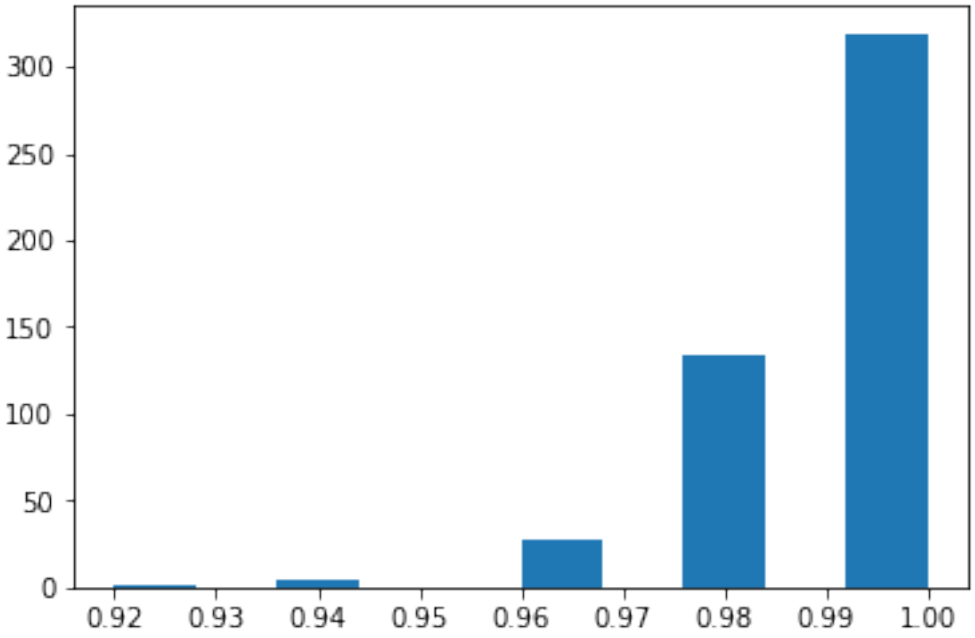
avg / total       0.82      0.79      0.80      1213
```

	precision	recall	f1-score	support
0	0.79	0.84	0.82	614
1	0.84	0.75	0.79	599
avg / total	0.82	0.80	0.80	1213

	precision	recall	f1-score	support
0	0.77	0.89	0.82	614
1	0.87	0.69	0.77	599
avg / total	0.82	0.79	0.80	1213

	precision	recall	f1-score	support
0	0.78	0.86	0.82	614
1	0.86	0.71	0.78	599
avg / total	0.82	0.79	0.80	1213

	precision	recall	f1-score	support
0	0.80	0.85	0.82	614
1	0.85	0.76	0.80	599
avg / total	0.83	0.80	0.81	1213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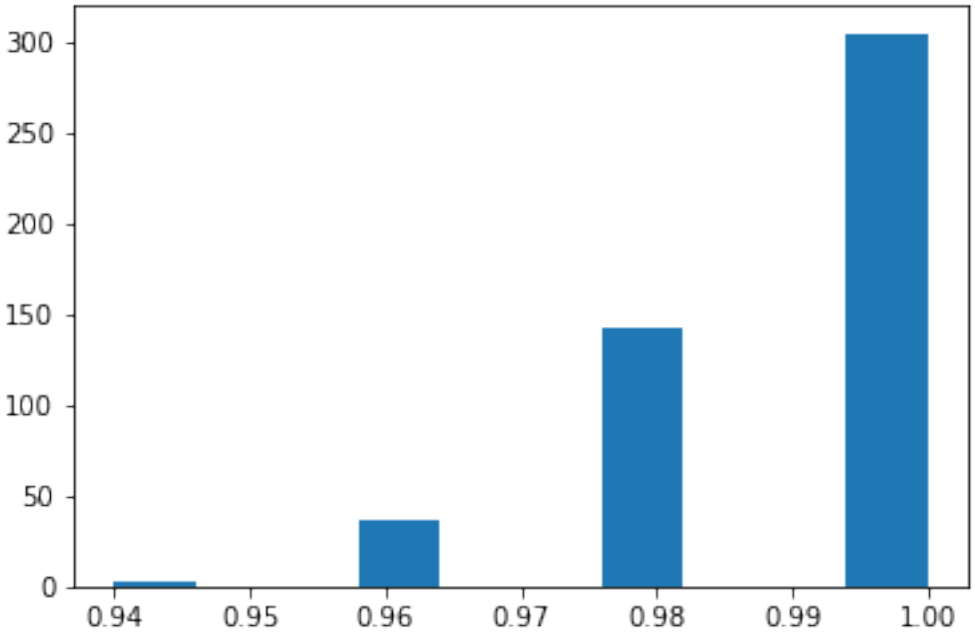
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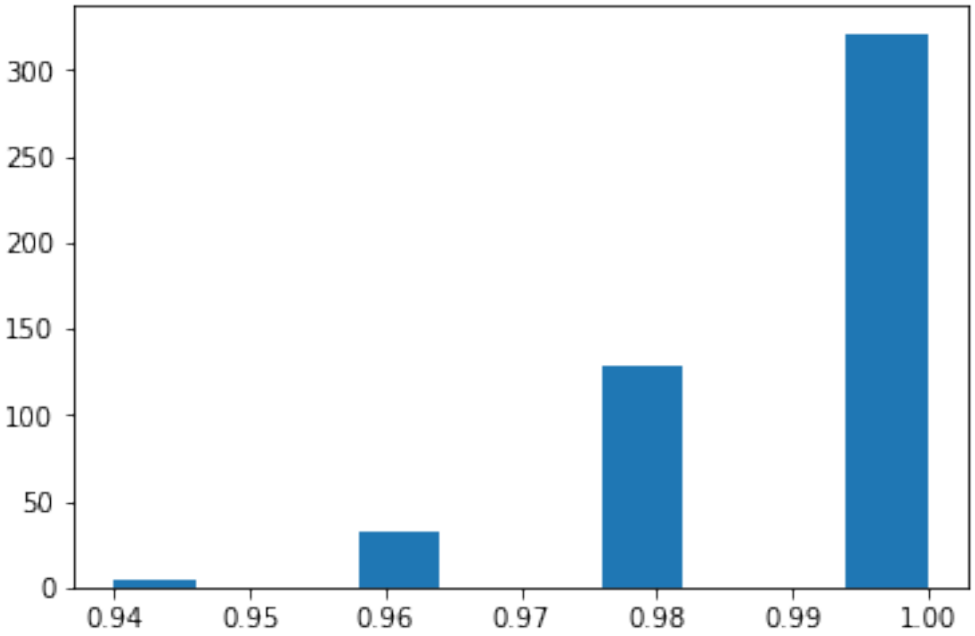
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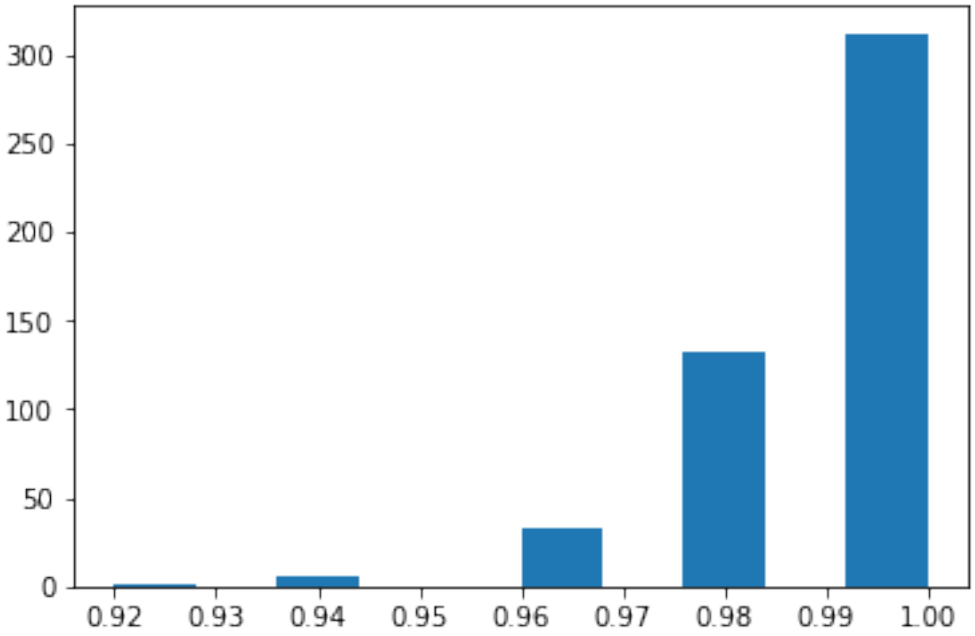
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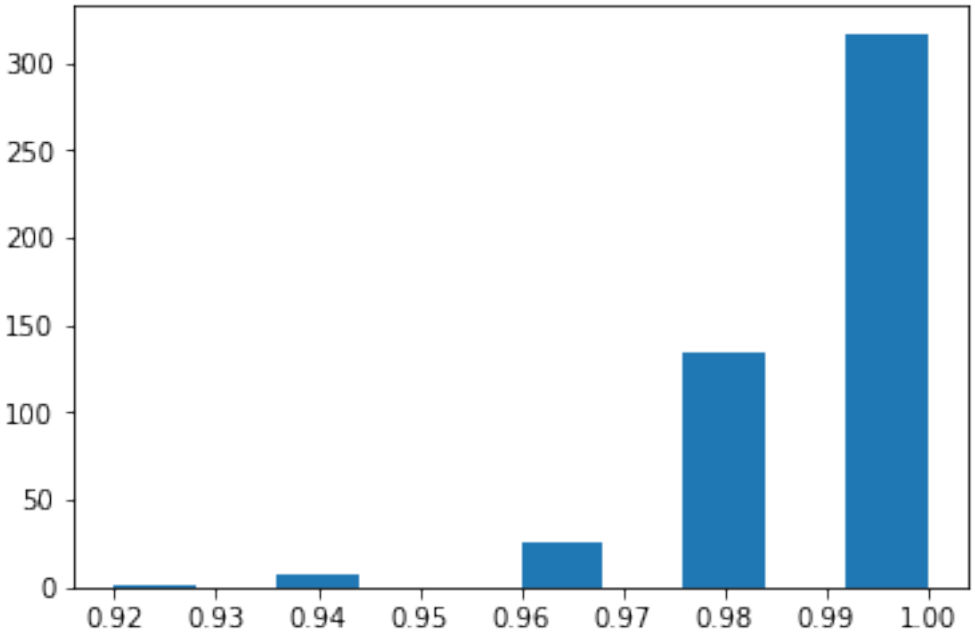
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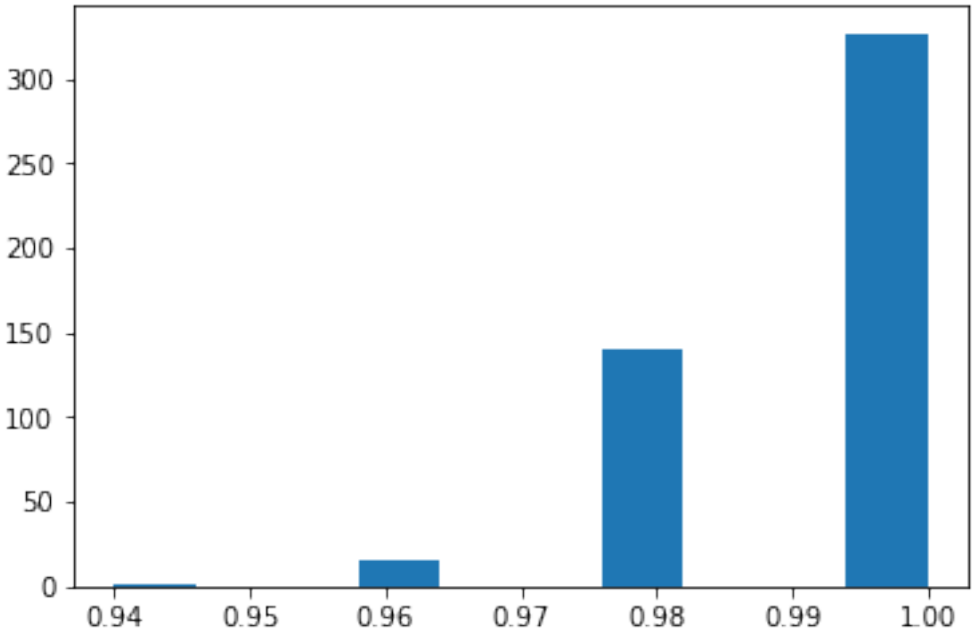
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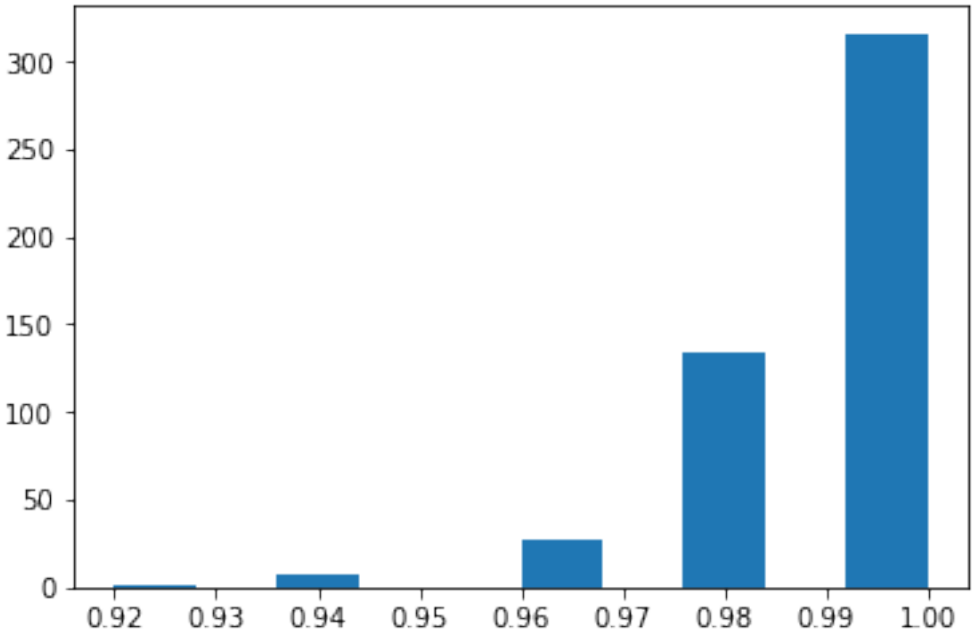
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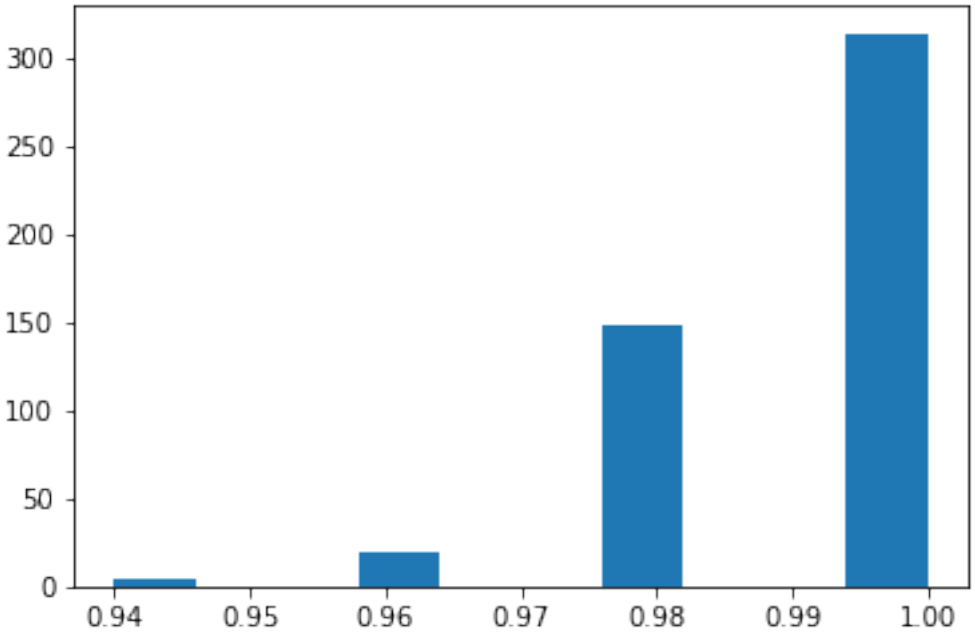
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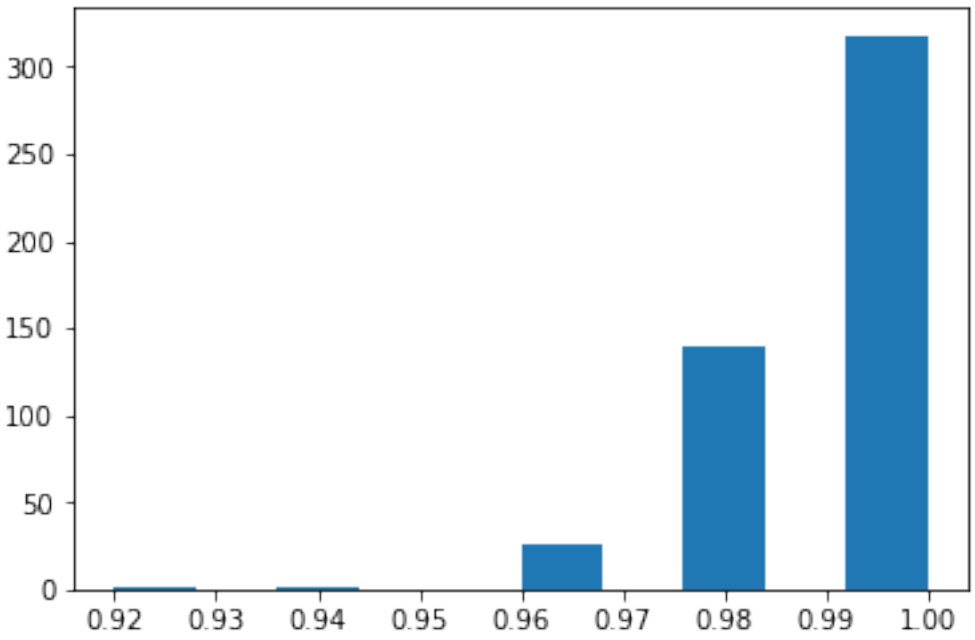

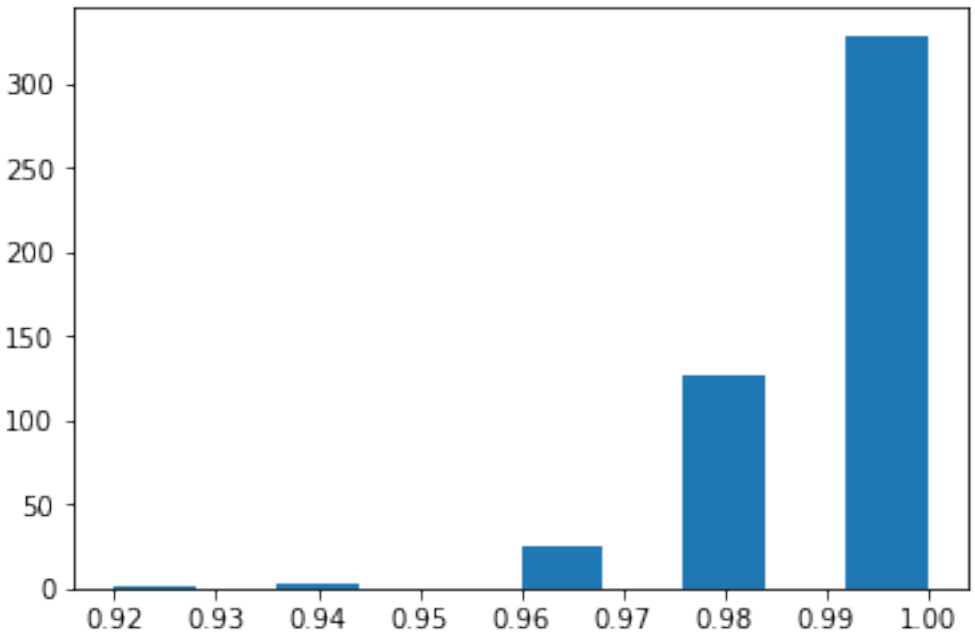


```
In [14]: clf = make_clf()
         for ii in range(10):
             X_train_,y_train_ = pickle.load(open('data/train/train%d.p'%(ii),'rb'))
```

```
random_inputs = np.random.rand(X_train_.shape[0],32,16,192)
#random_labels = [0]*X_train_.shape[0]
#random_labels = np_utils.to_categorical(random_labels,2)
#X_train_ = np.concatenate([X_train_,random_inputs],axis=0)
#y_train_ = np.concatenate([y_train_,random_labels],axis=0)
clf.fit(X_train_,y_train_)
pred_ = clf.predict(X_validation)
print(metrics.classification_report(y_validation,pred_))
plt.figure()
plt.hist(clf.predict_proba(random_inputs)[0][:,-1])
```

```
             precision    recall  f1-score   support

          0       0.89      0.73      0.80       614
          1       0.78      0.89      0.83       599

avg / total       0.83      0.81      0.82      1213

             precision    recall  f1-score   support

          0       0.83      0.82      0.83       614
          1       0.83      0.82      0.82       599

avg / total       0.83      0.82      0.83      1213

             precision    recall  f1-score   support

          0       0.85      0.82      0.84       614
          1       0.84      0.85      0.84       599

avg / total       0.84      0.83      0.84      1213

             precision    recall  f1-score   support

          0       0.88      0.78      0.83       614
          1       0.81      0.88      0.84       599

avg / total       0.85      0.83      0.83      1213

             precision    recall  f1-score   support

          0       0.89      0.77      0.82       614
          1       0.80      0.87      0.84       599

avg / total       0.85      0.82      0.83      1213

             precision    recall  f1-score   support
```

```
          0       0.86      0.78      0.82       614
          1       0.81      0.86      0.83       599

avg / total       0.84      0.82      0.83      1213

             precision    recall  f1-score   support

          0       0.89      0.76      0.82       614
          1       0.80      0.88      0.84       599

avg / total       0.85      0.82      0.83      1213

             precision    recall  f1-score   support

          0       0.87      0.80      0.83       614
          1       0.82      0.86      0.84       599

avg / total       0.85      0.83      0.84      1213

             precision    recall  f1-score   support

          0       0.87      0.79      0.83       614
          1       0.81      0.85      0.83       599

avg / total       0.84      0.82      0.83      1213

             precision    recall  f1-score   support

          0       0.88      0.77      0.82       614
          1       0.81      0.88      0.84       599

avg / total       0.84      0.82      0.83      1213
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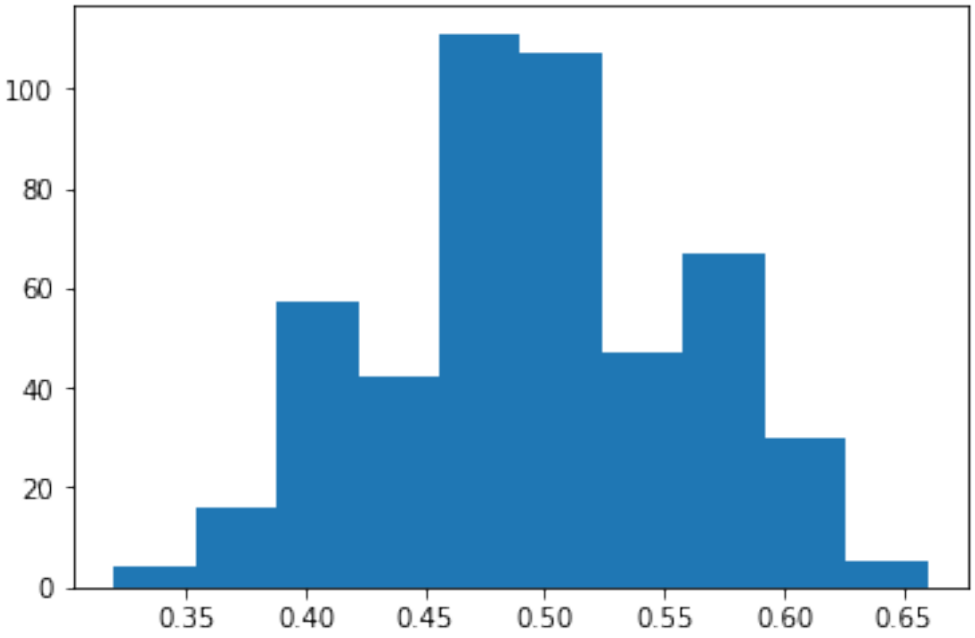
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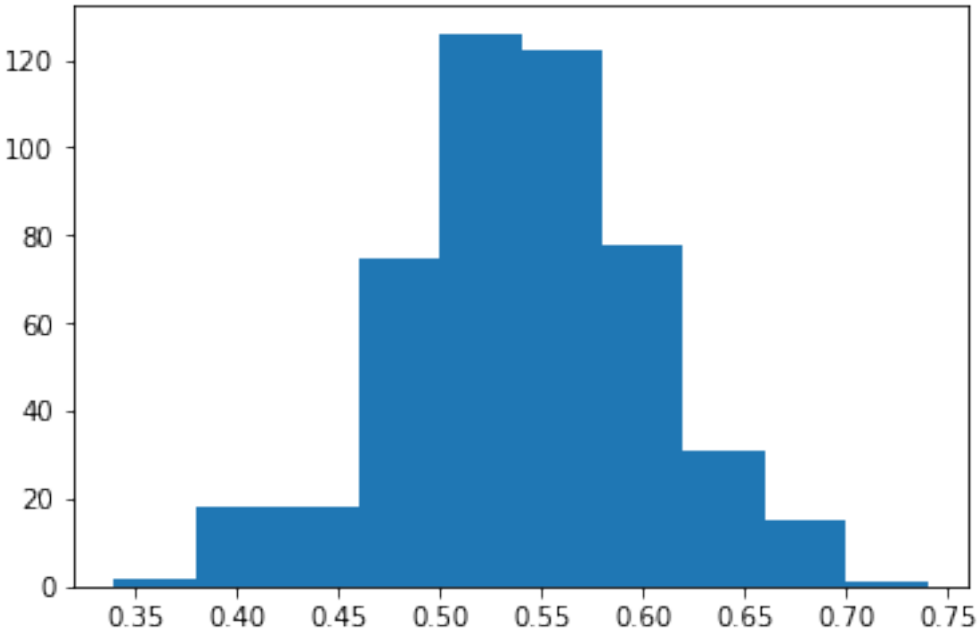
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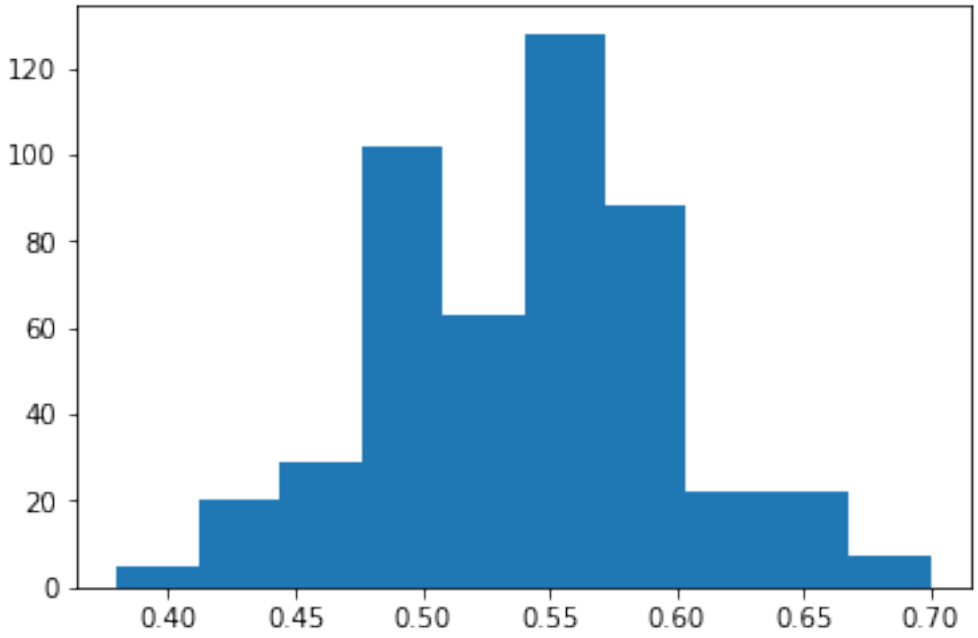
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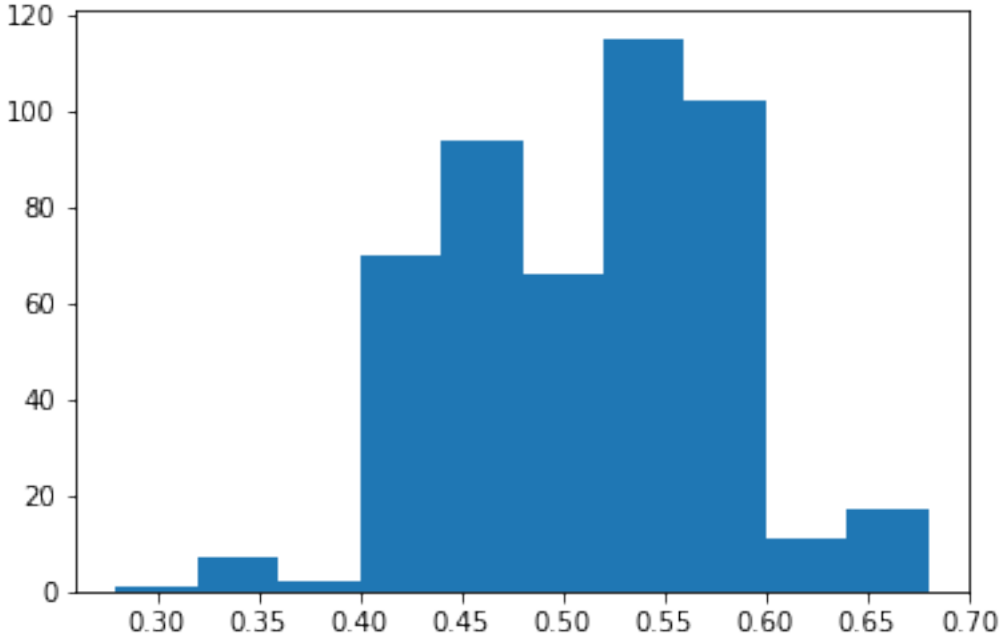
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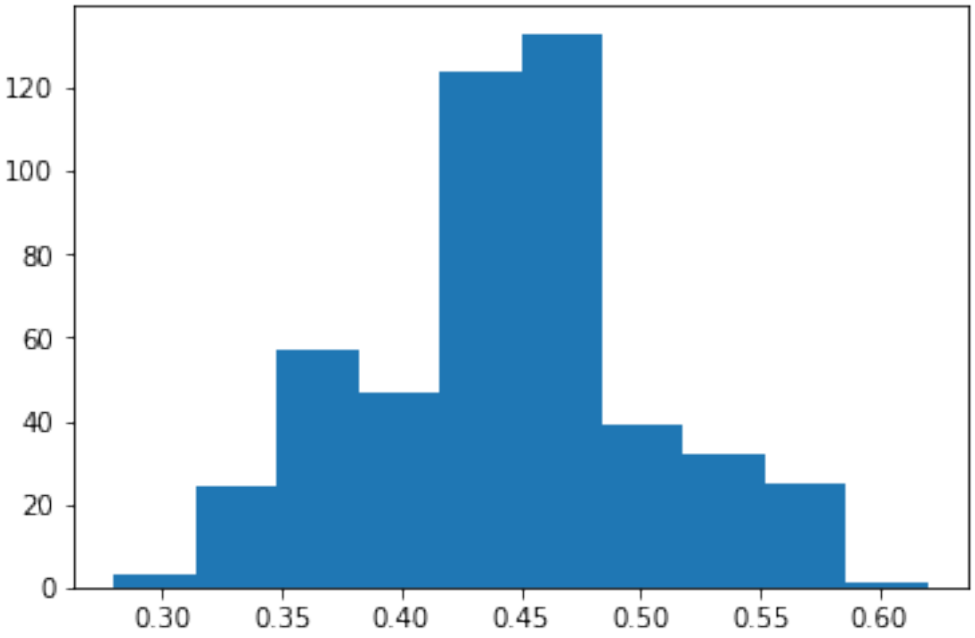
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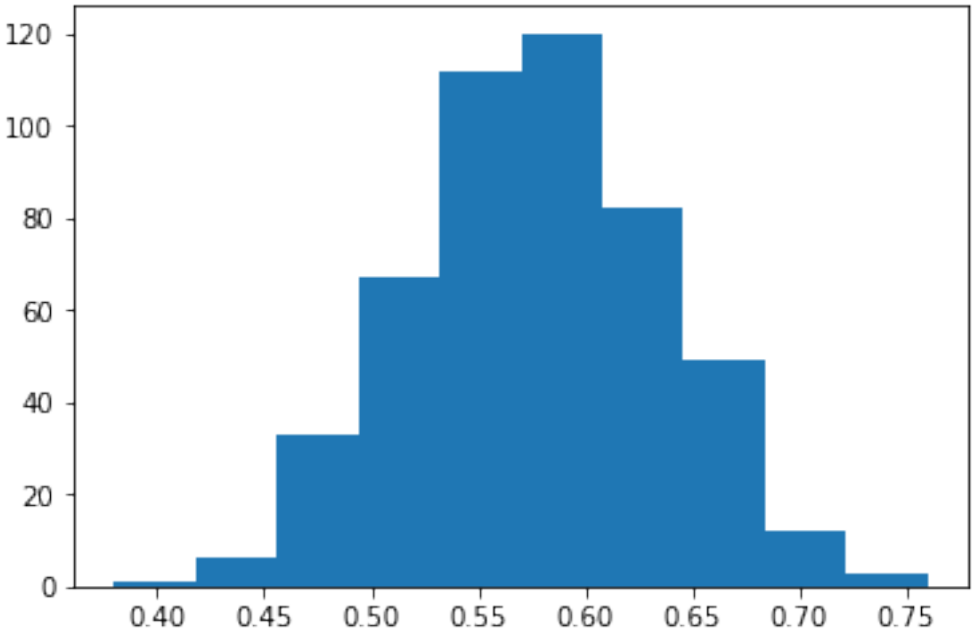
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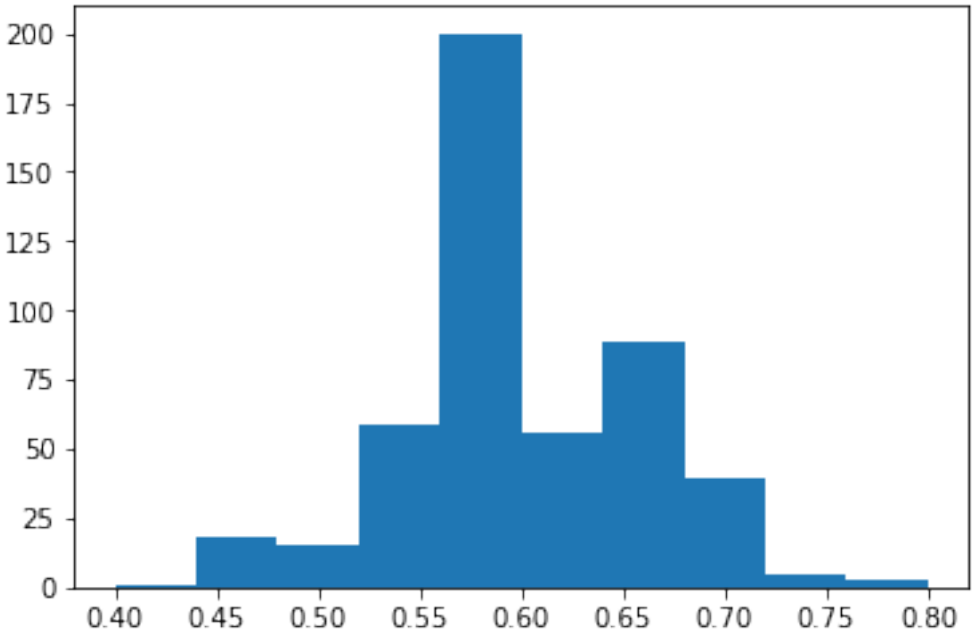
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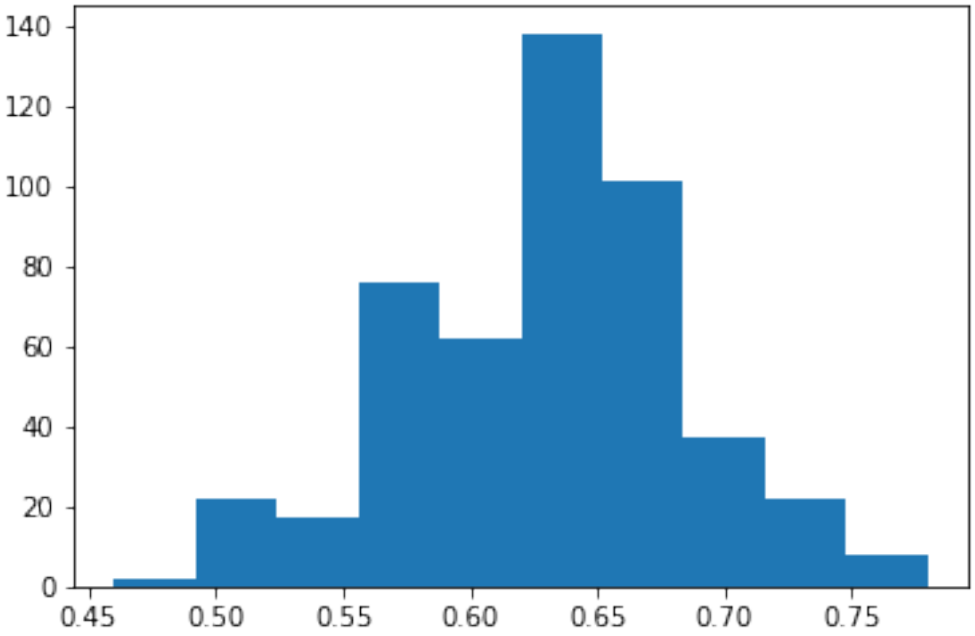
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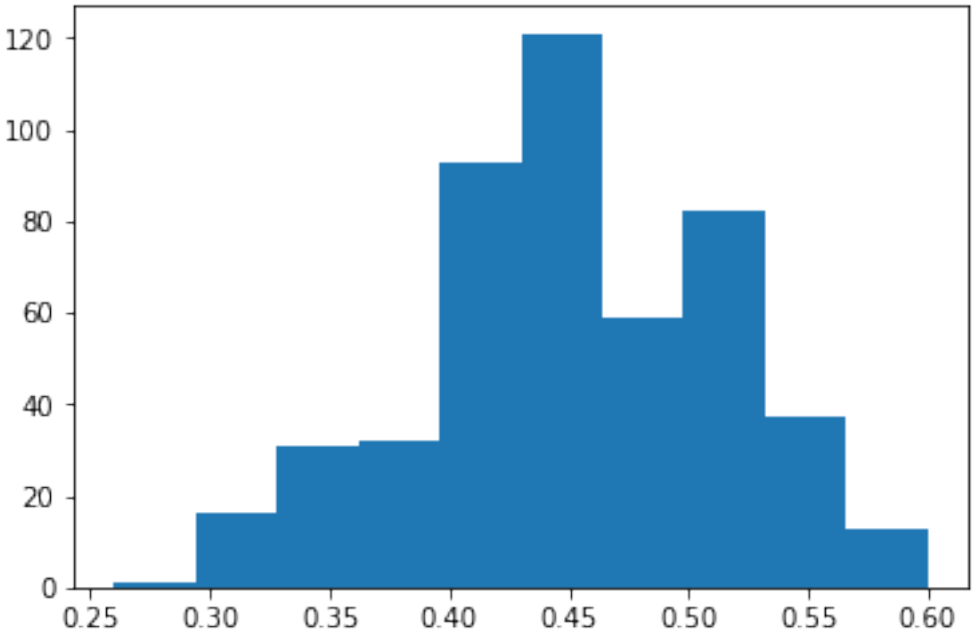
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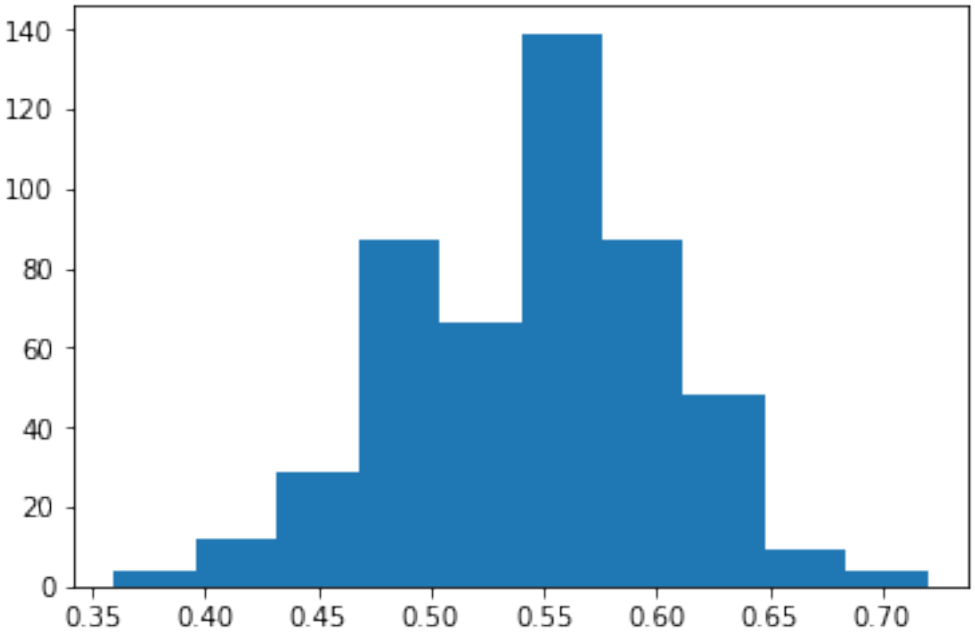
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