Documentație Machine Learning

Funcția de calcularea a acurateți:

```
def accuracy_score(y_true, y_pred):
    return (y_true == y_pred).mean()
```

Citirea datelor:

```
# Data reading
data_train_samples =
pd.read_csv('data/train_samples.txt', sep="   ",
header=None)
data_train_labels =
pd.read_csv('data/train_labels.txt', sep=" ",
header=None)

data_validation_samples =
pd.read_csv('data/validation_samples.txt', sep=" ",
header=None)
data_validation_labels =
pd.read_csv('data/validation_labels.txt', sep="   ",
header=None)

data_test_samples =
pd.read_csv('data/test_samples.txt', sep=" ",
header=None)

train_ids = data_train_samples[0]
train_data = data_train_samples[1]
train_labels = data_train_labels[1]

validation_ids = data_validation_samples[0]
validation_data = data_validation_samples[1]
validation_labels = data_validation_labels[1]

test_ids = data_test_samples[0]
test_data = data_test_samples[1]
```

```
ytrain = train_labels.astype('int')
yvalidation = validation_labels.astype('int')
```

Preprocesarea si scalarea textului folosind clasa CountVectorizer:

```
# Text preprocessing and scaling
cv = CountVectorizer(encoding='str',
strip_accents='unicode')

xtrain = cv.fit_transform(train_data)
xvalidation = cv.transform(validation_data)
xtest = cv.transform(test_data)

xtrain = xtrain.toarray()
xvalidation = xvalidation.toarray()
xtest = xtest.toarray()
```

Modelul MultinomialNB:

```
alphaList = [0.1, 0.2, 0.3, 0.4, 0.5, 0.6, 0.7, 0.8,
0.9, 0.01, 0.02, 0.03,
             0.04, 0.05, 0.06, 0.07, 0.08, 0.09, 0.001]
print('--------------')
for alphaValue in alphaList:
    mnb = MultinomialNB(alpha=alphaValue)
    mnb.fit(xtrain, ytrain)
    predicted = mnb.predict(xvalidation)
    print(alphaValue, accuracy_score(predicted,
yvalidation), sep=" ")

alphaList = [0.3, 0.31, 0.32, 0.33, 0.34, 0.35, 0.36,
0.37, 0.38, 0.39, 0.4, 0.41, 0.42, 0.43, 0.44, 0.45,
0.46, 0.47,
             0.48, 0.49, 0.5]
print('--------------')
for alphaValue in alphaList:
    mnb = MultinomialNB(alpha=alphaValue)
    mnb.fit(xtrain, ytrain)
```

```
    predicted = mnb.predict(xvalidation)
    print(alphaValue, accuracy_score(predicted,
yvalidation), sep=" ")
```

Tabelul rezultat este (partea importanta):

alpha	score
0.1	0.6828
0.2	0.687
0.3	0.6896
0.31	0.6898
0.32	0.69
0.33	0.6904
0.34	0.69
0.4	0.6902
0.5	0.6884

Folosindumă de acest tabel am ales alpha = 0.33 si am facut predictiile.

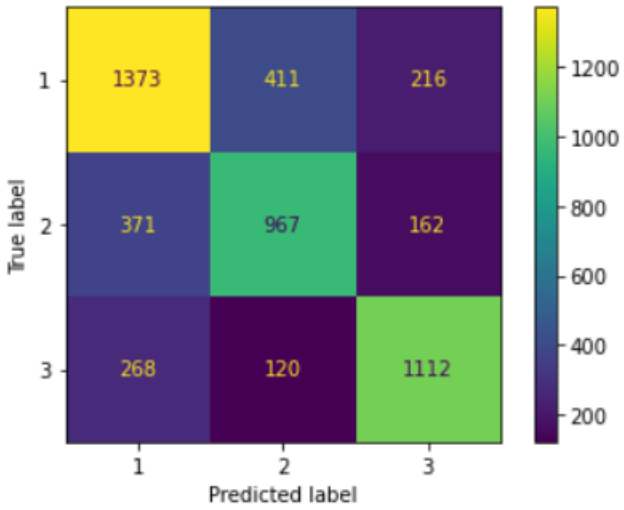
```
print('---------------')
mnb = MultinomialNB(alpha=0.33)
mnb.fit(xtrain, ytrain)
predicted = mnb.predict(xvalidation)
print(0.33, accuracy_score(predicted, yvalidation),
sep=" ")

cm = confusion_matrix(yvalidation, predicted)
print(cm)

predictedSubmission = mnb.predict(xtest)

output = open('data/test_labels.txt', 'w')
output.write('id,label\n')
for i in range(len(test_ids)):
    output.write(str(test_ids[i]) + ',' +
str(predictedSubmission[i]) + '\n')
output.close()
```

Matricea de confuzie:



Modelul Perceptron:

```
# Model2
alphaList = [0.1, 0.01, 0.001, 0.0001, 0.00001,
0.000001]
print('---------------')
for alphaValue in alphaList:
    pr = Perceptron(alpha=alphaValue, penalty='l2')
#eta0 = 1
    pr.fit(xtrain, ytrain)
    predicted = pr.predict(xvalidation)
    print(alphaValue, accuracy_score(predicted,
yvalidation), sep=" ")
```

Tabelul rezultat este:

alpha	score
0.1	0.4014
0.01	0.4098
0.001	0.4642
0.0001	0.574
0.00001	0.536

0.000001	0.6398

Folosindumă de acest tabel am ales alpha = 0.000001 și am făcut predicțiile.

```
pr = Perceptron(alpha=0.000001, penalty='l2') #eta0 = 1
pr.fit(xtrain, ytrain)
predicted = pr.predict(xvalidation)
print(0.000001, accuracy_score(predicted, yvalidation),
sep=" ")

cm = confusion_matrix(yvalidation, predicted)
print(cm)

predictedSubmission = pr.predict(xtest)
output = open('data/test_labels.txt', 'w')
output.write('id,label\n')
for i in range(len(test_ids)):
    output.write(str(test_ids[i]) + ',' +
str(predictedSubmission[i]) + '\n')
output.close()
```

Matricea de confuzie: