**Experiment No. 9 – Naïve Bayes Classifier**

* Implement and evaluate a Naïve Bayes classifier on a [dataset](http://210.212.172.190/moodle2324/mod/resource/view.php?id=8635) of email messages
* Use given data for learning purposes. Then take new data for classification and perform experiment.

**Introduction to Naïve Bayes classifier**

* The Naïve Bayes classifier is a popular supervised machine learning algorithm used for classification tasks such as text classification.
* It belongs to the family of generative learning algorithms, which means that it models the distribution of inputs for a given class or category.

**# Sample Code**

# Import required libraries

import matplotlib.pyplot as plt

import nltk

import numpy as np

import pandas as pd

import seaborn as sns

from sklearn.feature\_extraction.text import CountVectorizer

from sklearn.metrics import roc\_auc\_score, roc\_curve, confusion\_matrix, precision\_score, recall\_score

from sklearn.model\_selection import train\_test\_split

from sklearn.naive\_bayes import MultinomialNB

from sklearn.utils.multiclass import unique\_labels

# Dataset link

data = pd.read\_csv('https://raw.githubusercontent.com/AiDevNepal/ai-saturdays-workshop-8/master/data/spam.csv')

data['target'] = np.where(data['target']=='spam',1, 0)

data.head(10)

X\_train, X\_test, Y\_train, Y\_test = train\_test\_split(data['text'],

data['target'],

random\_state=0)

# extract features

vectorizer = CountVectorizer(ngram\_range=(1, 2)).fit(X\_train)

X\_train\_vectorized = vectorizer.transform(X\_train)

X\_train\_vectorized.toarray().shape

#### # Model Evaluation

model = MultinomialNB(alpha=0.1)

model.fit(X\_train\_vectorized, Y\_train)

predictions = model.predict(vectorizer.transform(X\_test))

print("Accuracy:", 100 \* sum(predictions == Y\_test) / len(predictions), '%')

model.predict(vectorizer.transform(

[

"Thank you, ABC. Can you also share your LinkedIn profile? As you are a good at programming at pyhthon, would be willing to see your personal/college projects.",

"Hi y’all, We have a Job Openings in the positions of software engineer, IT officer at ABC Company.Kindly, send us your resume and the cover letter as soon as possible if you think you are an eligible candidate and meet the criteria.",

"Dear ABC, Congratulations! You have been selected as a SOftware Developer at XYZ Company. We were really happy to see your enthusiasm for this vision and mission. We are impressed with your background and we think you would make an excellent addition to the team.",

])

)

model.predict(vectorizer.transform(

[

"congratulations, you became today's lucky winner",

"1-month unlimited calls offer Activate now",

"Ram wants your phone number",

])

)