**CS331: Artificial Intelligence**

**Assignment Report (Assignment3: Part2)**

**Problem:** Given 22 medical test reports of a person, we have to implement a classifier which predicts whether the person is normal or abnormal. (Y/N)

**Approach:** Using the Bernoulli Naïve Bayes model for the classification task.

**Code Explanation:**

Naive Bayes classifier is a probabilistic machine learning model which used for classification task based on the Bayes theorem. It assumes independence in the predicates. **Bernoulli Naive Bayes classifier** assumes that all our features are binary such that they take only 0 and 1 as values. In our case we had 80 patients in training (40normal and 40abnormal) each had 22 medical tests with 1 as “Test Passed” and 0 as “Test Failed”. With a test data of 187 patients each again with 22tests each, I want to classify the patients into normal and abnormal. I divided the code into two parts: Training Implementation and Testing Implementation. Following are the key steps involved in both.

Training Implementation:

* As done in the written part of assignment, I calculated priors (Probability of abnormal and normal patients in train data). Both turned out to be 0.5 i.e. 40normal and 40abnormal.
* After that I calculated the condition probabilities and separated them into 4 lists i.e.
* Test Pass | Normal
* Test Pass | Abnormal
* Test Fail | Normal
* Test Fail | Abnormal
* Data extraction and probability calculation for train data is complete.

Testing Implementation:

* In case train data, I want to check how many of 187 patients are normal and abnormal.
* I used my lists, 0 for fail and 1 for pass and multiplied independent event probabilities to obtained 2 probabilities per person; one for tests | normal and other for tests | abnormal.
* For each patient, P(tests | normal) > P(tests | abnormal), the patient is normal otherwise abnormal.
* All the data was compiled and accuracy was calculated.

**Model Accuracy:**

The accuracy for this part turned out to be 77.54%. Error is 22.46%