**DS 501: STATISTICAL AND MATHEMATICAL METHODS FOR DATA SCIENCE**

REPORT FOR ASSIGNMENT 02

ROLL No.:**18L1863**

**IMPORTANT:** Do not submit more than one page for this assignment.

**Problem 1:** MAP Probabilities using naïve Bayes' assumption

You can paste values from R here. Make sure the table is formatted properly.

|  |  |  |  |
| --- | --- | --- | --- |
| **No.** | **MAP probability:**  P(C=0|**x**) | **MAP probability**  P(C=1|**x**) | **Predicted label** |
| 1 | 0.119851016226076 | 0.880148983773923 | 1 |
| 2 | 0.132664714745959 | 0.867335285254041 | 1 |
| 3 | 0.0509963798798943 | 0.949003620120106 | 1 |
| 4 | 0.114101421738102 | 0.885898578261898 | 1 |
| 5 | 0.126388682458568 | 0.873611317541432 | 1 |
| 6 | 0.417314178970529 | 0.582685821029471 | 1 |
| 7 | 0.00212647682223004 | 0.99787352317777 | 1 |
| 8 | 0.0749701868646096 | 0.92502981313539 | 1 |
| 9 | 0.0925622964680407 | 0.907437703531959 | 1 |
| 10 | 0.15314650136688 | 0.84685349863312 | 1 |

**Problem 2:** ML Probabilities using naïve Bayes' assumption

|  |  |  |  |
| --- | --- | --- | --- |
| **No.** | **ML probability:**  P(**x**|C=0) | **ML probability**  P(**x**|C=1) | **Predicted label (ML)** |
| 1 | 0.00425212681371327 | 0.0122240289410305 | 1 |
| 2 | 0.00714502025544779 | 0.0182864221639502 | 1 |
| 3 | 0.00169276984590938 | 0.0123316197823715 | 1 |
| 4 | 0.00425212681371327 | 0.0129238779262041 | 1 |
| 5 | 0.00714502025544779 | 0.0193333547305885 | 1 |
| 6 | 0.014712181726448 | 0.00804159283823345 | 0 |
| 7 | 1.75001115974886e-05 | 0.00321476591036005 | 1 |
| 8 | 9.52551572891421e-05 | 0.000460096919220858 | 1 |
| 9 | 0.000759891194755102 | 0.00291627047750693 | 1 |
| 10 | 0.00414785820072812 | 0.00897881032946378 | 1 |

**Problem 3: In two or three lines comment on the two methods.**

**MAP** is a method which maximizes the entire posterior distribution by taking into account the prior as well. Whereas, **MLE**, maximizes the likelihood function. There is no difference between them if prior distribution is assumed to be constant.