

Inf2B-CW2

Task 2 Report

→ my_bnb_classify:

- write results to new array based on threshold condition
- calculate probability of each class by dividing **class feature occurrences** by **total class occurrences**
- iterate through test vectors:
 - use naïve Bayes formula to calculate the $P(\vec{b}|C_k)$ as product $\prod_{i=0}^{D-1} P(b_i = 0|C_k)^{1-b_i} P(b_i = 1|C_k)^{b_i}$
 - this is done using `np.where()`, which takes a condition and returns the first argument in indices at which it is true, and the second in indices at which is false - effectively recreating the terms $P(b_i = 0|C_k)^{1-b_i}$ and $P(b_i = 1|C_k)^{b_i}$ in `p0` and `p1`, respectively, as a 26×784 array of class feature probabilities for this vector
 - these are then collapsed via the `prod()` function to give a final 26×1 array of class probabilities
 - find the index at which the product is maximised and set that as prediction for class

Time elapsed approx (in seconds)
[DICE environment, command line]

total

0.99

Statistics

(all possible thresholds were calculated and are displayed to the right)

- best accuracy within thresholds 35-55
- accuracy stays at $64\% \pm 1\%$ between thresholds 0 to 205
- a sharp drop is observed at the threshold halfway point, 127

Comparisons

- considerably faster than K-NN
- offers a quicker insight into data

threshold

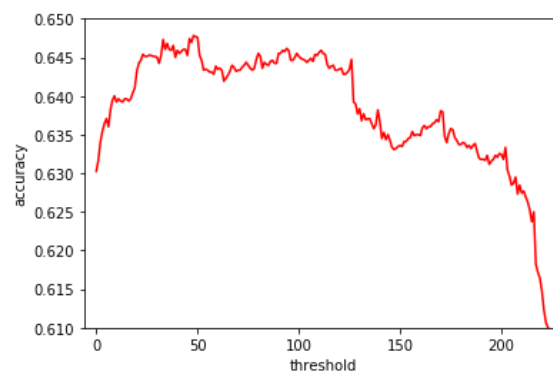
N Nerrs

acc

1.0

7800 2884

63.03%



(accuracy falls rapidly at threshold values greater than 230 [therefore omitted]; accuracy tends to $\sim 3.8\%$ [all vectors are classed as 0, akin to random chance] at threshold = 255)