Assignment-1

① after converting all of em to lower case

⇒ list = ['alom', 'animals', 'and', 'are', 'cats', 'cute', 'dop', 'funny', 'get', 'rarely']

dimension = 10 → 10 unique words.

Vec a = [0, 0, 1, 1, 1, 1, 0, 1, 0, 0].

Vec b = [0, 1, 0, 1, 0, 0, 1, 1, 0, 0]

vec c = [1, 0, 1, 0, 1, 0, 1, 0, 1, 1]

$$Matrix = \begin{bmatrix} 0 & 0 & 1 & 1 & 1 & 1 & 0 & 1 & 0 & 0 \\ 0 & 1 & 0 & 1 & 0 & 0 & 1 & 1 & 0 & 0 \\ 1 & 0 & 1 & 0 & 1 & 0 & 1 & 0 & 1 & 1 \end{bmatrix}$$

②

$P(cat) = P$ → for 1word · 10 words

$P(not \ cat) = 1-P$ → $(1-P)^{10}$

$P(atleast \ 1 \ cat) = 1 - P(not \ cat)$

→ $1 - (1-P)^{10}$

if a expression has length L

then → $\boxed{1 - (1-P)^L}$

Total no of words in the corpus = 15

Probability vector = $[0.067, 0.067, 0.133, 0.133, 0.133, 0.067,$

$0.133, 0.133, 0.067, 0.067]$

Cat $\longrightarrow$ 2 times

$$P = \frac{2}{15}$$

$$P\begin{pmatrix} \text{Post A being} \\ \text{Cat type} \end{pmatrix} = 1 - \left(1 - \frac{2}{15}\right)^5 \Rightarrow 1 - \left(\frac{13}{15}\right)^5 \Rightarrow 0.512$$

$$\longrightarrow 51.2\%$$

2 cat type posts $\longrightarrow$ A and C $\Rightarrow$ 2

no we shd find the probability s.t

a post contains cute and it is a

Cat type post.

$P\left(\frac{\text{cute}}{\text{cat type}}\right)$ $\Rightarrow P(A/B) = P\left(\frac{\text{cat type}}{\text{cute}}\right)$

$\Rightarrow \dfrac{P(B/A) \cdot P(A)}{P(B)}$ $P(B/A) = P\left(\text{cute}/\text{cat type}\right)$

2 $\longrightarrow$ posts $\longrightarrow$ cat type

A $\longrightarrow$ contains cute

$$P(B/A) = \frac{1}{2}$$

P(A) → cat type

total ≥ posti

2 posti   A or C   cat type

$\longrightarrow \frac{2}{3}$

$\overbrace{\qquad}^{only A}$

P(B) → P(cute) → $\frac{1}{3}$

$$\frac{\frac{1}{2} \times \frac{2}{3}}{\frac{1}{3}} \Rightarrow 1$$

$\rightarrow \underline{\underline{100\%}}$

so $P(cute/cat) = \frac{1}{2}$ $P(cat\theta/cute) = 1$

③ upvotes

$$U(l) = -\frac{l^2}{20} + 3l$$

$$\frac{dU(l)}{dl} \Rightarrow -\frac{l}{10} + 3 \qquad \boxed{l = 30}$$

$$\frac{d^2U}{dl} = \frac{-1}{10} < 0 \qquad @ \ l = 30 \ \text{func is man}$$