231057008
VISHWAS.P

Page No.

SESSIONAL-1 REFLECTION

ALA

S.No	Solutions	Mistakes
1(2) b)	a) $p = \frac{(a-\frac{1}{n}1^T a 1)^T(b-\frac{1}{n}1^T b)}{\|a-\frac{1}{n}1 a\| \, \|b-\frac{1}{n}1^T b\|}$	I applied the concept of broadcasting which is not there in numpy.
1)3]	$x v_1$ represents the the moment of vector x along the direction v_1	I have written it as the ~~dot product~~ vector vector multiplication
1)5)	$std(c) = \frac{1}{2} std(a+b)$ $= \frac{1}{2}(0.159) \approx 0.08$	I have calculated std(a+b) using the formula $std(a+b) = \sqrt{a^2+b^2+2.a.b}$ but not the other one i.e, $std(c) = \frac{1}{2}(a+b)$
Q2]	$Max(a^Tb, b^Tc, a^Tc)$	I used the right approach, i.e, convert it to word vector but failed to apply the formula $Max(a^Tb, b^Tc, a^Tc)$

Q3] $\|\|x\|\|^2 = \beta_1^2 a^T a + \beta_2^2 b^T b + \beta_3^2 c^T c$ $a^T a = \|\|a\|\|^2 = \|\|a_1\|\|^2 + \|\|a_2\|\|^2 + \|\|a_3\|\|$ $= 100 + 400 + 900$ $= 1400$ $\|\|b\|\|^2 = 25 + 49 + 64 = 138$ $\|\|c\|\|^2 = 4 + 16 + 25 = 50$ $\|\|x\|\| = \sqrt{\beta_1^2 \|\|a\|\|^2 + \beta_2^2 \|\|b\|\|^2 + \beta_3^2 \|\|c\|\|^2}$ $= \sqrt{(0.2)^2 \times 1400 + (0.3)^2 \times 138 + (0.5)^2 + 50}$	I calculated the $\|\|a\|\|^2$, $\|\|b\|\|^2$ & $\|\|c\|\|^2$ values correctly but calculation of $\|\|x\|\|^2$ I messed up. Didnot use the β values in the formula
Q4] $x_4^T x_i$	I have written this wrongly as $x^k x_1$ due to confusion in the concept and lack of time
Q5] 1] $q_1 = \frac{a}{\|\|a\|\|} = \begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix}$	

$$q_b = b - (q_b^T b)\, q_a$$

$$= \begin{bmatrix} 0 \\ 1 \\ 1 \end{bmatrix} - \begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix}^T \begin{bmatrix} 0 \\ 1 \\ 1 \end{bmatrix} \begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix}$$

$$= \begin{bmatrix} 0 \\ 1 \\ 1 \end{bmatrix} - \begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix}$$

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

2] $q_c = c - (q_a^T c)\, q_a - (q_b^T c)\, q_b$

$$= \begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix} - \begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix}^T \begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix} \begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix} - \begin{bmatrix} 0 \\ 1 \\ 0 \end{bmatrix}^T \begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix} \begin{bmatrix} 0 \\ 1 \\ 1 \end{bmatrix}$$

$$= \begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix} - \begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix} - \begin{bmatrix} 0 \\ 1 \\ 0 \end{bmatrix}$$

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

I had not read this particular slide and decided to skip it due to time constraint. ~~But~~ ~~is~~ I tried to answer it influke but the answers ~~were~~ were not related to the concept.

Page No
Date

3] Let q_i be a vector

then q_i

$$\bar{q_i} = a_i - \left[(q_1^T a_i) q_1 + (q_2^T a_i) q_2 \right) \dots (q_{i-1} a_i) q_{i-1}))$$

which is of the form

$$\bar{q}_1 = a_i T (-\beta_1) q_1 + (-\beta_2) q_2 + \dots (-\beta_{i-1}) q_{i-1}$$

if $\bar{q}_1 = 0$ then $q_1, q_2 \dots q_{i-1}$ are ~~linear~~ independant,

then q_i is linearly independant on q_1, q_2, q_{i-1}

$\therefore$ If $q_i \neq 0$ it implies linear dependance

(d)

4] No, changing the order will represent 3 different orthogonal components will be generated because of the choice of first vector from the dist is AS 1, 3, the rest of them are made orthonormal to the first selected vectors