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TAKEHOME ANMUL

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1. Metode Analisis Multivariat
   a. PCA
   b. Factor Analysis
   c. CCA
   d. MANOVA
   e. MANCOVA

2. Matriks varians - covarians

	GDP	Inf	IHSG	Rate
GDP	4,77	1,92	5,11	1,69
Inf	1,92	2,95	2,44	2,41
IHSG	5,11	2,44	5,70	2,16
Rate	1,69	2,41	2,16	2,29

a. Persamaan kanonik setiap variate

$S - \lambda I$

$$A = \begin{bmatrix} 4,77-\lambda & 1,92 & 5,11 & 1,69 \\ 1,92 & 2,95-\lambda & 2,44 & 2,41 \\ 5,11 & 2,44 & 5,70-\lambda & 2,16 \\ 1,69 & 2,41 & 2,16 & 2,29-\lambda \end{bmatrix}$$

$$M_{11} = \begin{bmatrix} 2,95-\lambda & 2,44 & 2,41 \\ 2,44 & 5,70-\lambda & 2,16 \\ 2,41 & 2,16 & 2,29-\lambda \end{bmatrix} \begin{matrix} \rightarrow \lambda^2 - 7,99\lambda + 8,4174 \\ \rightarrow -2,44\lambda + 0,382 \\ \rightarrow 2,41\lambda - 8,4666 \end{matrix}$$

$\det M_{11} = (2,95-\lambda)(\lambda^2 - 7,99\lambda + 8,3874) - (2,44)(-2,44\lambda + 0,382) + (2,41)(2,41\lambda - 8,4666)$

$= -\lambda^3 + 10,94\lambda^2 - 21,2162\lambda + 3,4097$

$$M_{12} = \begin{bmatrix} 1,92 & 2,44 & 2,41 \\ 5,11 & 5,70-\lambda & 2,16 \\ 1,69 & 2,41 & 2,29-\lambda \end{bmatrix} \begin{matrix} \rightarrow \lambda^2 - 7,99\lambda + 8,4174 \\ \rightarrow -2,44\lambda + 0,382 \\ \rightarrow 2,41\lambda - 8,4666 \end{matrix}$$

$\det M_{12} = 1,92\lambda^2 - 3,5791\lambda - 5,183$

$$M_{13} = \begin{bmatrix} 1,92 & 2,95-\lambda & 2,41 \\ 5,11 & 2,44 & 2,16 \\ 1,69 & 2,41 & 2,29-\lambda \end{bmatrix} \begin{matrix} \rightarrow \lambda^2 - 7,99\lambda + 8,4174 \\ \rightarrow -2,44\lambda + 0,382 \\ \rightarrow 2,41\lambda - 8,4666 \end{matrix}$$

$\det M_{13} = 7,55\lambda^2 - 32,9959\lambda + 21,6773$

$$M_{14} = \begin{bmatrix} 1,92 & 2,95-\lambda & 2,44 \\ 5,11 & 2,44 & 5,70-\lambda \\ 1,69 & 2,41 & 2,16 \end{bmatrix} \begin{matrix} \rightarrow \lambda^2 - 7,99\lambda + 8,4174 \\ \rightarrow -2,44\lambda + 0,382 \\ \rightarrow 2,41\lambda - 8,4666 \end{matrix}$$

$\det M_{14} = 4,13\lambda^2 - 6,39\lambda - 7,28$

Jadi nilai eigennya

$\lambda_1 = 0,9716588 \quad \lambda_2 = 0,7873412 \quad \lambda_3 = 0,972152 \quad \lambda_4 = 0,787848$

eigen vektor :

$\lambda_1 = 0,9776788 \rightarrow V_1 = \begin{bmatrix} 0,689 \\ 0,341 \\ -0,565 \\ -0,276 \end{bmatrix}$

$\lambda_2 = 0,7873412 \rightarrow V_2 = \begin{bmatrix} -0,512 \\ 0,725 \\ 0,369 \\ -0,284 \end{bmatrix}$

$\lambda_3 = 0,9772152 \rightarrow V_3 = \begin{bmatrix} 0,405 \\ -0,341 \\ -0,502 \\ 0,682 \end{bmatrix}$

$\lambda_4 = 0,7873848 \rightarrow V_4 = \begin{bmatrix} -0,382 \\ -0,512 \\ 0,648 \\ 0,423 \end{bmatrix}$

$U = a_1X_1 + a_2X_2 \rightarrow u = (0,9730778 . GDP) + (-0,4501206 . Inf)$

$V = b_1Y_1 + b_2Y_2 \rightarrow V = (0,9737758 . IHSG) + (-0,3684378 . Rate)$

b. Korelasi kanonik

$r_{xy} = \dfrac{\Sigma(x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\Sigma(x_i - \bar{x})^2}\sqrt{\Sigma(y_i - \bar{y})^2}}$

$= \sqrt{\lambda \text{ terbesar}}$

$= \sqrt{0,9776588}$

$= 0,9857$

3. a. persentase varians dan persentase kumulatif

$\frac{\lambda i}{\Sigma \lambda} \times 100\%$ → varians

		kumulatif.
Pc 1 =	55,46 %	Pc 1 = 55,46 %
Pc 2 =	15,86 %	Pc 2 = 71,32 %
Pc 3 =	10,35 %	Pc 3 = 81,67 %
Pc 4 =	8,15 %	Pc 4 = 89,82 %
Pc 5 =	3,67 %	Pc 5 = 93,49 %
Pc 6 =	2,85 %	Pc 6 = 96,34 %
Pc 7 =	2,15 %	Pc 7 = 98,49 %
Pc 8 =	1,37 %	Pc 8 = 99,86 %
Pc 9 =	0,10 %	Pc 9 = 99,96 %
Pc 10 =	0,04 %	Pc 10 = 100 %

b. Yang memenuhi kriteria kaiser rule

↳ Pc 1, Pc 2, dan Pc 3

persamannya :

$$Pc_1 = (0,25)x_1 + (-0,53)x_2 + (0,03)x_3 + (0,69)x_4 + (0,66)x_5 + (-0,15)x_6 + (0,08)x_7 + (-0,01)x_8 + (0,01)x_9 + (0,01)x_{10}$$

c. $P_{Yi,F} = \frac{e_{iF}\sqrt{\lambda i}}{\sqrt{\sigma_{FF}}}$ factor loading.

nf)
Rate)

$Pc_1 = [0,25, 0,53, -0,03, 0,06, 0,61, 0,51, -0,05, -0,01, 0] \times \sqrt{5,1546}$

$= 0,59, 1,25, -0,07, 0,14, 1,44, 1,2, -0,35, 0,72, -0,02, 0$

$Pc_2 = [0,25, -0,5, -0,32, 0,09, 0,2, 0,53, 0,51, -0,05, 0, -0,01] \times \sqrt{1,5856}$

$= -0,31, -0,63, 0,4, 0,11, 0,25, 0,67, 0,64, -0,06, 0, -0,01$

$Pc_3 = [0,03, -0,45, 0,69, -0,34, 0,36, 0,05, -0,13, -0,07, -0,01, 0] \times \sqrt{1,0351}$

$= 0,03, -0,46, 0,7, 0,19, 0,34, 0,05, -0,13, -0,07, -0,01, 0.$

d. • faktor loading menunjukkan seberapa besar hubungan antar variabel asli dengan Pc

• Var dengan faktor loading hitung pada 1 Pc lebih dominan.

4. a. Metode One Way Manova, karena memiliki kelompok variabel dependen yang lebih dari 1.

b. • endependen : setiap variabel yang ada harus indoependen

• varians dan kovarians harus equal

• variabel dependen harus terdistribusi multivariate normal.

c. $\bar{x}_{KM} = \frac{72+70+71+76+72+77+70+60}{8} = 71$

$\bar{x}_{KMM} = \frac{80+86+80+85+75+76+70+70}{8} = 75,25$

$\bar{x}_1 - \bar{x} = \begin{pmatrix} 71 \\ 82 \end{pmatrix} - \begin{pmatrix} 71 \\ 75,25 \end{pmatrix} = \begin{pmatrix} 0 \\ 6,75 \end{pmatrix}$

$\bar{x}_2 - \bar{x} = \begin{pmatrix} 75 \\ 72 \end{pmatrix} - \begin{pmatrix} 71 \\ 75,25 \end{pmatrix} = \begin{pmatrix} 4 \\ -3,25 \end{pmatrix}$

$\bar{x}_3 - \bar{x} = \begin{pmatrix} 65 \\ 70 \end{pmatrix} - \begin{pmatrix} 71 \\ 75,25 \end{pmatrix} = \begin{pmatrix} -6 \\ -5,75 \end{pmatrix}$

d. Hasil Uji Manova menunjukkan bahwa ada perbedaan signifikan antara pendekatan pembelajaran kontekstual, open-ended, dan realistik pada KM dan KMM