(12) PATENT APPLICATION PUBLICATION
(19) INDIA
(22) Date of filing of Application :17/12/2025
(21) Application No.202511128363 A
(43) Publication Date : 26/12/2025

(54) Title of the invention : Dimensionality Reduction Method using Linear Algebra and Eigenvalue Decomposition

(51) International classification	:G06K 9/62, G06F 17/16, G06F 17/30, G06F 17/18, G06K 9/00
(31) Priority Document No	:NA
(32) Priority Date	:NA
(33) Name of priority country	:NA
(86) International Application No Filing Date	: :01/01/1900
(87) International Publication No	: NA
(61) Patent of Addition to Application Number Filing Date	:NA :NA
(62) Divisional to Application Number Filing Date	:NA :NA

(71)**Name of Applicant :**
1)Dr. Rajan Singh
Address of Applicant :Associate Professor, Department of Mathematics, School of Sciences, IFTM University, Moradabad, Uttar Pradesh – 244102 Uttar Pradesh India
2)Dr. Vani S V
3)Mrs. Kavita Sanjay Singh
4)Mrs. Kumari Deepika P
5)Dr. Satheesh Babu R
6)Mr. Souvik Chakraborty
(72)**Name of Inventor :**
1)Dr. Rajan Singh
2)Dr. Vani S V
3)Mrs. Kavita Sanjay Singh
4)Mrs. Kumari Deepika P
5)Dr. Satheesh Babu R
6)Mr. Souvik Chakraborty

(57) Abstract :
The present invention relates to a dimensionality reduction method that employs linear algebraic principles and eigenvalue decomposition to convert high-dimensional datasets into lower-dimensional, information-preserving representations. The method comprises preprocessing input data through mean-centering and normalization, constructing a covariance matrix to capture variance and feature correlations, and performing eigenvalue eigenvector decomposition to identify the principal directions of variability. Eigenvalues are ranked in descending order, and a subset of eigenvectors is selected according to a predetermined variance-retention threshold. The selected eigenvectors are then used to project the dataset into a reduced-dimensional subspace that maintains essential structural and statistical characteristics while eliminating redundancy and noise. The invention provides a computationally efficient, mathematically rigorous, and adaptable framework suitable for machine learning, pattern recognition, data compression, and real-time analytical applications. (Accompanied Figure No. 1)

No. of Pages : 23 No. of Claims : 6