**Introduction**

Principal Component Analysis (PCA) is an incredibly useful and widely used multivariate technique in Machine Learning. Moreover, such technique is also extremely helpful in the analysis of huge datasets, whilst effectively undertaking Dimensionality Reduction and Feature Selection. Mathematically, PCA enables the conversion of linear continuous data into a new coordinate system, characterized by new axis (Principal Components) which are ordered in accordance with the features in the new coordinate system. The PCA's main characteristics of decreasing the dimensionality of data, whilst retaining salient information, lead to it being the most effectively ranked data analysis and machine learning technique [1-2]. Nevertheless, such algorithm’s behaviour may not always be comprehensible, thus cementing the need for the creation of a visual tool, which could allow users to visualise the algorithm's stages and transformations, whilst offering a better understanding on the modified data. Additionally, the developed system was tested on various distinct datasets utilised by the machine learning community, in the process of identifying any visual data characteristics. The programmed solution also effectively portrays the PCA process as a simple convenient story targeted towards students who have just completed a Linear Algebra or AI Numerical Methods course.

**Background**

**References**

[1] S. Mishra et al., "Multivariate Statistical Data Analysis-Principal Component Analysis," Int. J. Livest. Res., vol. 1, pp. 1-6, 2017. [Online]. Available: https://www.researchgate.net/publication/316652806\_Principal\_Component\_Analysis. [Accessed: 18-Apr-2023].

[2] D. Li and S. Liu, "4.2.3.1 Principal Component Analysis," in Water Quality Monitoring and Management: Basis, Technology and Case Studies, 1st ed., S. K. Gupta and R. Kumar, Eds. Amsterdam, Netherlands: Elsevier, 2019. [Online]. Available: https://www.sciencedirect.com/topics/agricultural-and-biological-sciences/principal-component-analysis. [Accessed: 18-Apr-2023].