OLET5610 Report

A Preprint

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Abstract

1 Method

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1.1 Participants

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1.2 Materials

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1.3 Procedure

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1.4 Hypotheses

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2 Results

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2.1 Dimensionality reduction

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See Figure @ref(fig:eigenplots).

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See Figure @ref(fig:biplot).

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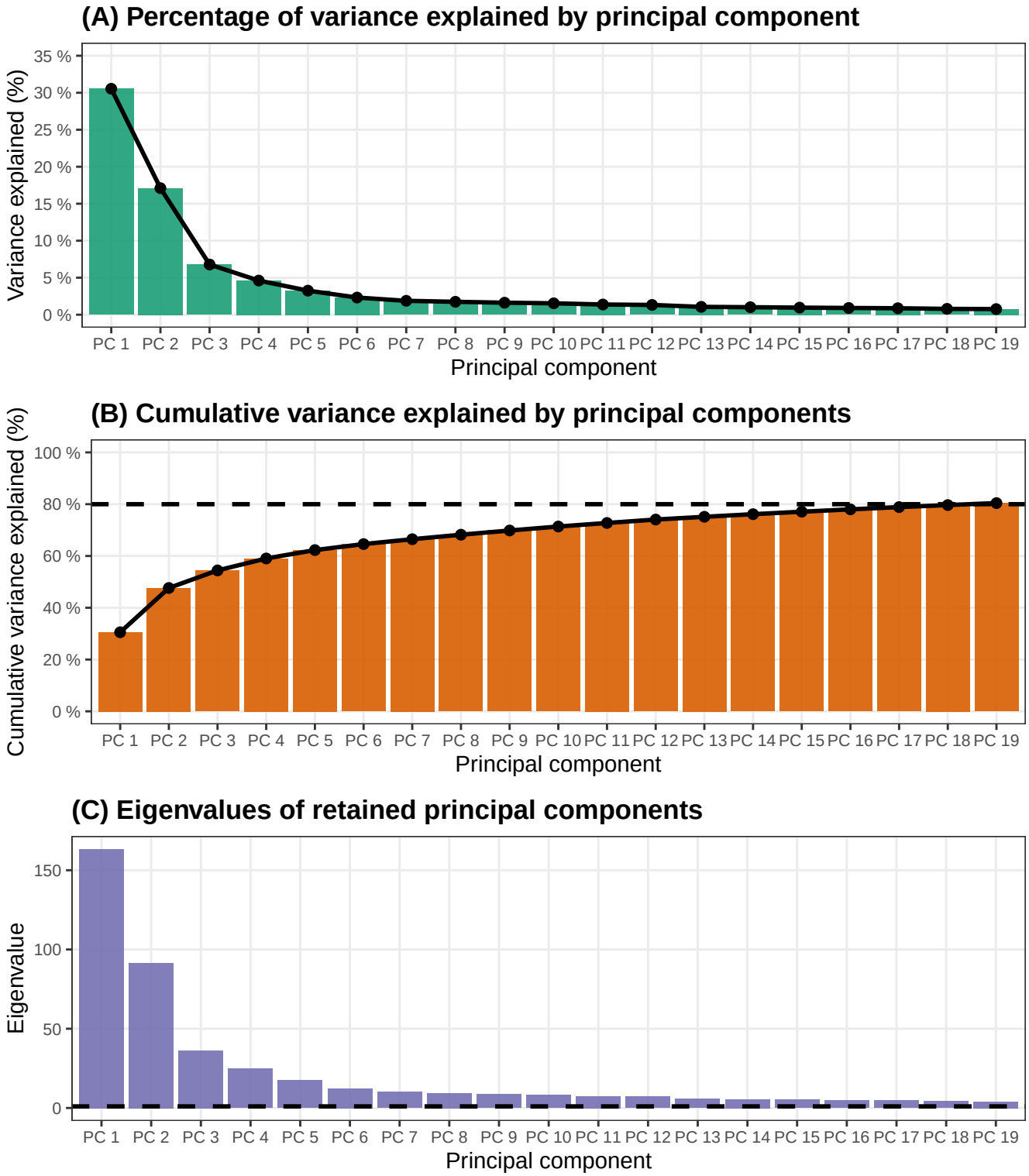

Figure 1: Summary of nineteen retained principal components. (A) Percentage of variance explained is plotted in descending order for each of the retained principal components. (B) Cumulative variance explained is plotted for each of the retained principal components. An 80% cumulative variance threshold was selected to determine the principal components to retain which returned the nineteen plotted here (from the original 313). (C) Eigenvalues of the nineteen retained principal components are plotted in descending order. All retained components exceed the $\lambda = 1$ cutoff for the Kaiser criterion.

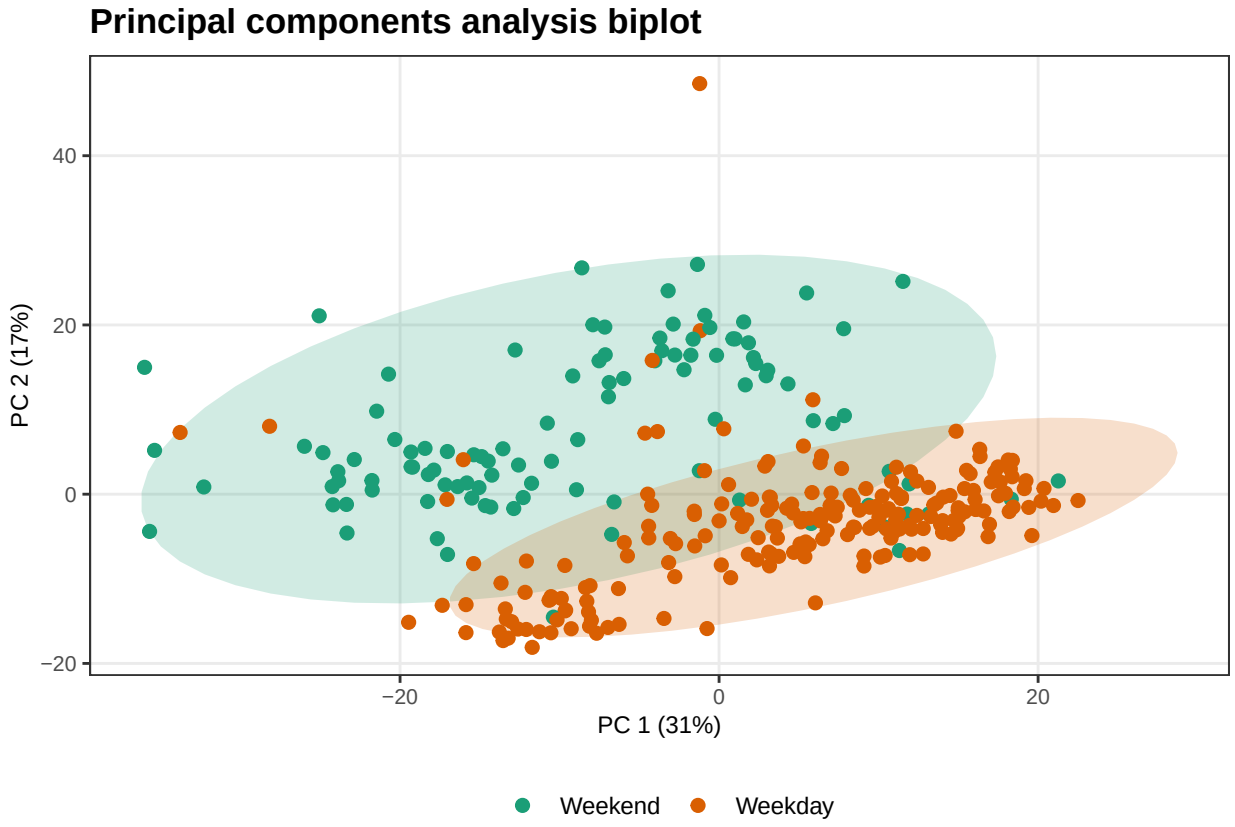

Figure 2: Principal components analysis biplot. The first principal component (positioned along the x-axis) explains 30.5% of the variance in the Chinatown dataset. The second principal component (positioned along the y-axis) explains 17.1% of the variance in the Chinatown dataset. Despite some overlap, meaningful class separation is visible between the $Weekend$ and $Weekday$ classes.

2.2 Time-series classification

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See Figure @ref(fig:impranks). See Figure @ref(fig:impdists).

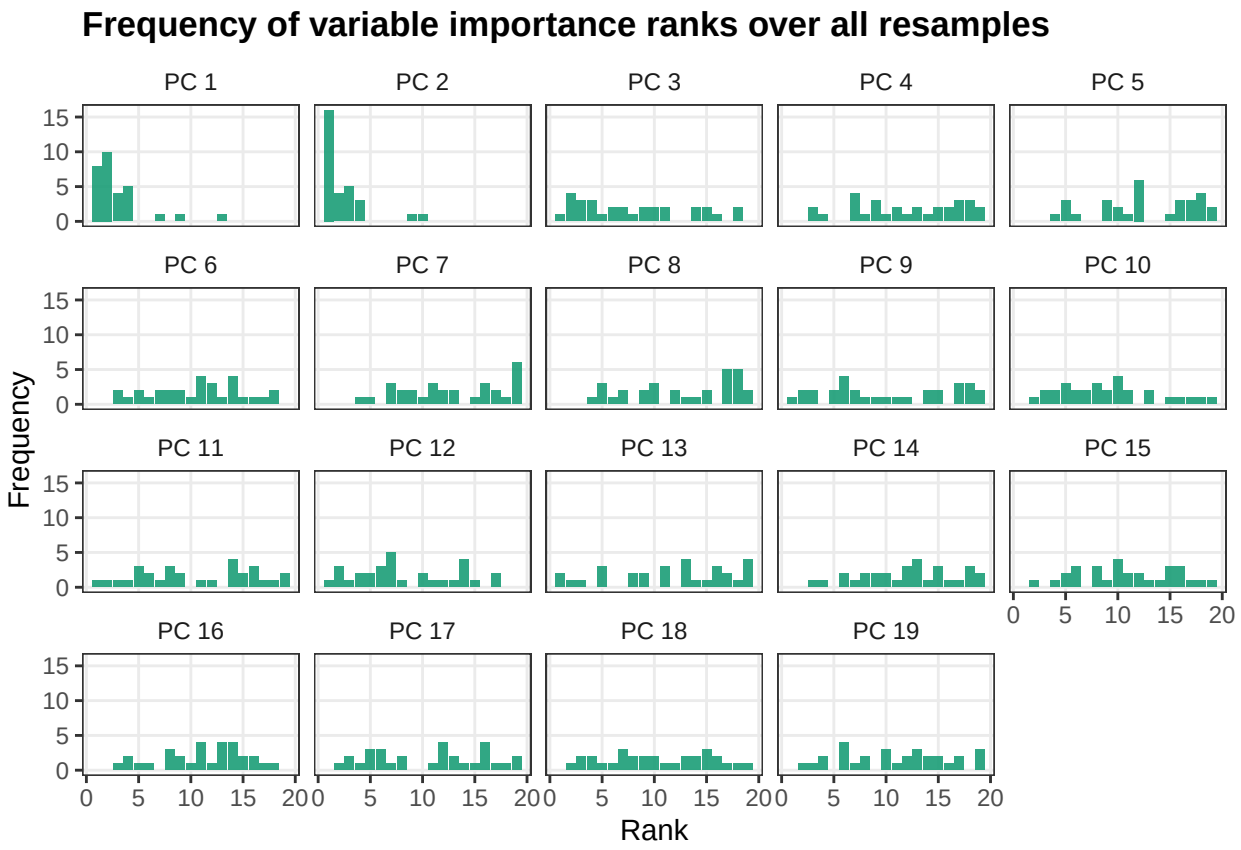

Figure 3: Frequency of ranks over all resamples are plotted for each principal component used as a predictor in the models. $PC2$ demonstrates the highest number of first rankings, indicating that across the 30 resamples (different train-test splits), $PC2$ is more often than not the most informative predictor of class ($Weekend$ versus $Weekday$).

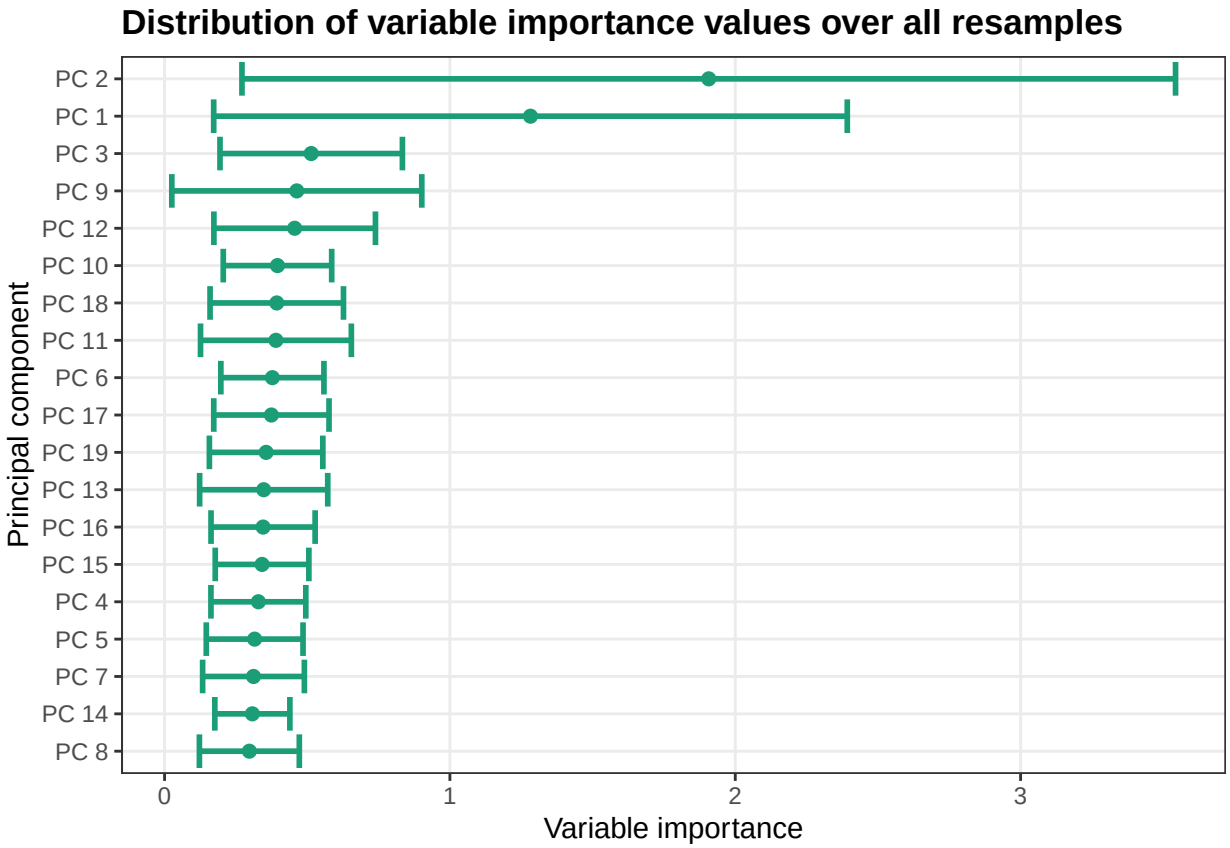

Figure 4: Mean variable importance ± 1SD is plotted for each principal component used as predictors in the models. $PC2$ demonstrates the highest mean variable importance values, but with a large variance.