

A METHOD FOR THE VISUAL REPRESENTATION OF HISTORIC MULTIVARIATE POINT DATA

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The integration of multivariate spatial and temporal data is important for creating innovative visualization techniques that can be used in the interpretation and analysis of historical geographic patterns that change over time. The introduction of geospatial technologies to historical scholarship has led to the field of Historical GIS. This new field has created a need for greater temporal emphasis and the tracking of historical events over time, and has therefore challenged the suitability of conventional visual representations utilised in the majority of Historical GIS projects. This research presents an alternative holistic visualization approach for point based multivariate historical data.

The method has been developed by enhancing the spatial presence in information graphics and through meaningful spatial classification of the point based data. Distance and direction from a central point of influence have been used to classify the spatial dimension of the data, whilst time has been treated using time-series graphs. This has resulted in a visualisation framework of eight time-series graphs for the eight cardinal direction classes. By taking an abstracted view of space and extending the treatment of location in the time-series graphic technique, it is possible to create a more position oriented representation. Instead of depicting the venues as point features, these point locations are transformed into lines that rest within the spatial framework. The advantages of doing so can be seen in a lines continual nature; a line can be tracked through a time-series graph far more effectively than a point. In addition, linear features have the ability to represent multivariate data more effectively than point features due to the fact that in addition to the visual variables of width, colour, and style, linear features can vary in their shape (through changes in direction and curves) and length.

This paper demonstrates the benefits gained from visualising historical, geographic, temporal, and attribute data concurrently through a case study on the history of Melbourne's cinema venues between 1946 and 1986. Because cinema venues are generally represented as point feature geographic entities, the history of cinema venues acts as an excellent case study for the developed method. Additionally, cinema venues, whilst geographically static, have associated variables that change over time such as seating capacity, change in management, and change in name. This paper focuses on the results of addressing a single geographic question for cinema history; *how does change affect the longevity of large cinema companies?* It has been found that the visualization allows relationships between cinema attributes to be explored, spatial and temporal patterns to be investigated, and also provides a visual representation for the analysis of multivariate spatial and temporal dimensions.