Geovisualizing Data with **Ring Maps**

Improves comprehension when mapping many variables

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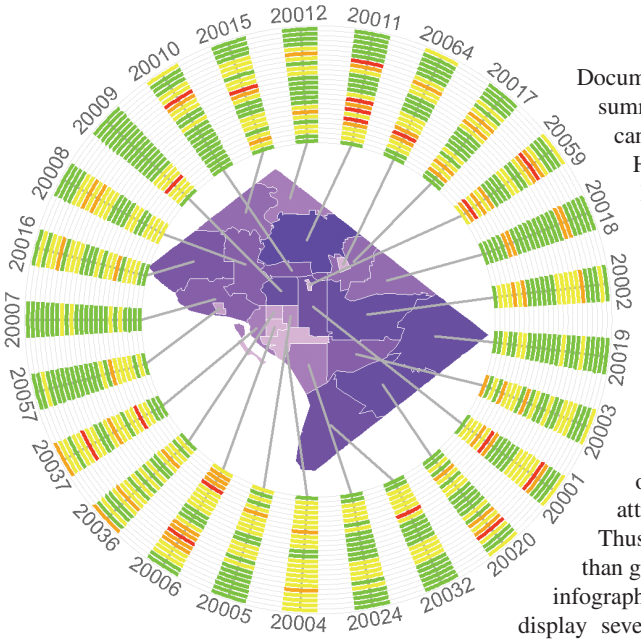

Figure 1: This ring map displays 24 weeks of disease alert status for each ZIP Code. Changes in status over time are much more easily discerned when displayed in this fashion.

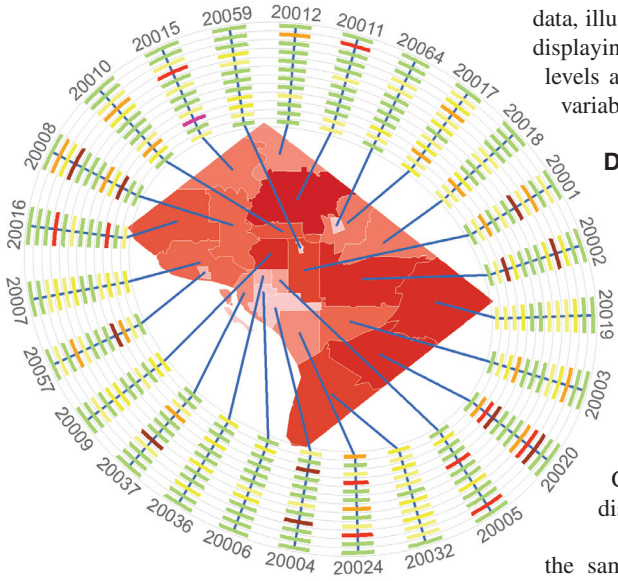

Figure 2: This elliptical ring map displays one month of data for 12 demographic variables in each ZIP Code in Washington, D.C.

Document files, tables, and charts can summarize complex data, but they can be hard to read and interpret. However, a GIS-based map known as a ring map can help overcome this problem for location-specific data.

A ring map is a map surrounded by a set of concentric, segmented rings that can be circular or elliptical in shape. Each ring displays an additional dimension (e.g., temporal) of data that represents an attribute of a particular location. Thus, the ring map shows more than geographic positions; it creates infographics that can organize and display several types of data organized using the simplicity and clarity of a map.

Visualizing Data with Ring Maps

Each ring in the ring map can be used to display a time series or a variable series. Two sample applications, using hypothetical data, illustrate how ring maps can be used for displaying time series data about disease alert levels and relating a series of demographic variables.

Displaying a Time Series

Many administrative agencies collect and produce data at hourly, daily, weekly, monthly, or yearly intervals that are supplied in diverse formats such as text, tables, and charts. For purposes of illustration, suppose that over the course of 24 weeks the Washington, D.C., Department of Health creates weekly alert levels for a disease for each ZIP Code in the city. This fictional data is displayed in Table 1.

The ring map in Figure 1 shows the same hypothetical information that is contained in the table. For each ZIP Code, the innermost ring represents the alert status for Week #1, while the outermost ring depicts the status for Week #24. The ring map combines temporal and spatial attributes (by geocoding the alert levels) and makes it easier to compare the status of different ZIP Codes. Combining ring maps with tabular data for health reports or other documents containing complex data could make it easier for readers to understand how that data changes over time and space.

Displaying a Variable Series

The second example illustrates demographic data for Washington, D.C., for one month. This data, shown in Table 2, has been categorized by ZIP Code. The corresponding ring map is shown in Figure 2. The innermost ring corresponds to the first column of data in Table 2 (Infectious Disease), while the outermost ring corresponds to the last column of data in the table (in this case, Snow Day or the number of days it snowed). It is much easier to compare different variables and neighbors by looking at the ring map rather than the table.

Conclusion

Ring maps provide a straightforward and innovative way to display GIS data. GIS holds tremendous potential to support data visualization for governments, businesses, and research organizations. This article has explored one innovative way: the ring map. By representing the attributes of a particular location around the simplicity and clarity of a map, it has important practical value for a range of users.

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SUMMARY

Ring maps help people understand complex public health data more easily than the same data presented in tables. Ring maps are particularly adapt at vizualizing the relationahips between spatial and temporal data.

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ZIP Code	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7
20001	Green	Yellow	Yellow	Yellow	Green	Green	Yellow
20002	Green	Yellow	Yellow	Yellow	Green	Yellow	Green
20003	Orange	Green	Yellow	Green	Green	Green	Yellow
20004	Green	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
20005	Yellow	Green	Yellow	Green	Green	Green	Green
20006	Yellow	Orange	Orange	Orange	Yellow	Green	Green
20007	Green	Green	Green	Green	Green	Green	Green
20008	Yellow	Yellow	Yellow	Yellow	Green	Green	Green
20009	Green	Yellow	Yellow	Yellow	Green	Green	Green
20010	Green	Green	Green	Green	Green	Green	Yellow
20011	Green	Yellow	Yellow	Yellow	Green	Green	Green

Table 1: A sampling of weekly color-coded disease alert levels. Green denotes no risk, yellow indicates a limited risk, orange shows areas with moderate risk, and red highlights areas of severe risk. ***Note: This is a hypothetical scenario and does not represent actual risk of any known disease in the Washington, D.C., area.***

ZIP Code	Infectious Disease	Other Disease	Hospitals	Schools	Crime Rate	Snow Day
20001	0	1	3	0	1	0
20002	0	1	4	2	0	0
20003	0	1	2	3	0	0
20004	1	0	4	0	0	0
20005	0	2	0	0	5	0
20006	0	2	0	0	0	0
20007	2	1	2	1	0	0
20008	0	0	4	2	3	0
20009	2	2	0	1	0	0
20010	0	2	3	1	0	0
20011	1	1	0	0	0	0

Table 2: These statistics for demographic variables for Washington, D.C., spanning one month, have been categorized by ZIP Code. ***Note: This data is fictitious and is used only to illustrate the concepts described in this article.***

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