

# Flow circle: Circular visualization of wiki revision history

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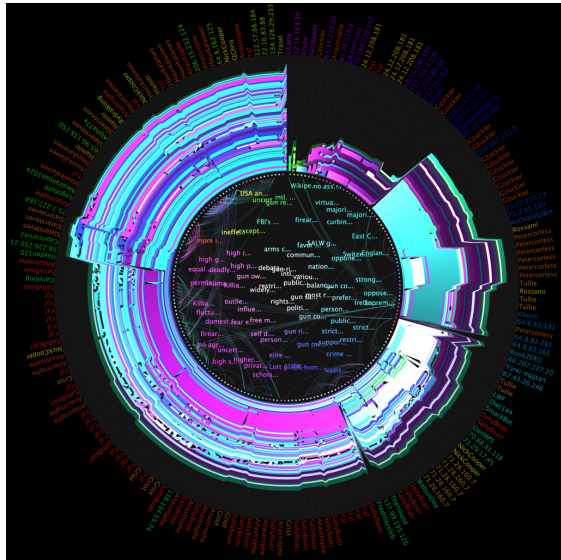


Figure 1. Flow Circle: visualizing Gun politics in Wikipedia

## 1. Introduction

We visualize the Wiki revision history based on a History Flow, which is a visualization tool for a time-sequence of snapshots of a document in various stages of its creation. The previous History Flow was judged to be inadequate in that it did not display the relationships between the authors, so prevents users from analyzing the meaning of the revisions of the data. First, this study introduces the Flow Circle, which is a new exploratory data analysis tool devised to solve such problems of History Flow. Second, this tool is used to actually visualize the Wiki revision history regarding gun politics in order to understand and analyze the flow of the revision history and the relationship and conflict structures between the authors based on the results of the MDS analysis.

## 2. Approach

We attempted to integrate the previous History Flow with an MDS graph. This graph allowed us to analyze the meaning index of the writings and gave us a Circos visualization, which displayed the relationships between the authors. In this regard, we believed that changing the linear layout of the Flow View into a circular layout facilitated integration. As a result, we perfectly integrated 3 types of visualizations and created a visually beautiful and functional Flow Circle (Figure 2).

The “Revision Line” in the Flow Circle is arranged according to the passage of time in a clockwise direction, rather than flowing according to the X axis. Flow view connects corresponding segments on the lines representing versions. This arrangement method allows users to view the first version and the last version of the revisions that were made, making it easier to analyze the text changes at a glance. We selected the MDS graph in order to present the meanings of each of the text. The MDS graph is composed of keywords individually extracted from the Revision Data of various versions. Also, the conflicting terms of the keywords arranged in the MDS graph are presented with conflicting colors. For this reason, the colors become whiter towards the center in order to display neutrality. The established colors of the keywords are engaged one-on-one with the colors of each Flow View,

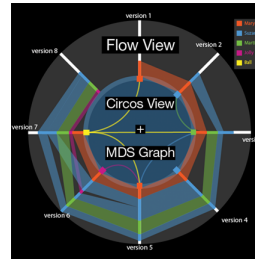


Figure 2. Structure of Flow Circle



Figure 3. MDS Graph

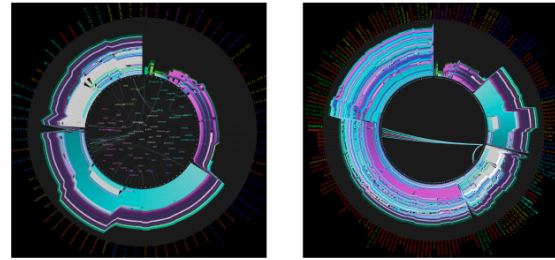


Figure 4. Interaction: (left) Transform Section (right) Focus Circos

which makes it easier for users to comprehend the meanings and characters of the text simply by looking at the Flow View based on its colors. The node of each Revision Line presents the author of each version, and the edges that connect the two nodes together display the editing relationships regarding the deletion of the previous version text from the later version. The Flow Circle can express a larger amount of data in the same space when compared to the History Flow. And distortions are not presented in the circular layout, since the part that actually displays the amount of data in the Flow Circle is the spacing within each revision line.

## 3. Results and Conclusions

The previous History Flow did not analyze the meaning of the texts and the indicators of the relationship between the authors. For this reason, it was unsuitable in analyzing the conflict relationships between authors and in analyzing the reasons for such conflicts. Another form of visualization, other than the existing Flow View, must be combined in order to solve this problem. The straight-line layout of the History Flow makes it difficult to integrate with other visualizations. The Flow Circle changes this layout into a circular form to successfully integrate the Circos and MDS in the existing view, while also maintaining the advantages of the previous flow. These 3 Views become organically integrated with one another. For this reason, the space can be efficiently used to present a large amount of data at a single time.

## 4. References

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- Krzywinski, M., Schein, J., Birol, I., Connors, J., Gascoyne, R., Horsman, D., Jones, S. J., and Marra, M. A. 2009. Circos: An Information Aesthetic for Comparative Genomics. *Genome Res* 19(9):1639–1645.