

Enabling Comparative Analysis of Election Data in Ecuador

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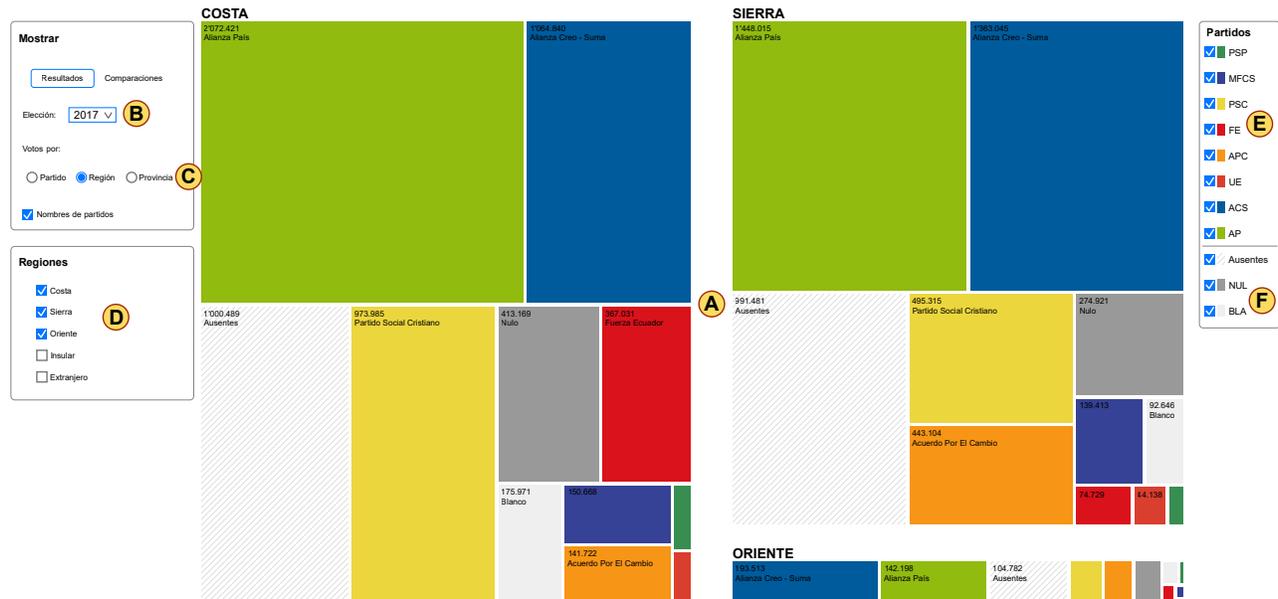


Figure 1: GUI of our tool. By default, votes are organized in a treemap and can be grouped by parties, geographical region, and provinces. Filters allow to focus the analysis by removing or adding data entities. This example depicts the data of the first electoral round of Ecuador’s 2017 presidential election. The tool is available online at <http://vis.cti.espol.edu.ec/resultados>.

ABSTRACT

We present an interactive visualization tool that enables exploration and comparative analyses of election data in multi-partisan systems. We motivate and explain our design in the context of the Ecuadorian political landscape. We demonstrate the tool with data from Ecuador’s three most recent presidential elections. Our tool enables both relative and absolute comparisons of the election results.

CCS CONCEPTS

• **Human-centered computing** → **Visualization systems and tools**.

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1 INTRODUCTION

Appropriate communication of election results is key to any democratic system [1, 2]. Thus, bodies responsible for organizing and regulating elections often resort to visual representations to better communicate election outcomes (e.g., [3, 4]). Visualization technologies are widely recognized as powerful tools to fulfill this purpose, as they can make election data more understandable, accessible, engaging, and appealing to the general public [5]. This view aligns with that of the *National Electoral Council* (CNE in Spanish), the body responsible for organizing elections in Ecuador.

Election results in Ecuador are officially published through a web based interface¹ that combines simple statistics with basic visual representations (e.g., maps and bar charts). The tool is widely used during election times both by the general public and the media, as it constitutes the only source of official information regarding the outcomes of an election. The tool serves its intended communicative purposes reasonably well and allows for basic interaction with the data (e.g., exploring results at different levels of granularity).

¹Available at <https://app01.cne.gob.ec/Resultados20212V>

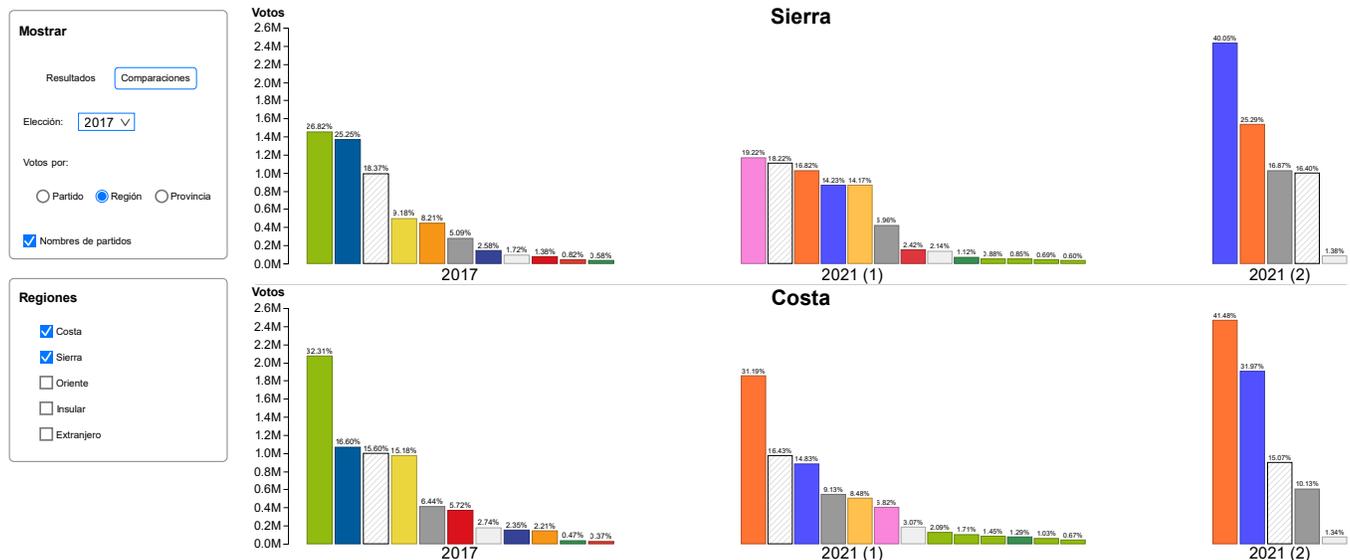


Figure 2: The comparison view allows to compare the votes achieved by the parties across different elections. This figure shows the overall results but the data can be aggregated by provinces

However, because the referred tool is intended exclusively for communicative purposes, it is not suited for analytical tasks. For example, it does not have mechanisms to compare the votes of specific parties in specific regions of the country. Historical comparisons across elections are also unfeasible, as the tool presents the results of one election at a time. Such analyses currently require tedious and time consuming tasks that are beyond reach for the average citizen due to lack of specialized knowledge and tools. In turn, this limits the interactions that people can have with the election data, precluding better, deeper understandings of election facts.

We seek to redress this gap with an interactive tool that enables visual comparative analyses of election data. The tool operates with data published by the CNE that we assembled in JSON files. Our tool enables both relative and absolute comparisons of votes, which can be aggregated according to several categorical criteria (e.g., geographical regions, provinces).

2 THE TOOL

Upon loading, the main view of the tool (Figure 1.A) shows the data of the 2017 presidential election—the default dataset—aggregated by party. Other datasets (first and second round of the 2021 presidential election) can be selected through a list of options (B). Our current implementation could support datasets from future elections. This would simply require processing and preparing the newly published data, without major modifications in the tool’s backend.

Users can interactively aggregate the data displayed in the tool’s main view by geographical region or province (C). Each aggregation enables filters (D) that allow to remove data entities from (or add them to) the analysis. This supports focusing the analysis on specific provinces or regions. Parties can be filtered out from their corresponding legend (E). Specific types of votes can also be filtered. For example, it is possible to hide invalid or blank votes, as well as the data of absent voters (F).

The treemap representation allows rearranging the screen real estate according to the relative contribution of the parties of the dataset to the election’s outcome. Users can transform this view into a bar-based representation that enables absolute comparisons of the votes associated to each party in all the elections at once. Figure 2 shows an example of this. This visualization makes possible, e.g., to draw conclusions on the evolution of the number of votes a given party obtained since 2017. As with the treemap, the data of this view can be both aggregated and filtered according to different criteria. The depicted example shows the votes aggregated by geographical region and only shows the data of the Ecuadorian coast and highlands. The remaining regions have been filtered out.

3 CONCLUSION

We presented a tool that enables comparative analysis of election data in Ecuador. The tool complements the communicative purposes of other existing tools and has the potential to spark richer conversations on electoral data. Ultimately, such conversations have the potential to promote citizen engagement and participation.

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