A VISUALIZATION-BASED APPROACH FOR THE TAXONOMY BROWSER INTERFACE

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The process of collecting biological data is a continuous activity, specially in field work for research projects or teaching activities. Data obtained from these collecting activities need to be properly stored in order to be readily available for future analysis. ***TaxonomyBrowser*** [1] is a biodiversity information system mainly developed to manage data collected by biologists during field work. This work presents a new approach for the ***TaxonomyBrowser's* user interface**, focusing on providing an easier and more intuitive method of managing and visualizing the information stored in such databases. The main tool used for implementing all the visualizations is Data-Driven Documents (D3), a JavaScript library created for manipulating documents based on data used mainly for creating interactive visualizations.

VISUALIZATION-BASED INTERFACE

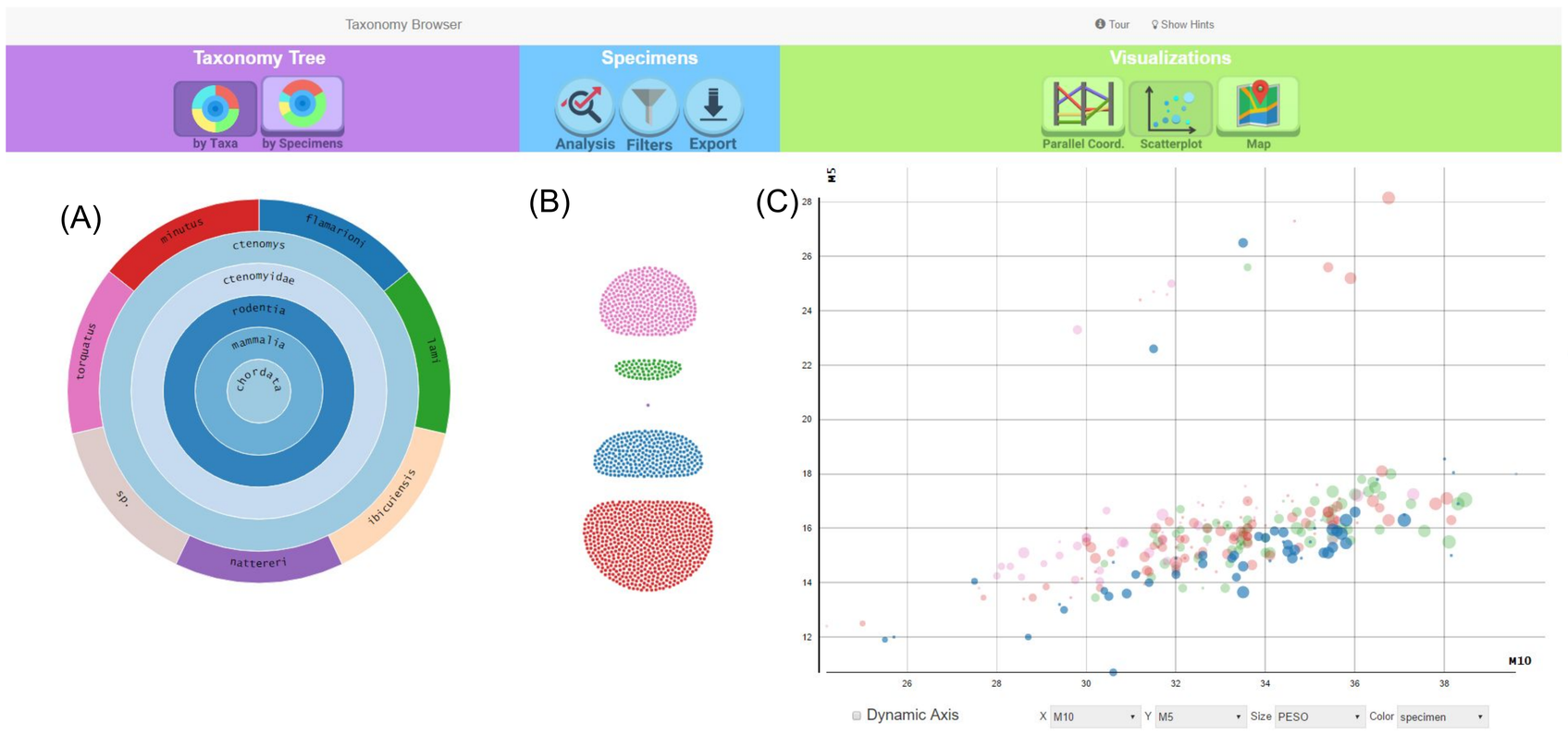

Figure 1: Overview of the interface

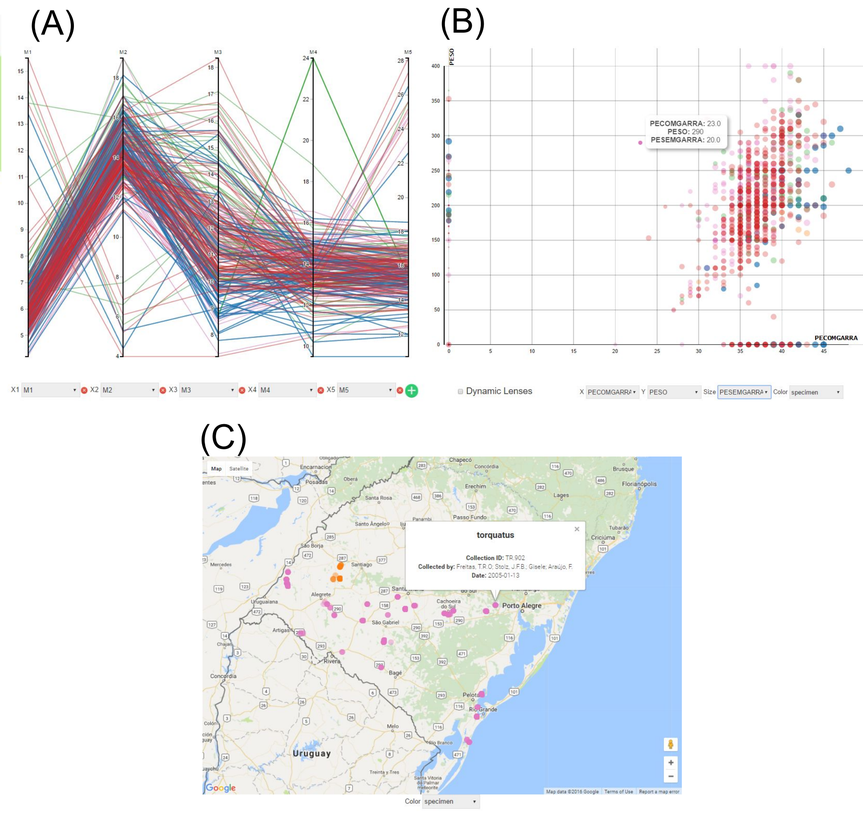

Figure 2: Parallel Coordinates, Scatterplot and Geospatial Visualization

For desigining the new TaxonomyBrowser interface, we followed Shneiderman's basic principle of visual design, the Visual Information Seeking Mantra: "overview first, zoom and filter, then details on demand" [2].

The new interface is based on a Sunburst visualization [3] that allows for representing and interactively managing the taxonomic tree. As each species is selected in the Sunburst visualization (Figure 1A), the specimens classified as belonging to that species are exhibited as small circles in the center of the layout (Figure 1B) and three types of visualizations can be created with the specimens' measures (Figure 1C). Following the Visual Information Seeking Mantra, the Sunburst represents the overview of the data, while the specimens' visualization serve as zooming and filtering, and, finally, the parallel coordinates (Figure 2A), scatterplot (Figure 2B) and geospatial visualization (Figure 2C) present details on demand.

RESULTS

The assessment involved 40 participants, 75% male and 25% female, with age between 19 and 58 years old. 32.5% of these participants are from the field of Biology, 52.5% are from Computer Science, and 15% are from other fields, such as Engineering, Health and Social Sciences.

Participants provided correct answers to most of the tasks/questions. In general, users liked and understood the proposed visualizations and the layout of the application. Regarding the System Usability Scale, the average **SUS score** was **78.3**, which is above the average of 68 and close to an A grade score (above 80.3). Feedback was mostly positive, especially regarding how well integrated the system's features were and its overall consistency. Also, 87.5% thought that they did not need to learn many things before they could operate with the system.

From these results we can conclude that the tool was generally visually interesting and understandable to all users, regardless of their field of study or age. Moreover, participants with practical applications for the tool were more interested in using the system frequently. The tasks results can be considered relevant, especially since it was the users' first experience with the application.

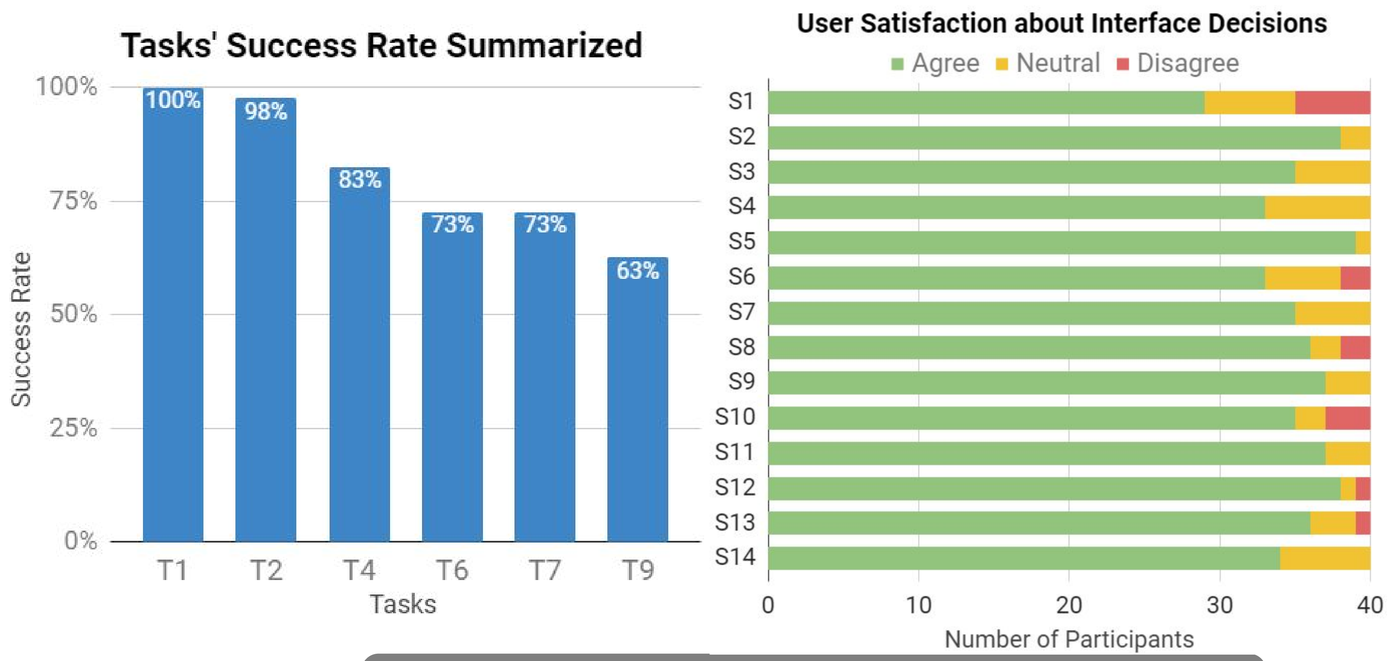

Figure 3: Summary of task's success rate results and user satisfaction results

CONCLUSIONS AND FUTURE WORK

This work presented a new interface for *TaxonomyBrowser* based on Shneiderman's Visual Information Seeking Mantra: overview first, zoom and filter, then details on demand. A Sunburst visualization was implemented for displaying an overview of the taxonomy tree and for managing the database information.The user's selected and/or filtered information can be viewed on different visualizations for a better understanding of the size and characteristics of the set of filtered specimens. The interface was assessed by means of a remote survey based both on specific tasks and a questionnaire.

REFERENCES

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