# Cambiera: Collaborative Tabletop Visual Analytics

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## Abstract
Cambiera is a tabletop system designed for co-located collaborative visual analytics. As a tabletop system, Cambiera encourages analysts to face each other around the tabletop to analyze large text document collections collaboratively. Cambiera allows analysts to search for documents and read them, organize documents on the tabletop, and to monitor each other's' work. The video illustrates the major collaborative features of Cambiera.

## Keywords
Collaboration, visual analytics, tabletop, surface computing

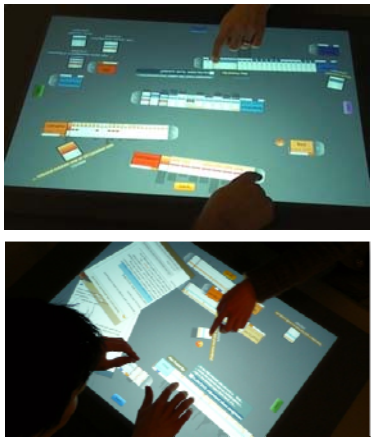
## ACM Classification Keywords
H5.3. Information interfaces and presentation (e.g., HCI): Group and Organization Interfaces (Collaborative Computing).

## General Terms
Human Factors

## Introduction
Visual analytics tasks can have overwhelming amount of information combined with minimal intrinsic structure. Analysts working on solving these tasks must

make sense of large amounts of information. While collaboration is known to be helpful, technological support for collaborative analytics is limited [1]. Even when analysts are co-located (and presumably would have an easier time working together), they are often forced to work separately, communicating through emailed or instant-messaged links.

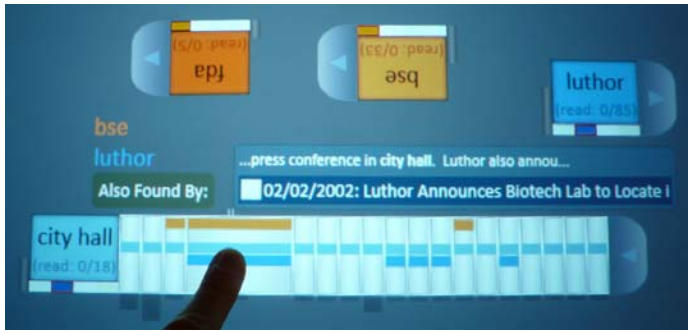
We have developed *Cambiera* [2,3] to explore ways of allowing analysts to collaborate around a tabletop. Cambiera is an application for Microsoft Surface, a multi-touch display. As a tabletop system, Cambiera allows analysts to face each other around the display while collaboratively analyzing text document collections.



Two uses of Cambiera in practice. Above, a complex tabletop with several tabs and documents organized on the side of the screen. Below, two documents are open on the left side.

## System Description

A complete description of the Cambiera system and usage can be found in [2,3].




Users issue **searches** through a virtual keyboard; the results of those searches are reflected with colored **search tabs.** Each user is assigned a color; each search tab is tinted a shade of their color. In the figure, the user facing 'up' (in blue) has searched for "luthor" and "city hall", while the user on the other side of the table (in orange) has searched for "bse" and "fda". At tab shows how many documents were found; for example, "luthor" found 85 documents.

A search tab can be expanded to show the documents that it found. In the figure, "city hall" found 18 documents; each of them is represented as a grey bar on the right side. Each document is colored by the set of searches that found it: all the documents have a pale-blue stripe for "city hall". The fourth document, currently being touched by the user, was also found by the search "bse" and "luthor." In addition, documents have cues to show read-wear and write-wear (not shown in this figure).

Users can easily pass searches and documents around and across the table to each other, arranging the documents as they see fit (see sidebar).

These mechanisms collectively allow collaborators to keep track of each other's work. Using this system, several different collaboration strategies are possible, including working closely together, as well as ensuring non-duplication of effort.

## References

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[3] Isenberg, P., Fisher, D. Collaborative Brushing and Linking for Co-Located Visual Analytics of Document Collections. (2009) *Computer Graphics Forum,* 28(3):1031-1038.