Temporal Visualization for Legal Case Histories

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Abstract

This paper discusses visualization of legal information using a tool for temporal information called *LifeLines*. The direct and indirect histories of cases can become very complex. We explored ways that *LifeLines* could aid in viewing the links between the original case and the direct and indirect histories. The Apple Computer, Inc. v. Microsoft Corporation and Hewlett Packard Company case is used to illustrate the prototype. For example, if users want to find out how the rulings or statutes changed throughout this case, they could retrieve this information within a single display. Using the timeline, users could also choose at which point in time they would like to begin viewing the case. *LifeLines* support various views of a case's history. For instance, users can view the trial history of a case, the references involved in a case, and citations made to a case. The paper describes improvements to *LifeLines* that could help in providing a more useful visualization of case history.

Keywords
Graphical user interface, information visualization, legal information, temporal data, history

1.0 INTRODUCTION

Visualization enables people to use a natural tool of observation and processing --
their eyes as well as their brain – to extract knowledge more efficiently and find insights (Gershon & Eick,1995).

Is a picture worth a thousand words? Although many would respond positively, they often desire to have both the picture and the thousand words when interacting within a computer interface. Information visualization is a solution that can make this combination of graphics and text possible. Overviews of information can be visualized which then can be manipulated to provide more detailed information. With information visualization, we can reduce the amount of text that has to be read and understood by representing the text in a graphical form. This process allows users to browse through the information and find what they are looking for rapidly.

Information visualization attempts to display structural relationships and context that would be more difficult to detect by individual retrieval requests (Roberston, Card & MacKinlay, 1993).

This paper describes the application of a tool that displays temporal data called *LifeLines* to the visualization of legal information.

2.0 USING *LIFELINES* FOR LEGAL INFORMATION

LifeLines can show relationships among temporally ordered events. It has been used for showing youth records of the Maryland Department of Juvenile Justice and medical patient records (Plaisant et al., 1996; Lindwarm, et al.,

1998; Plaisant, Mushlin et al., 1998; Plaisant, Shneiderman et al., 1998). For this research project, we apply it to the visualization of the temporal events associated with a legal case.   The case modeled in the example is the Apple Computer, Inc. v. Microsoft Corporation and Hewlett Packard Company (Citation: 35 F.3d 1435) case (Figure 1).
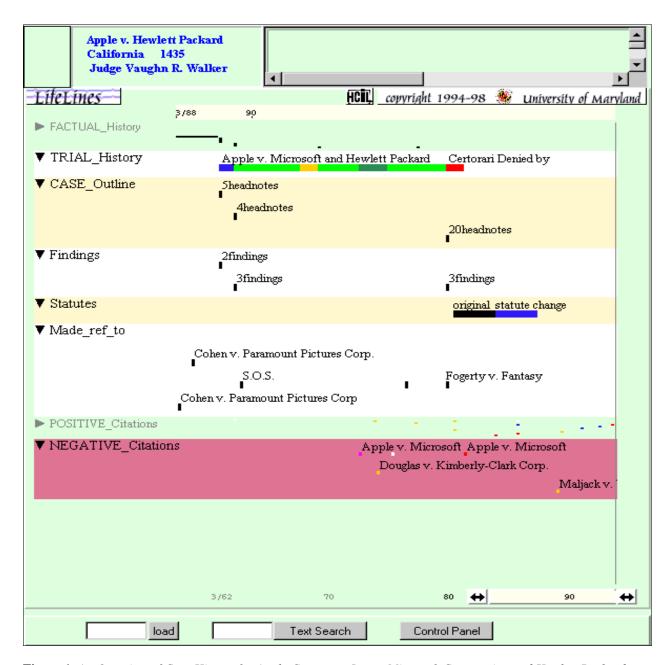

Figure 1. *An Overview of Case History for Apple Computer, Inc. v. Microsoft Corporation and Hewlett Packard Company*. The case history's facets include factual history, trial history, an outline of the case, findings, statutes, references, and citations.

Visualization of a case's events as they occurred in time may help in understanding the case as it progressed as well as provide an overview of the nature of events in a case. It may also provide direct access to the details of a case, like the text of specific headnotes, findings, citations, and references.

LifeLines uses *facets* and *aggregates* to organize and group events contained in a history. Aggregates typically combine events that are very similar but occur at different points in time. For instance, a judge's opinion about a decision is segmented by West Publishing into "headnotes". One aggregate might collect all the later cases which cited a given headnote. Facets are a way to group related aggregates. Visualization of the temporal order of events in a case may improve understanding of those events. It can also facilitate access to documentation about a case.

The *LifeLines* interface allows users to focus on aspects of a case that are of particular interest to them. For instance, users can open or close facets. A closed facet still reveals its "silhouette" (e.g. the top facet of Figure 1). Users can also zoom in and out or pan to see more events or get a better overview. They can access detailed information associated with the events by clicking on the objects representing events. Details appear in separate tiled windows on the side. Finally they can use control panels to determine the type and amount of information to be shown.

Temporal relationships are important in other aspects of a case such as its *factual history* and its *trial history*. The factual history includes the events leading to the actual manifestation of the case such as when a crime occurred, where it occurred and the people involved. The trial history includes the events occurring during the course of a trial such as mentions, decisions, petitions, and depositions. It is possible that statutes upon which a trial is based could change during the course of a trial.

3.0 THE APPLICATION OF *LIFELINES* TO THE APPLE COMPUTER, INC. V. MICROSOFT CORPORATION AND HEWLETT PACKARD COMPANY CASE

We will now review each facet of the proposed LifeLines overview of the Apple Computer, Inc. v. Microsoft Corporation and Hewlett Packard Company case.

The aggregates of *factual history* include the events leading up to a trial such as: who is involved, what is involved, when did/will the important events occur, where did/will the important events occur, and why did the participants act in this way (Figure 2). The factual history of the Apple Computer, Inc. v. Microsoft Corporation and Hewlett Packard Company case began in the mid-70's with Xerox's early design of a graphical interface. Facts in the case and their clustering in time can be reviewed easily (Figure 2). Following the timeline, one can see that first Microsoft announced plans to develop Windows, then an infringement action was brought by the plaintiff. Other highlights of events include the 1985 Agreement in which Microsoft was granted a license to use Apple's windows and icons in the first version of Windows (Myers, 1995). In return, Microsoft agreed to develop software for the Macintosh operating system. Thereafter, Apple took action against Microsoft and pursued a lawsuit for copyright infringement. In this case, the events tend to be spaced relatively evenly in time, while other case overviews might reveal periods of activity and inactivity. Dates can be estimated by looking at the timeline legend, and the exact date and other attributes can be read in a small side window when users bring their cursor over an event.
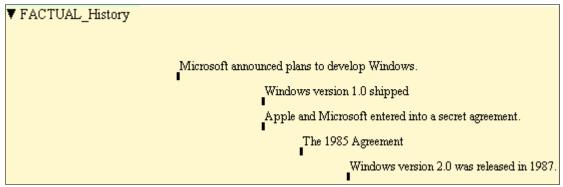

Figure 2. A subset of the factual history

The *trial history* aggregates include the mentions, decisions, petitions, depositions, etc. that were made throughout the course of the trial (Figure 3). In this example, color codes are used to denote the original case and the other colors include appeals and retrials and their status: affirmations, reconsiderations, clarifications, and denials.

Viewing the trial history with the timeline, one could observe that court hearings for the case began in 1989, and appeals consisted of affirmations, reconsiderations, and clarifications and ended in 1994 with the denial of the final appeal. Once again users can see the full title of each event in the aggregate by bringing the cursor over the event.
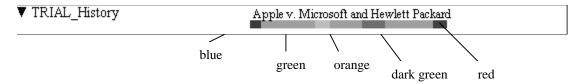
▼ TRIAL_History   Apple v. Microsoft and Hewlett Packard

blue   green   orange   dark green   red

Figure 3. Trial history facet

In the *case outline* facet, the headnotes (discrete aspects of the case) are displayed as aggregates (Figure 4). The case outline provides an overview of the headnotes of a particular court hearing. Retrieving more details by clicking on the aggregates (e.g., 5 headnotes), users would see that some aspects of the case involved the discussion of overlapping windows and the interpretation of the license agreement. Of course, access to the full transcript of the case itself could be made accessible, but it is not available in the current information system.

▼ CASE_Outline   5headnotes

4headnotes

20headnotes

Figure 4. Case Outline facet

The *findings* include aggregates of rulings (Figure 5) made by the judge. They include a summary of the facts of the case and are interpreted and available from the Westlaw legal information system. For instance, obtaining more details from the overview of findings, one would see that on March 20, 1989, there were two findings: 1) License did not cover enhancements to licensee's computer software program and 2) Licensee's computer program was not covered by license.

▼ Findings   2findings

3findings

Figure 5. Findings

The *statutes* facet aggregates the statutes involved in the case (Figure 6), alerting users of statute changes during the course of the case, and showing clearly which events preceded or followed the change of statute. The statutes in this case involved copyright laws (the statute change example illustrated here is hypothetical)

▼ Statutes   original   statute change

Figure 6. Statute history facet

The references are previous cases that a case referred to throughout the trial (Figure 7).   References in this case include the *Cohen v. Paramount Pictures Corp* case of 1988, the *Heston v. Farmers Ins. Group* case of 1984, and the *Gilliam v. American Broadcasting Co.* of 1976. Here the user chose to display the references in a compact manner, therefore limiting how many labels could be shown. An alternative option is to further spread all events on more lines and reveal all labels.
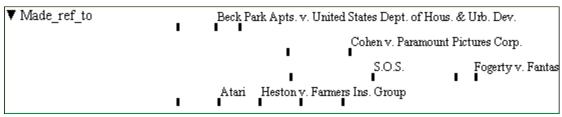

Figure 7. References facet

Positive and negative citations to the case are represented in Figures 8 and 9. Positive citations include cases that cited the Apple Computer, Inc. v. Microsoft Corporation and Hewlett Packard Company in good light, approving the decisions made in the trial. Examples of positive citations in the case include the *Asyali v. Sheraton Palace Hotel* case of 1993 and the *Smith v. Jackson* case of 1988. Negative citations include cases that cited the Apple Computer, Inc. v. Microsoft Corporation and Hewlett Packard Company case in a way that represents disapproval or disagreement of the process and outcome of the trial.   Examples of negative citations in the case include the *Douglas v. Kimberly-Clark Corp.* case of 1993 and the *Maljack v. UAV Corp.* case of 1997.
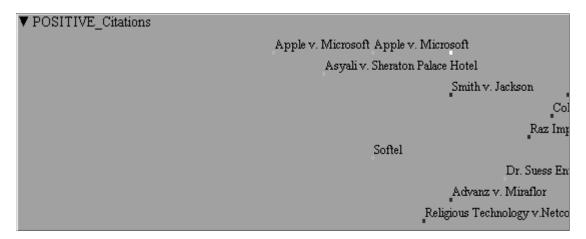

Figure 8. Positive Citations

Figure 9. Negative Citations

The backgrounds are color-coded green and red to represent positive and negative citations, respectively. This color-coding is consistent with how these colors are interpreted in North American culture. Each citation also has a color associated with it denoting how the citing case made reference to the Apple Computer, Inc. v. Microsoft Corporation and Hewlett Packard Company case. These dimensions of a case were represented in the attempt to

model case history using *LifeLines*. The categories include: 1) Examined (White) - The citing case contains an extended discussion of the cited case, usually more than a printed page of text, 2) Discussed (Blue) – The citing case contains a substantial discussion of the cited case, usually more than a paragraph and less than a printed page, 3) Cited (Orange) – The citing case contains some discussion of the cited case, usually less than a paragraph, and 4) Mentioned (Red) – The citing case contains a brief reference to the cited case, usually in a string citation (Categories taken from the *Using WESTMATE for Windows* Version 6.3 User Manual). Instead of assigning colors to indicate the depth of treatment categories, Westlaw uses stars: 1) One star represents the *Mentioned* category, 2) Two stars represent the *Cited* category, 3) Three stars represent the *Discussed* category, and 4) Four stars represent the *Examined* category. The size of events on LifeLines could also be adjusted to represent such an attribute.

4.0 INTERACTION WITHIN THE INTERFACE

The *LifeLines* interface displays legal information in a compact, graphical way instead of a lengthy textual interface that legal experts and other users are presented with when searching for information. We would like to reduce the cognitive load on users to process what is often lengthy text and shorten the time it takes to search for the desired information. The interface gives users an overview of case history and allows them to zoom in on a point in time and view events of interest. Users then can determine if they have found what they are searching for. If so, they can retrieve more details. This may relieve users from having to sort through the details up front and locate the information they are looking for.

Double-clicking on an event causes more detailed information to be displayed in adjacent window (or tiled windows). Performing this action on events contained within the factual history leads to a summary of the original case (Figure 10).
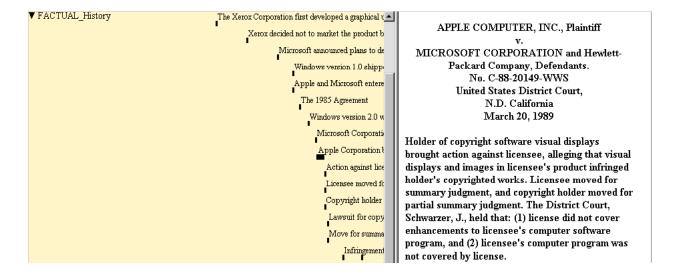

Figure 10. The right window shows the result of double-clicking on an event within the factual history.

Double-clicking on the headnotes opens up two windows, one containing a list of headnote links and the other containing the text of a particular headnote (Figure 11). For the trial history, double-clicking does not lead to more information in our prototype but could potentially lead to the whole text of pertinent case.
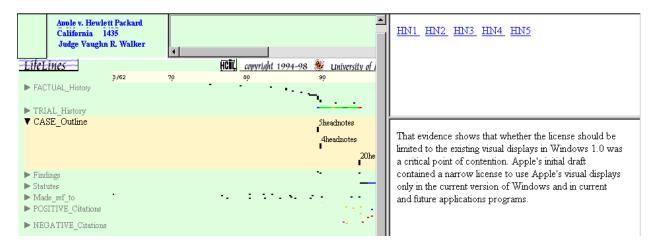
Figure 11. The tiled windows to the right of the display show the results of double-clicking on a headnotes event in the case outline. The list of headnotes appears on the top right and the 1st headnote text in the bottom right.

Double-clicking on the findings leads to a similar result. Findings are presented rather than headnotes.

Double-clicking on the references and citations would load the part of the case where the reference is made or open up the text of the citing case where the case being studied is cited.

Users can filter on events contained in the case history either by a simple string search or by selecting an event's attribute and search for other event with the same attribute value. For example, each citation has a "trial date" attribute. So users can reveal all the citations to a given trial by selecting the date of a trial and searching for all other events with that date in their attributes (Figure 12(a) and 12(b)). All relevant events are shown normally while nonpertinent items appear grayed-out. Similarly users can relate citations with their corresponding headnotes. Users can also filter on attributes such as color, thickness of an icon representing an event, or labels.
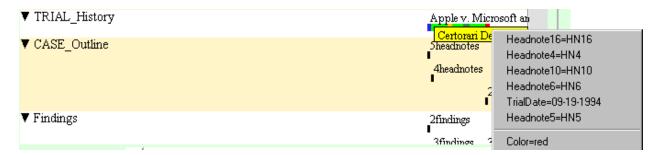

(a)

(b)

Figure 12. Illustration of filtering (a) A menu displaying attributes to filter on and (b) Filtering results. This is a basic filter on a color attribute that is associated with event.

5.0 FUTURE WORK

The data for our prototype was created manually, but an extraction tool to create LifeLines data automatically is needed to make this type of visualization practical. Because a statute's legislative history includes all of the events resulting in its enactment (Kunz, et al., 1996), the complex versioning of statutes would benefit from specific tools similar to software versioning. Recommendations for new features of *LifeLines* include 1) better handling of labeling, especially long labels, 2) the development of vertically expandable aggregates (opposed to horizontally only expansion), 3) better visualization of related events beside the current filtering (e.g. showing connecting lines across facets). In addition, state diagrams can be used to better display the headnotes history and tools for showing a citation network could be linked to *LifeLines*. The citation network would highlight the citation of interest and use arrows to indicate which cases cited it and which cases it cited.

We have shown that temporal visualizations such as LifeLines have the potential to be useful for visualizing legal information. Our experience suggests that complementing and coordinating multiple views of the data will be an important component of successful graphical tools for legal applications.

A demonstration of this prototype can be viewed at http://www.cs.umd.edu/hcil/west-legal/lifelines/index.html.

The LifeLines project home page is http://www.cs.umd.edu/hcil/lifelines

6.0 ACKNOWLEDGMENTS

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