ABSTRACT
As the ease of accessing and generating large quantities of information increases, people’s ability to navigate through that information and maintain personal perspective decreases [1]. This paper describes an interface element, the Relativity Controller, that enables users to specify what is important to them and modify the portion of their perceptual space that information takes up, using a variation on fisheye view techniques [2]. This process is described as a generalized tool for annotating documents and for controlling the balance between detail and context in representations of document contents. Peripheral portions of documents are condensed so that salient segments can be expanded and whole document contexts maintained. It will be shown here in its application to video data.


INTRODUCTION
While fisheye views are common in human cognitive processes, such as perception and memory, and have been demonstrated as useful in computer interfaces [2], they are rarely used in common computer applications. This may be due to a lack, thus far, of suitable interfaces for personalization of documents.

The need for this type of control was expressed most recently by Mills, Cohen & Wong [3]. They enabled users to magnify details and maintain displays of context by creating a hierarchy of video data. Users successively extract increasingly detailed segments from larger contexts. However, this method required numerous user actions and filled the electronic desktop with several windows of video, thus bringing up questions of efficiency and cognitive overload.

DESCRIPTION
The Relativity Controller addresses these concerns by maintaining a single window to the data and giving users the ability to adjust the degree of fisheye magnification in a single step — the user always has visual and navigable access to the whole document via the scrollbar.

In order to enable users to navigate among different perspectives from the scrollbar, the scrollbar itself must maintain a fisheye representation consistent with that of the document. Chimera [4] demonstrated scrollbar satellites, called Value Bars, that graphically indicate relative values of data attributes independent of the actual data’s representation in a window. This is accomplished by scaling proportions of attribute indicators according to their values in a bar parallel to the scrollbar. The Relativity Controller leverages off this idea, but instead uses a single bar to perform both the functions of scrollbar and Value Bar. Indicating the scope of salient segments in the scrollbar allows users to simultaneously navigate through the document and transform its represented meter — from regular intervals to intervals that scale according to salience.

APPLICATION TO VIDEO DATA
In this implementation of the Relativity Controller, users are provided with a means of annotating and modifying perspective on digital video stored in the QuickTime movie format on

Figure 1. Adjusting perspective on video data. In this figure, the user has marked three salient segments of video. Notice how these marks in the scrollbar get wider, as the spacing between them condenses and darkens, when the mouse is moved up. The cursor, to the left, changes to reflect the size of the marks in relation to the length of the whole video.
The user expands a pre-scaled text abstract by dragging the mouse to the right. The windows to the right show the resulting succession of increasingly detailed segments of text coming into view. Notice that the size of the marks in the scrollbar show relative proportions of marked and unmarked text being displayed.

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REFERENCES

DISCUSSION
Initial user studies have indicated that the relativity controller is an intuitive method of establishing and representing personal perspectives in video documents. Video editors found it useful as a pre-editing and archiving tool. Others saw it as potentially enhancing interpersonal communication: sharing annotated and scaled video that retains its original context might facilitate a better understanding of unique points of view.

Issues that need to be further addressed include methods for modifying the scope of marks, a more obvious means of initiating perspective change, and ways to represent layers of collaboration in annotation. In addition, I plan to apply the controller to other data types. Figure 2 shows a rough sketch of how text could be presented as a pre-scaled abstract in search systems. People could scan and retrieve information at personally relevant levels of magnification, thus making the online inclusion of complete works a viable option.

CONCLUSION
The Relativity Controller is an important development that has practical application to the navigation and visualization of various types of information, enabling people to construct data spaces that are reflective of their personal perspectives.