# Souvenir:

Flexible note-taking tool to pinpoint and share media in digital libraries.

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## Categories & Subject Descriptors

H.3.7 Digital Libraries, User Issues; H.5.1 Multimedia Information Systems, Video (e.g., tape, disk, DVI); H.5.2 User Interfaces, Graphical user interfaces (GUI)

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Digital libraries, multimedia annotation, audio/video indexing, commentary, personalization, streaming media, pen-based input, digital ink, note-taking.

## ABSTRACT

Digital media audio/video can be difficult to search and share in a personal way. **Souvenir** is a software system that offers users a flexible and comprehensive way to use their handwritten or text notes to retrieve and share specific media moments. Users can take notes on a variety of devices, such as the paper-based CrossPad, the Palm Pilot and standard keyboard devices. Souvenir segments handwritten notes into an effective media index without the need for handwriting recognition. Users can use their notes to create hyperlinks to random-access media stored in a digital library. Souvenir also has web publishing and email capabilities to enable anyone to access or email media moments directly from a web page. Souvenir annotations capture information that can not be easily inferred by automatic media indexing tools.

**Unstructured Handwritten Notes**: Handwriting is ideal for taking quick notes. However, handwritten notes are "unstructured" and text notes are highly structured. Hence, handwritten notes need to be structured to enable both digital ink and text in the same Souvenir document and to be an effective query index for digital media. Furthermore, people need to be able to interact with digital ink at a level of organization that is easy and familiar.

**Media-enabled Notes**: Souvenir time stamps the user's note-taking activity so that these time stamps can be used to synchronize the notes with the timeline of a media recording to enable pinpoint media playback.

**Segmentation of Handwritten Notes**: Souvenir organizes digital ink into segments by exploiting spatial and temporal characteristics of how people write without having to recognize their handwriting. Souvenir employs a "segment-oriented" framework to support: (a) both handwritten and text notes as well as (b) the playback of multiple media recordings in the same document, (c) to enable users to interact with digital ink at a higher-level of organization than instead of having to manage many individual strokes, and (d) to create hyperlinks to random-access media wherever it is stored. Users can easily edit the detected ink segments by merging or splitting them.

**Text Annotation of Digital Ink**: Handwritten notes are often hard to read and therefore difficult to share with others. In Souvenir, users can easily annotate an ink segment, where the text is displayed directly below it.

**Media Synchronization**: Souvenir can automatically synchronize notes and media if (a) the audio/video is recorded on the same device used for taking notes, or (b) the media playback occurs in the Souvenir Media Player. In all other cases, users simply need to identify a specific media moment to be linked with a specific note. After that, Souvenir does the rest. Double clicking on the digital ink or text will play the associated media.
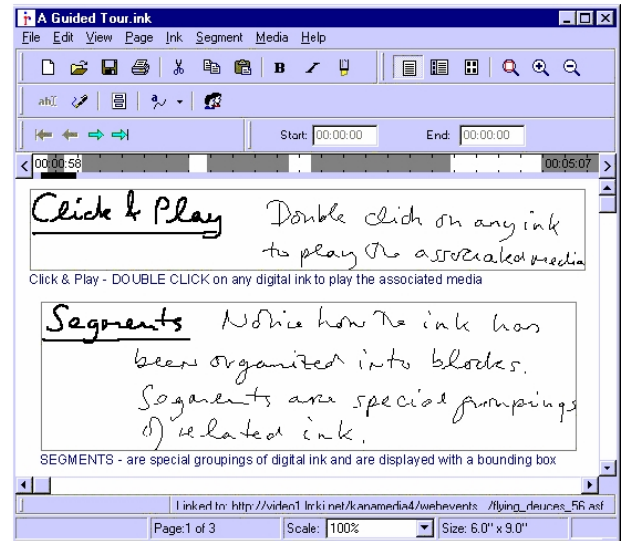


**Figure 1**: *Souvenir Desktop* displays media-enabled ink and text.

**Text View of Notes**: Souvenir has been designed so that users can use their text editing skills to organize and refine their initial, quick notes to create a full report to be shared with others. They can edit and rearrange their text notes as well as "copy & paste" notes from other Souvenir documents that reference different media files. The Souvenir Desktop contains a media timeline that enables users to fine-tune the relationship between their notes and the associated media.

**Web Publishing & Email Sharing**: Users can publish their Souvenir documents as a set of web pages so that others can access or share via email specific media moments directly from a web page. The media owners do not lose control over their content, because users are only creating and sharing pointers to specific media moments instead of actually copying the content.

**Discussion**: Souvenir has been downloaded by quite a few people. Informal tests of Souvenir's digital ink segmentation algorithm are encouraging. Souvenir makes it easy for anybody to bookmark specific moments in streaming media hosted on the Internet. However, some media sites make it difficult to identify the URLs of their media content to prevent "deep linking."