Selection tool for handwritten text on bitmap pictures

Duration : 6 mois
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This internship takes place in a project aiming at designing an annotation tool for handwritten document, in the context of genealogical research. This annotation will ease transcription with interactive and automatic methods. Interactive methods rely on tagging words to reconstruct the structure of the document. Automatic methods require learning bases, and ideally segmented input. This is why we propose to design an efficient pixel selection tool.

Picture editing software feature pixel selection tools for decades. They usually propose specific shape selections, free-form, and more interestingly, several variations of *magic wands*. Apple applications also have a tool to define the transparency color so that pictures integrate better on the background of a document or slides. Research explored other methods. Liu *et al.* designed a selection tool similarly to a painting tool [1]. Leitner *et al.* proposes a selection tool which selects objects by crossing them [2]. This is not a pixel selecting tool, but the interesting feature that might be interesting for pixel selection is that they use a selection threshold, which depends on the cursor speed. Another approach is to use simple selection tools, but different views of the same picture, in particular different histograms [3].

Description

In our context, what we would like to select is text, which are darker pixels than the background. However, the quality of documents, and their scans cannot guarantee that the background color is the same on the whole document. Moreover, several lines of text can overlap.

We propose a new selection tool, which uses 4 degrees of freedom: x,y position, size, and threshold. The difficulty is that consumer-grade pointing device have at most 3 continuous degrees of freedom. The question is: how can we map these 4 parameters to 3 degrees of freedom? We have several leads. One of them consists in adapting the threshold depending on the analysis of pixels in the cursor area. Another idea consists in mapping the threshold to the cursor speed. The candidate will implement and evaluate these mappings, and others he will design.

The candidate's work will consist in:

- Studying related work on pixel selection tools, especially for handwritten text.
- Defining a design space for selection interaction techniques.
- Designing existing and new interaction techniques, and compare their performance with a user study.

Candidate

A successful candidate must show a great interest in performing high quality research in Human-Computer Interaction. He or she must speak and write English fluently, and experience or strong interest in software development. Creativity, independence, team working and communication skills are valuable advantages.

References

[1] J. Liu, J. Sun and H.-Y. Shum, “Paint selection,” in *SIGGRAPH’09*, 2009.

[2] J. Leitner and M. Haller, “Harpoon Selection: Efficient Selections for Ungrouped Content on Large Pen-based Surfaces,” in *UIST'11*, 2011.

[3] F. Chevalier, P. Dragicevic and C. Hurter, “Histomages: Fully Synchronized Views for Image Editing,” in *UIST'12*, 2012.