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Slides for teaching: the *slim* approach*

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*We describe the **slim** approach for making presentations using mind maps, which is particularly useful to assist the "slide maker" while thinking about and structuring her presentations. As presentations become larger, like for teaching purposes when creating and updating a course, we believe this approach to be particularly effective, and that common tools like PowerPoint fail to provide support to the user in managing and organizing the information she wants to lay out. We also present our effort in creating the **sli-m**, **sli**de **m**achine, a web application publicly available at www.sli-m.com, that materializes our idea allowing further enhancements like collaboration between users or integration into existing e-Learning portals.*

* An extended version of this paper is available at www.sli-m.com/publications

1.Introduction

In the last decade, the employment of slides as teaching tools has seen a large increase, especially in universities and technical schools. Although several studies indicate that students prefer computer slides to other types of material [Bartsch and Cobern, 2003, Parker et al, 2008], their effectiveness from the pedagogical point of view is still debated. In their work, Bartsch and Cobern point out that slides become less effective if they are complex or overloaded with multimedia elements such as sounds or irrelevant pictures. Therefore, the main problem is **how to create effective presentations**.

Presentations are usually created with the help of computer programs such as PowerPoint. Since their introduction in the late '80s, these tools have always been designed around the What You See Is What You Get (WYSIWYG) paradigm, in the sense that they allow to **draw** a presentation exactly the way it will look like. However, they do not assist the user in what we believe is the most important phase, namely to **think** what it will look like, and structure the set of slides accordingly.

Starting from this observation, we elaborated a new approach for creating presentations using mind maps, that are powerful instruments for studying and organizing information. In addition to this, we developed a WYSIWYW (What You See Is What You Want) tool to build mind maps that automatically

generates a set of slides. These slides are clean and **slim**, in the sense that they are the result of a methodical process of reasoning, thus they only contain relevant information.

The remainder of this paper is organized as follows: in Sec.2 we present mind maps and we detail our approach for making slides; in Sec.3 we present our tool and the design principles surrounding its development; in Sec.4 we conclude and outline future directions.

2. Making Slides out of Mind Maps

Mind maps, first proposed by Buzan in 1970, are diagrams used to represent ideas and information and arrange them around a central concept [Buzan and Buzan, 1997]. The elements of a mind map are organized according to the importance of the concepts, and are classified into branches, with the goal of showing the connections between pieces of information.

Efficacy of mind maps has been investigated in the educational field and they are successfully applied to various disciplines. For instance, they have been used in Executive MBA programs [Mento et al, 1999] for business case teaching, where students are required to collect, interpret, and communicate large quantities of complex information, or in medicine [Farrand et al, 2002] to help students to improve factual recall from written information. Moreover, [Brinkmann, 2003] pointed out that mind maps are also useful for teachers, who can use them as a pedagogical tool helping, among other things, to organize information and to meaningfully connect new information with existing knowledge.

Many of the benefits of using mind maps derive from their graphical representation which makes it possible to easily add and, especially when using computer-aided tools, reorganize concepts. In this paper we apply mind maps to the field of studying, though not directly as the above mentioned works, but rather as a tool to create presentations. To some extent, mind maps are our answer to the problem of how to create effective presentations. A similar use of mind maps has already been proposed by [Holman et al, 2006]. They still rely on classical tools such as PowerPoint to create a set of slides, but they sort them using a mind map, thus introducing a spatial representation of the progress of the presentation which contributes to increase the quantity of information which is retained by the audience.

The **slim** approach is similar, but makes mind maps central to the creation of the whole presentation, including the content of each individual slide. As Holman et al., we start from the title of the presentation as key concept, we arrange sections around it, then subsections and slides. Next we increase the depth of the map, by adding **elements** that represent the content of each slide, which is usually organized in items and subitems. Finally, we also support other graphical objects, such as images or blocks (e.g., for definitions or examples).

We identified two main phases while creating a presentation: in the first one, the concepts are organized and sorted, while in the second one the graphical layout of each slide is arranged (this includes adding images or performing small changes in the content, for instance to avoid overly long sentences).

These phases are cyclically repeated while updating the content of a presentation (consider for instance course material that is revised each year). Our approach stresses the importance of the first phase, thus the use of mind maps as tools to structure information.

As an example, consider the case where a user defined a slide with some items and then realized that each item deserved more attention. With our approach, by simply moving the item to a higher hierarchy level, the slide becomes a subsection and each item is converted into a slide. Using a computer program for editing mind maps, this task can be accomplished with a drag-and-drop operation, while ordinary tools for presentations lack this possibility as they are not designed to assist the user in the process of reorganizing the information.

3. Making Slides with sli-m.com

Our approach would not be complete without a tool that supports the user in building a mind map and capable of automatically generating slides from it. To this aim, we developed the **sli-m** (**sli**de **m**achine), a web application publicly available at www.sli-m.com. The guiding principle in the development of this application is the use of open formats and standards, and we plan to make the whole code open source shortly. Following this principle, any presentation created with **sli-m** is public by default and released with Creative Commons license (but the owner can of course make it private if she so wishes).

The core of the **sli-m** is built around Freemind, an open source tool for building mind maps. As Freemind stores mind maps in a XML format, we created an XSLT stylesheet to transform maps into presentations. We chose LaTeX/Beamer as final format as it fits our WYSIWYW approach and already provides a number of interesting features, including automatic sectioning, creation of tables of contents and different themes and colours.

In addition to this, our application offers a web interface, that allows the building of a mind map and provides a live preview of the active slide. The live preview (that can be resized, closed or detached in a separate window) is particularly useful when most of the presentation is already structured, and the author needs to turn to the layout of each slide.

A web application rather than a standard application was developed because it is platform independent, pervasive (currently, **sli-m** is hosted on Amazon EC2 cloud) and needs no configuration or upgrade by the user. Furthermore, thanks to the fact that it is a web application, it can be easily extended to facilitate collaboration between users.

The WYSIWYW approach that characterizes the **sli-m** mitigates many inconsistencies in style, such as non-coherent colours, different font sizes and misaligned bullet points.

4. Conclusions

We have presented a new approach for making presentations based on mind maps and the **sli-m** (**sli**de **m**achine), a web application that implements this idea.

The tool is at an early stage of development, and many features are yet to be implemented. To mention a few, we would like to support the OASIS Open Document format as an alternative to LaTeX/Beamer, to improve collaboration by allowing users to share (parts of) presentations and to introduce support for creation and updating of multilingual slides.

The web site also requires improvements: by exploiting the new features of HTML5, we would like to let users work in off-line mode as well as with their mobile devices, and more in general we plan to design the application in such a way as to facilitate the integration with existing web portals, for instance e-Learning platforms.

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