

Abstract

Content distribution in a page designed for printing is a difficult task performed by human editors. There are applications and tools to help the editor in this task, but it is still a manual, interactive process that is made more difficult when content is distributed

in columns, as is the case of newspapers. This work describes an algorithm to automatically distribute content in a printable page. Our implementation tries to use all the page, dividing it among the items to be placed according to their area.

Motivations and Goals

One of the problems in the design of magazines and newspapers is to distribute elements on a page. A designer is responsible for creating the page layout, distributing elements to achieve some degree of aesthetic quality. To reach a high-quality final result, that professional usually edits the layout several times, changing the news positions and format. There are tools to help the designer to format the page layout, but these tools do not generate the layout automatically and only support human intervention.

This work is to describe and present results of an algorithm to automatically distribute elements into a page. This algorithm was developed as part of the APL (Automatic Page Layout) project. The current version is able to produce documents akin to newspapers covers. In our case, a user selects some news and pictures to be placed on the page and the algorithm distributes these elements.

This poster was produced by our algorithm. It received the different news and pictures, titles and other data, and distributed the text on a 7-column page.

First Results

Initial tests automatically generated newspaper covers, containing pictures and news. We have high-quality results in a short processing time. The figures show examples of newspaper cover that has as input seven news and two pictures, but we are also able to produce other types of documents, as for example photo albums and collections of RSS feeds.



The layout for this poster was generated as a result example.

Approach and Methodology

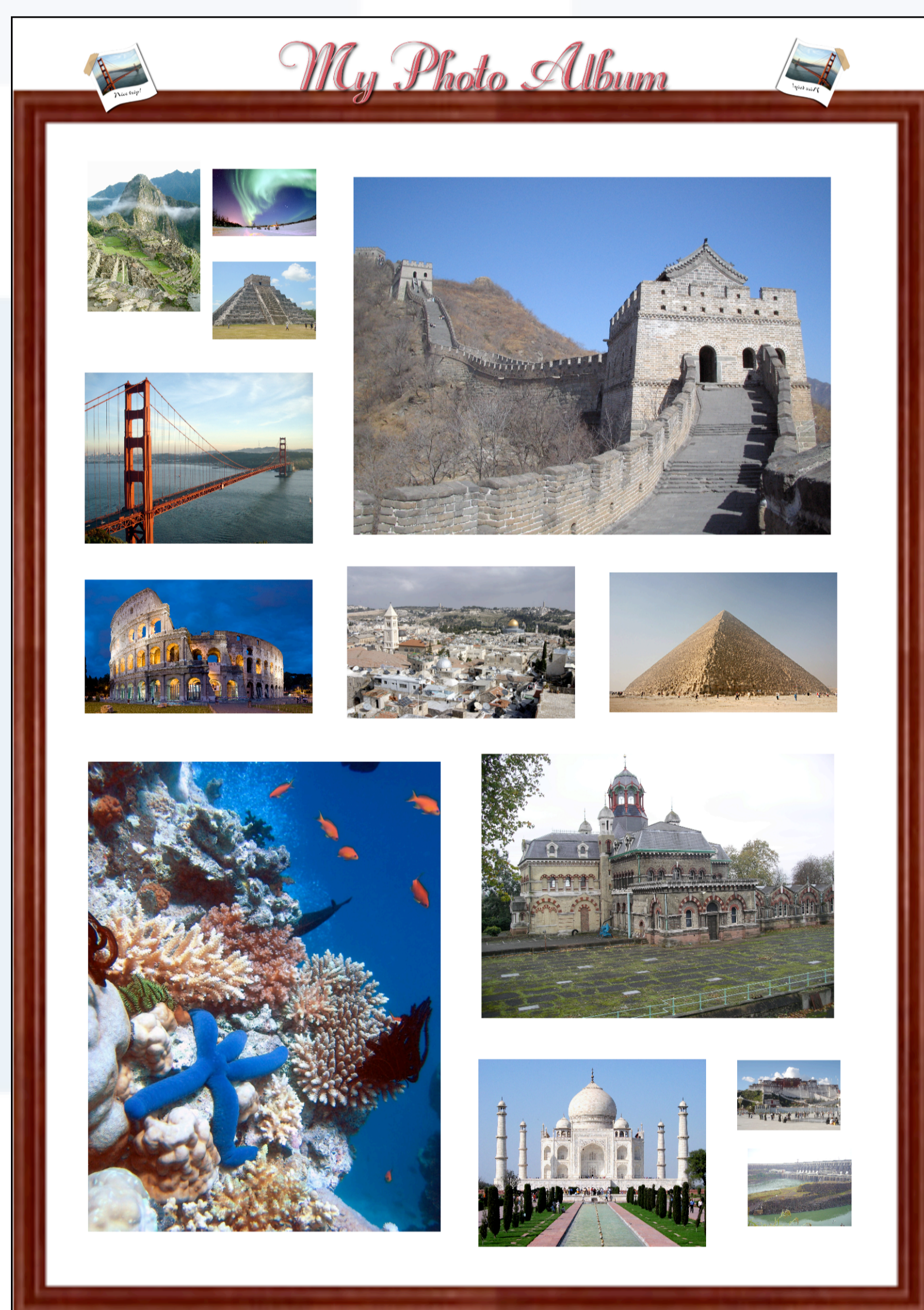
João Batista de Oliveira
Researcher

In our algorithm, the elements of a page are news, pictures and groups of such elements. News are composed by a title, the content text and optional attributes, such as author or the page number to the full news. Pictures are placeholders for an image or picture, and groups are used to aggregate them.

The algorithm is based on a divide and conquer strategy: it receives the page width and height and a list of elements to be placed, and through consecutive bisections the page is divided into regions, and we try to allocate the required elements into each region. In our case, bisection is made by a horizontal or vertical

line dividing the longest side of a region into two new regions and, similarly, the list of elements is also divided. The page is divided into columns as in a typical newspaper, and this restriction has to be followed by the bisection process. Moreover, news have to use an integer number of columns.

The algorithm tries to keep the elements in reading order (as given by the input sequence), from the top left to the bottom right. This strategy reduces the amount of possibilities to be examined and also reduces the surprise of the user, as news are not placed randomly. Initial tests automatically generated newspaper covers, containing pictures and news. We have high-quality results in a short processing time.



Example of an automatically generated picture album page.



Example of a page generated from a RSS feed.

Related Works

Jacobs et al. present an algorithm to generate layout automatically, using templates to guide the layout construction. Harrington et al. propose a genetic algorithm to distribute elements on a page, but the computational cost of a genetic algorithm is very high for massive production. The distribution of photos on a page was researched by Atkins. Another solution for this problem using genetic algorithms was presented by Geigel and Loui.

Conclusions and Future Works

This poster presents a new algorithm to distribute content automatically in a printable page divided into columns, preserving reading order and taking into account the area of each news. Future works include finishing the prototype to make it available for tests and evaluation; extending the page layout from one to several pages and the development of a user interface for simpler use.



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This work was (partially) developed in collaboration with HP Brazil R&D.