Abstract

One of the chief problems facing academic researchers in all areas of study are the harsh page-limits imposed by conference proceedings and journals. Under such constraints, ideas of large size simply must be truncated to fit. In paper we present a new text layout methodology called Level of Detail Typesetting that allows for ideas of any size to be expressed in any Draconian page limit without truncation. The technology allows the graceful degradation of presentation quality as the page limit decreases.

Introduction

Faced with the harsh page-limits of the academic publishing industry, scientists are routinely forced to limit the amount of information in published papers. This means that important technical exposition, proofs, figures, citations, footnotes, appendices, and non sequiturs must invariably be cut from a paper prior to publication. This leads to billions of dollars in public and private research grants ultimately being sent to the "cutting room floor."

There are a number of traditional solutions to this problem.

The classic solution is to produce a separate "deleted scenes" paper (often called a "technical report" for historic reasons) that includes any text that was excised during the editing process. A minority of researchers publish their entire CVS or Subversion revision history (Murphy 2007). This approach suffers several drawbacks: At least two versions of the paper must be simultaneously maintained; a reader must acquire both to achieve all knowledge; technical reports are not usually subject to peer review, thwarting the academic process; and university publication standards may still yet limit the length of a technical report.

Another solution from the news wire industry is the "pyramid model" where information is presented in a strictly more-to-less important order, so that any prefix of the article maximizes the content value for that number of characters. This allows the publisher to print exactly as much of the article as can fit in the space available. This technique also suffers drawbacks, mainly that the natural textual flow can be interrupted by this prioritization. Additionally, the pyramid model does not well accommodate mainstays of the academic model such as figures, citations, and politically necessary acknowledgement sections.

Modern typesetting has rendered the pyramid model obsolete. The inspiration for this technology comes from the letterlaying regime used in the Star Wars Movie (Lucas 1977). In the opening scene text is displayed to us at an angle, receding to the vanishing point. Were our eyesight sufficiently acute, we would be able to read further and further into the distance; since the Star Wars Movie begins on "Episode 4" it is even suggested to us that the plot summaries for Episodes 3 through negative infinity in fact are written in yellow stardust on that very horizon. Yet all of this takes place in the finite two-dimensional area of the silver screen! Although such technology was once thought to be exclusively the purview of Space, we now know how to emulate it in print.

Content Attenuation

The primary technology we employ is the ability for modern computers to render typefaces at arbitrary size. Each section, paragraph, sentence, or word, is prioritized by its worth as in the pyramid scheme. Then, successive components of that prioritized string are rendered at progressively decreasing type sizes so as to fit in an arbitrary amount of space.

To illustrate the concept, this paragraph contains a list of the things that the author ate today, in decreasing importance: Big Mac, McDLT, a quarter pounder with some cheese, Filet-O-Fish, a hamburger, a cheeseburger, a Happy Meal, McNuggets, tasty golden french fries (in regular and large sizes) and salads chef or garden, or a chicken salad oriental, big big breakfast, egg McMuffin, hot hot cakes and sausage, maybe biscuits, bacon egg and cheese, or sausage danish hash brown too, and for dessert: last apple pie, or smudged three varieties a soft serve cone; three kinds of shakes, or absolutely any codes and to drink a Coca Cola Diet Coke or orange Sprite and coffee (decaf too) and also orange juice; I love McDonald's, good times, great taste and I get this all at one place.

After that exhaustive list, the paper can proceed with the proper flow by restoring the normal font size. The attenuation function can be chosen more or less arbitrarily. A simple choice halves the font size after \( n \) characters, then \( n/2 \) characters, then \( n/4 \) characters, etc., ensuring that an infinite amount of text can fit in a small finite space determined by \( n \) and the starting font size.

Extensions

This technique proves useful for most documents, but not all ideas can be easily expressed in linear form. For instance, many academic documents contain (or would contain, if not for the limitations of their primitive 1960s typesetting applications) footnotes, with footnotes annotating those footnotes, footnotes on those footnotes, footnotes, footnotes, footnotes, and so on. If every footnote were its own sub document, the file could grow without limit, an nothing less than drastic footnotes footnotes could be used.

Because the amount of text in such systems can be uncountably infinite, an extension to our system is necessary to allow for their layout. This extension is based on L-systems (Reed 1998). Using, for example, the Sierpinski triangle, we can lay out an arbitrary infinite nesting of footnotes, assuming a footnote is less important than the footnote it annotates.
We begin by writing our text line as in Figure 1. At the point we wish to insert a footnote, we make a small diagonal diversion from the line, on which the footnote is displayed (Figure 2). Such footnote lines support footnotes themselves (Figure 3), etc.

One possible drawback of such layouts is that while they accommodate an infinite amount of text, they use zero area, tending towards a page that is completely blank in the limit. For future work, we believe layout schemes could be devised based on space-filling curves such as the Hilbert Curve (Figure 4); for infinite amounts of text such curves produce aesthetically pleasing completely black pages (Figure 5).

Conclusions

Unencumbered by the constraints of having to produce a concise summary of this work, we instead repeat it in its entirety so as not to leave anything out.

Level-of-Detail Typesetting of Academic Publications

Tou Miner III, Tou Miner III, Tou Miner III, Tou Miner III, Tou Miner IV, Tou Miner V

Abstract

The advent of desktop-publishing has brought academics greater latitude in all aspects of publishing, especially in the typesetting of their papers. In this paper, we consider a number of such constraints, some of which may be more easily accommodated by the new paper layout possibilities provided by the desktop-publishing revolution. One such constraint is that all footnotes must be placed at the bottom of a page. Fortunately, this constraint may be easily accommodated by our Dimension page font without interruption. The technology allows the gradual development of a page layout that is not constrained by the limitations of printed text. Although each technique was once thought to be exclusively the property of print-on-demand, these techniques can be used to create an entirely new way of producing text.

Introduction

Packed with the minimal limits of the academic publishing industry, scientists are required to limit the amount of information published in their papers. This means that important technical reports, graphs, figures, citations, footnotes, appendices, and non-academic materials must inevitably be cut from a paper prior to publication. This leads to billions of dollars in public and private research grants ultimately being sent to the “cutting room floor.”

There are a number of solutions to this problem.

The first solution is to produce a separate “deleted section” paper (often called a “technical report”) for those who would like to read the full text of a paper that was censored during the editing process. A minority of researchers publish their earlier CVS or Subversion revision history (Murphy 2007). This approach suffers several drawbacks. At least two versions of the paper must be simultaneously maintained, and it may not even be possible to retrieve all knowledge: technical reports are not usually subject to peer review, threatening the academic process; and university publication standards may still limit the length of a technical report.

Another solution, from the law of industry is the “pyramid model” where information is presented in a strictly hierarchical order, so that each paper or article maximizes the content value for that number of characters. This allows the publisher to print exactly as much of the article or as can fit in the space available. This technique also suffers drawbacks, mainly that the natural format for is disrupted by this prioritization. Additionally, the pyramid model does not well accommodate the maintenance of the academic model such as figures, citations, and politically sensitive acknowledgments sections.

Modern typesetting has evolved the pyramid model obsolete. The inspiration for this technology comes from the layout of natural paper used in the Star Wars novel (Lucas 1977). In the opening scene text is displayed at an angle, revealing the things written. Were our eyesight sufficiently acute, we would be able to read further and further into the distance, since the Star Wars novel begins with a page that provides a new one characterized by a yellow stand-out on that very location. Yet all of this is taken place in the finite two-dimensional area of the silver screen. Although each technique was once thought to be exclusively the province of Space, we now have been enabled to print all of this in the space as well.

Content Attenuation

The primary technique we employ is the ability for modern computers to recognize types of arbitrary size. Each section, paragraph, sentence, or word, is prioritized by its location in the pyramid model of the paper, and that prioritized order is maintained as progressively decreasing type sizes as we fill in an arbitrary amount of space.

To illustrate the concept, this paragraph contains a list of the things that the author are today. In decreasing importance: Big Bill, MIDE, a quarter pounder, California cheese, Fitch-O- Fink, a hamburger, a cheeseburger, a Space Needle, McPinto, tasty apple which isn’t the normal apple, normal apple and milk shake, a cracker and orange, big by hondah, big McMount, but not only are, amongst all those givens, but meat and cheese. Meanwhile, the reader is now in the middle of the pyramid, where the Matek is no longer perceived.

After that exhaustive list, the paper can proceed with the proper flow by restoring the normal font size. The attenuation function can be chosen near or line arithmetically. A simple choice: between the first two characters, then ±2, characters, then ±4 characters, then ±8 characters, etc., meaning that an infinite amount of text can fit in a small finite space determined by the starting font size.

Extensions

This technique process would be at most documents, but all these can be easily expanded in future times. The attenuation function can be chosen near or line arithmetically, with footnotes amending these

Figure 4. The Hilbert Curve.

Figure 5. Text aesthetically laid out on a Hilbert Curve.

Bibliography

2. Lucas, George; “Star Wars Movie”, The Movie Theatre, 1977