Adaptive Layout for Dynamically Aggregated Documents

Evan Schrier[1] **Mira Dontcheva**[1] **Charles Jacobs**[2] **Geraldine Wade**[3] **David Salesin**[1,4]

[1]Computer Science & Engineering
University of Washington
Seattle, WA 98105-4615
evans0@msn.com, mirad@cs.washington.edu

[2]Microsoft Research, [3]Microsoft
One Microsoft Way
Redmond, WA 98052-6399
{cjacobs, gwade}@microsoft.com

[4]Adobe Systems
801 N. 34th Street
Seattle, WA 98103
salesin@adobe.com

ABSTRACT

We present a system for designing and displaying grid-based document designs that adapt to many different viewing conditions and content selections. Our system can display traditional, static documents, or it can assemble dynamic documents "on the fly" from many disparate sources via the Internet. Our adaptive layouts for aggregated documents are inspired by traditional newspaper design. Furthermore, our system allows documents to be interactive so that readers can customize documents as they read them. Our system builds on previous work on adaptive documents, using constraint-based templates to specify content-independent page designs. The new templates we describe are much more flexible in their ability to adapt to different types of content and viewing situations. This flexibility comes from allowing the individual components, or "elements," of the templates to be mixed and matched, according to the content being displayed. We demonstrate our system with two example applications: an interactive news reader for the New York Times, and an Internet news aggregator based on MSN Newsbot.

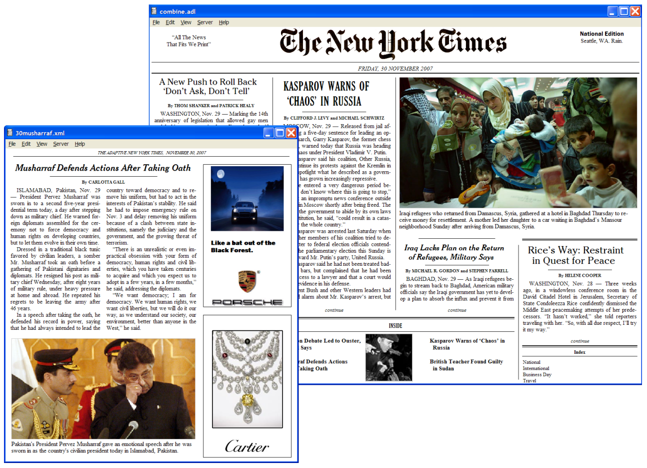
ACM Classification H5.2 [Information interfaces and presentation]: User Interfaces. - Graphical user interfaces.

General Terms Design, Human Factors

Author Keywords
Adaptive layout, grid-based layout, constraints, PDF, XML, XSL, CSS.

INTRODUCTION

The Internet makes it possible to easily assemble documents using information from many disparate sources. As a result, these documents, which we call *aggregated documents*, are becoming more and more common on the World Wide Web. Today, we see these documents at news aggregators, search engines, and RSS readers. However, aggregated documents currently remain nothing more than a list of hyperlinks, text, and images. We present a system that allows designers to create rich page layouts that re-introduce the graphic designs



"All The News That Fits We Print"

The New York Times

National Edition
Seattle, WA. Rain.

FRIDAY, 30 NOVEMBER 2007

A New Push to Roll Back 'Don't Ask, Don't Tell'

By THOM SHANKER and PATRICK HEALY

WASHINGTON, Nov. 29 — Marking the 14th anniversary of legislation that allowed gay men

KASPAROV WARNS OF 'CHAOS' IN RUSSIA

By CLIFFORD J. LEVY and MICHAEL SCHWIRTZ

MOSCOW, Nov. 29 — Released from jail af-
g a five-day sentence for leading an op-
arch, Garry Kasparov, the former chess
, warned today that Russia was heading
haos under President Vladimir V. Putin.
asparov said his coalition, Other Russia,
ntinue its protests against the Kremlin in
spotlight what he described as a govern-
has grown increasingly repressive.
e entered a very dangerous period be-
don't know where this is going to stop,"
an impromptu news conference outside
in Moscow shortly after being freed. The
the government to abide by its own laws
titution, he said, "could result in a catas-
the whole country."
asparov was arrested last Saturday when
her members of his coalition tried to de-
ter to federal election officials contend-
he parliamentary election this Sunday is
vard Mr. Putin's party, United Russia.
asparov said he had not been treated bad-
bars, but complained that he had been
cess to a lawyer and that a court would
evidence in his defense.
nt Bush and other Western leaders had
alarm about Mr. Kasparov's arrest, but

continue

Iraqi refugees who returned from Damascus, Syria, gathered at a hotel in Baghdad Thursday to receive money for resettlement. A mother led her daughter to a car waiting in Baghdad's Mansour neighborhood Sunday after arriving from Damascus, Syria.

Iraq Lacks Plan on the Return of Refugees, Military Says

By MICHAEL R. GORDON and STEPHEN FARRELL

BAGHDAD, Nov. 29 — As Iraqi refugees begin to stream back to Baghdad, American military officials say the Iraqi government has yet to develop a plan to absorb the influx and prevent it from

continue

Rice's Way: Restraint in Quest for Peace

By HELENE COOPER

WASHINGTON, Nov. 28 — Three weeks ago, in a windowless conference room in the David Citadel Hotel in Jerusalem, Secretary of State Condoleezza Rice confidently dismissed the Middle East peacemaking attempts of her predecessors. "It hasn't worked," she told reporters traveling with her. "So, with all due respect, I'll try it my way."

continue

INSIDE

n Debate Led to Ouster, Says

raf Defends Actions aking Oath

Kasparov Warns of 'Chaos' in Russia

British Teacher Found Guilty in Sudan

Index

National
International
Business Day
Travel

THE ADAPTIVE NEW YORK TIMES, NOVEMBER 30, 2007

Musharraf Defends Actions After Taking Oath

By CARLOTTA GALL

ISLAMABAD, Pakistan, Nov. 29 — President Pervez Musharraf was sworn in to a second five-year presidential term today, a day after stepping down as military chief. He warned foreign diplomats assembled for the ceremony not to force democracy and human rights on developing countries, but to let them evolve in their own time.

Dressed in a traditional black tunic favored by civilian leaders, a somber Mr. Musharraf took an oath before a gathering of Pakistani dignitaries and diplomats. He resigned his post as military chief Wednesday, after eight years of military rule, under heavy pressure at home and abroad. He repeated his regrets to be leaving the army after 46 years.

In a speech after taking the oath, he defended his record in power, saying that he had always intended to lead the country toward democracy and to remove his uniform, but had to act in the interests of Pakistan's stability. He said he had to impose emergency rule on Nov. 3 and delay removing his uniform because of a clash between state institutions, namely the judiciary and the government, and the growing threat of terrorism.

"There is an unrealistic or even impractical obsession with your form of democracy, human rights and civil liberties, which you have taken centuries to acquire and which you expect us to adopt in a few years, in a few months," he said, addressing the diplomats.

"We want democracy; I am for democracy. We want human rights, we want civil liberties, but we will do it our way, as we understand our society, our environment, better than anyone in the West," he said.

Pakistan's President Pervez Musharraf gave an emotional speech after he was sworn in as the country's civilian president today in Islamabad, Pakistan.

Figure 1. Using templates that adapt to both content and display size we present the New York Times RSS feed as a newspaper.

usually found in print media, and apply those designs to a collection of content that is unknown at design time. Our system also facilitates the design's adaptation to the variety of devices and screen dimensions available today.

For our layouts, we draw inspiration from newspaper design, which provides an existing, well developed methodology for displaying aggregated content, both efficiently and attractively. Arnold [2] describes newspaper design as the combination of typography and layout for quick, accurate transmission of information. As a result, typographic elements such as fonts, spacing, columnation, and juxtaposition are used to create compelling displays of content. In our work we introduce these typographic elements to the design and layout of digital aggregated documents (see Figure 1).

We build on prior work on adaptive grid-based document layout (AGBDL) [15], which allows users to design grid-based document layouts that adapt to different window dimensions. That work showed that high-quality, adaptive document layout is possible through constraint-based layout templates. In this work, we extend those adaptive, grid-based layout ideas to the rendering of dynamically aggregated documents. We also present a novel interaction model for viewing and reading these documents rendered with our system.

The previous system [15] focused on high-quality layout of content with a fixed document structure, such as content in magazines. However, aggregated documents include information from many different sources that do not have a fixed structure. Because these documents are assembled dynamically, we do not know the content that will be present; therefore, we cannot design specific layout templates ahead of time. Even if we were to try to design templates ahead of time, we would have to enumerate all possible content in all possible combinations, resulting in an explosion of layout templates.

In this paper we present a new template language for building templates that include multiple possibilities for displaying each piece of content, with rules for choosing between them; a designer might have portrait images and landscape images laid out differently, for example. These new templates can also include optional elements, which are displayed only if appropriate content is present. This new template specification vastly increases the applicability of each template, and the range of content that can be displayed with a relatively small collection of templates. Furthermore, the new templates are much easier to write because they are specified with high-level primitives that instruct the system to generate complex constraint systems automatically. The new template language compares to the original as a higher-level programming language compares to assembly language. With our new template specification we are able to display content with the style of the New York Times, as shown in Figure 1, with just five templates. With the previous AGBDL system, this display would require over fifty layout templates to handle all possible content.

As part of our system, we also present a set of interactions for manipulating these documents. Users can now drag and drop stories into different regions of the document. They can page through individual stories without altering others, and they can display hierarchical content such as newspaper sections side by side. In addition to adapting to a variety of display sizes, our documents can adapt by flowing content around overlapping windows of other applications, changing some basic assumptions about the desktop metaphor. We believe our system is the first to include such functionality.

In summary, we present these new ideas:

- placing layout decisions on the individual elements of a page, rather than on the page in its entirety, enabling much richer combinations of elements;
- a new high-level language enabling an easier and more concise template specification by designers who are not programmers;
- “smart” overlapping windows, which reflow content around other applications on the desktop;
- and novel user interactions that allow users to drag and drop hyperlinked content, read content in context, and interactively grow and shrink regions of interest.

We also demonstrate a new application of adaptive layouts for advertising, an innovation that should make this style of reading more commercially viable. Indeed, the research prototype described in this paper was inspiration for the New York Times commercial product, *Times Reader*.

RELATED WORK

There are many services on the Internet that dynamically aggregate Web content. RSS feeds, which allow users to easily stay up to date with favorite news or blog sites, have become so common that RSS readers, which aggregate multiple RSS feeds, are now regularly found in Web portals and mail clients. Search engines also aggregate content when they present users with search results for a query. Finally, news aggregators crawl the Web and compose aggregated documents that display current news around the world. All of these aggregators display their aggregated documents into simple lists using traditional HTML. We chose to implement our own layout renderer because we found HTML too limiting. For example, in HTML, text cannot flow from one element into another, making it difficult to create articles with more than one column. The recent CSS3 specification [22] includes multi-column layout within a single element, but it does not allow for flow between arbitrary elements, flow around image elements, and pagination. Using our adaptive templates, we could provide a richer front-end for RSS clients and news aggregators by simply translating their XML output, as we do in the Newsbot example.

In the HCI community, researchers have explored a variety of displays for aggregated documents. Kandogan and Shneiderman [17] built a specialized browser, Elastic Windows, which allows users to interactively build a custom layout for their Web browser by aggregating visited pages into a hierarchical display. More recently, Chickenfoot [6] and Greasemonkey [7] have allowed developers to write scripts that can automate, aggregate, and customize user interactions with specific websites. Dontcheva *et al.* [10] built a system that aggregates individual pieces of content from multiple visited websites. Their system displays these selected webpage features in template-based layouts, providing interactive summaries of relevant information from the browse session. In subsequent work, Dontcheva *et al.* [11] have extended their approach to create search templates that organize search results using layout templates. To the best of our knowledge, however, our system remains the only one that does adaptive document layout for dynamically aggregated documents. Kamba *et al.* [16] introduced one of the first Web-based adaptive newspapers, The Krakatoa Chronicle, which supports many of the adaptations present in our system, but does not have the ability to render modern grid-based layouts.

One important property of our system is the separation of content and style, which allows designs to accommodate unknown content. This is not a new idea; in fact, several World-Wide-Web Consortium (W3C) standards support this separation, e.g., the Extensible Stylesheet Language (XSL) [1] and Cascading Style Sheets (CSS) [18]. Borning *et al.* [8] were the first to suggest applying constraint systems to the layout of Web documents and applets. In their system, constraints were specified by both the author and the reader, and the final layout was negotiated by priorities on individual constraints. Constraint Cascading Style Sheets [3] built upon this work and then proposed the addition of constraints to the Scalable Vector Graphics language [21], which they called

Constraint Scalable Vector Graphics (CSVG) [4, 19]. CSVG allowed constraints to control the properties of diagram components. They also proposed extensions supporting better interactivity and constraint-based animation. All of these techniques control the layout of a single HTML webpage, while ours can control the layout of content from a collection of sources, integrating them into a single, possibly hierarchical document.

There have been many systems that support the design and construction of constraint-based graphical user interfaces, Garnet [20] and subArctic [14] among others. These toolkits are generally designed for traditional, widget-based interfaces, rather than document-based interfaces such as ours. Gajos and Weld [13] automatically generate adaptive interfaces in the SUPPLE system. Their approach is to find an optimal arrangement of widgets to layout an interface that meets the target device's constraints and is estimated to be easy to use by an objective standard. While document layout is related to widget layout, it addresses a different task and presents a different set of challenges.

BACKGROUND

Since dynamically aggregated documents vary in content structure, we must maintain a clean separation between content and style. Towards this end, we further develop the representation introduced in the AGBDL system. To provide the necessary background for the rest of the paper, we first describe this representation.

Document structure

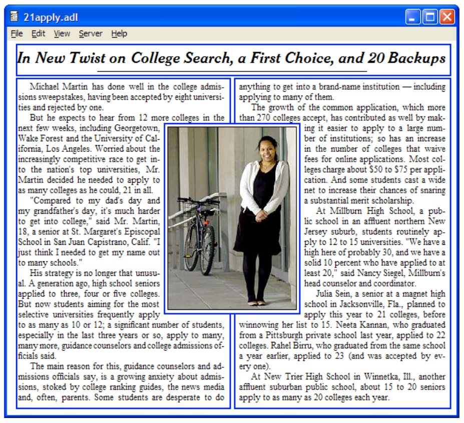
In our system, a *document* is represented as a set of parallel *streams* of content. For instance, the body text of an article could be one of the streams in the document. Other streams might contain figures, headlines, or sidebars. Within a stream, an individual piece of content could be text, an image, or a hierarchical collection of content. These hierarchical collections, or *subdocuments*, mirror the structure of a document itself. Thus, a figure might be represented as a subdocument containing separate streams for the image, title, caption, and photo credit.

To specify stylistic properties like color, font size, and font face, text can be tagged with a style name. This style name is then looked up in a *stylesheet,* which maps style names to actual style properties. The stylesheets themselves are provided by the layout templates, described below.

Content can be also be annotated with attributes that alter the way it is treated during layout. For example, an image could be marked with an "importance" attribute, and this attribute can be used in computing the desired size of the image in the final layout.

Layout templates

A document's visual style is encoded as a set of *templates*. Each template organizes a collection of content at a range of display sizes. Figure 2 shows a template that displays a headline, an image, and some body text. Each template is composed of *elements* that display content or other visual



In New Twist on College Search, a First Choice, and 20 Backups

Michael Martin has done well in the college admissions sweepstakes, having been accepted by eight universities and rejected by one.

But he expects to hear from 12 more colleges in the next few weeks, including Georgetown, Wake Forest and the University of California, Los Angeles. Worried about the increasingly competitive race to get into the nation's top universities, Mr. Martin decided he needed to apply to as many colleges as he could, 21 in all.

"Compared to my dad's day and my grandfather's day, it's much harder to get into college," said Mr. Martin, 18, a senior at St. Margaret's Episcopal School in San Juan Capistrano, Calif. "I just think I needed to get my name out to many schools."

His strategy is no longer that unusual. A generation ago, high school seniors applied to three, four or five colleges. But now students aiming for the most selective universities frequently apply to as many as 10 or 12; a significant number of students, especially in the last three years or so, apply to many, many more, guidance counselors and college admissions officials said.

The main reason for this, guidance counselors and admissions officials say, is a growing anxiety about admissions, stoked by college ranking guides, the news media and, often, parents. Some students are desperate to do anything to get into a brand-name institution — including applying to many of them.

The growth of the common application, which more than 270 colleges accept, has contributed as well by making it easier to apply to a large number of institutions; so has an increase in the number of colleges that waive fees for online applications. Most colleges charge about $50 to $75 per application. And some students cast a wide net to increase their chances of snaring a substantial merit scholarship.

At Millburn High School, a public school in an affluent northern New Jersey suburb, students routinely apply to 12 to 15 universities. "We have a high here of probably 30, and we have a solid 10 percent who have applied to at least 20," said Nancy Siegel, Millburn's head counselor and coordinator.

Julia Sein, a senior at a magnet high school in Jacksonville, Fla., planned to apply this year to 21 colleges, before winnowing her list to 15. Neeta Kannan, who graduated from a Pittsburgh private school last year, applied to 22 colleges. Rahel Birru, who graduated from the same school a year earlier, applied to 23 (and was accepted by every one).

At New Trier High School in Winnetka, Ill., another affluent suburban public school, about 15 to 20 seniors apply to as many as 20 colleges each year.

Figure 2. A template with its elements outlined in blue. Content can flow from one element to another. We use a layering paradigm to flow the text around the image.

features, *constraints* that define relationships between elements, and *preconditions* that characterize the suitability of the template for the particular content. A template can also reference a stylesheet that is used to map style tags into concrete style properties.

Elements

The basic building blocks of a page layout are *elements*: rectangular regions that are arranged on the page and filled with content. Each element receives content from one of the document streams. More than one element may consume content from the same stream, in which case the content flows from one element into the next. For example, the two-column layout in Figure 2 has two elements, each corresponding to a column. Text flows from the element on the left into the element on the right. To place the image on the page and flow the text around it, we use a layering paradigm. A page can be represented as a $2\frac{1}{2}$-D scene, where each element also has a z-order. Elements that have a higher z-order sit atop lower elements, and the area of the higher elements (in this case, the image) is subtracted from the area of the elements underneath (the text).

Since content can be hierarchically organized into subdocuments, templates can also be hierarchical. Elements that are filled by subdocuments can specify a set of templates to format the hierarchical collection of content displayed by that element. When rendering the page, the layout engine chooses the template that best fits the particular subdocument.

In order to allow text styling to vary across the different parts of the page, each element may reference its own stylesheet. Styles present in an element's stylesheet override the styles found in the template's stylesheet.

Constraints

The size and placement of each element in a template is determined by the evaluation of a set of interdependent constraints that form a directed acyclic graph. In Figure 2, the title is constrained to begin at the top of the page and allowed to grow as tall as required in order to fit the title text. The body elements are constrained to begin at the bottom of the title element, and to end at the bottom of the page. The image element is constrained to the middle of the body text. In our implementation, the constraint system is comprised of a pool of constraint variables whose values are computed by a mathematical expression in terms of the other constraint variables. This configuration is known as a one-way constraint system.

A template's constraint variables include both input and output variables. The input variables correspond to the context of the layout template, such as the page dimensions. The output variables correspond to the bounding rectangle for each element and the overall template score, which allows a template to express its fitness in terms of the inputs. If content is tagged with attributes, those values are reflected as additional variables in the constraint system.

Choosing templates: preconditions and scoring

In order to render a particular document, the system must choose an appropriate set of templates. It can make this choice using preconditions or a template's overall score. *Preconditions* define when a template is valid. *Content preconditions* specify content availability requirements, e.g., "there must be at least one item in the figure stream for this template to be considered." *Value preconditions* express a valid range for one of the constraint variables, e.g., "the page width must be between 400 and 600 points." If multiple templates are valid, the layout engine uses the output score to select the best fitting template. Typically a template will produce a low score if the constraints that place the elements are unable to produce a good layout. For example, if a figure is so tall that it doesn't fit on the page, the score might be negative.

The document content and layout templates feed into a document paginator and layout engine to produce a collection of potential page layouts. The paginator can optionally globally optimize the layout by slightly under-filling pages and altering template choices. We use a simpler, "First-Fit" paginator for the examples in this paper. For more details on this process, please see a description of AGBDL [15].

LAYOUT TEMPLATE SPECIFICATION

The principal challenge behind adaptive document layout for dynamically aggregated content lies in the design of layout templates that are flexible to many different assortments of content. Since a designer cannot be expected to design templates for all possible content combinations, template primitives must allow for variable content without explicit enumeration. Designers must also be able to incorporate layout preferences and conditions with minimal effort. Finally, the layout engine must be able to make reasonable choices about content display without intervention. To achieve these goals, we move design decisions to the element level from the overall template level and propose a set of high-level template primitives that are able to position and size available content appropriately. The new primitives we propose here include: *conditional elements*, which automatically choose whether to appear in a given layout based upon the availability of content and any other arbitrary constraints; *conditional groups*, which choose a single element from a group of possible elements, also based upon content and constraints; and *adaptive grids*, which automatically choose column count, sizes and margins. The constraint system always sizes and locates any elements that appear on a page.

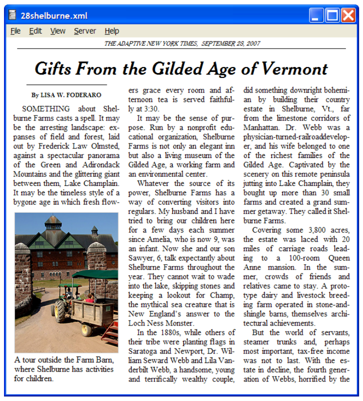
Conditional elements

As described in the previous section, the layout engine selects layout templates using preconditions that express when a specific template is valid. Preconditions can be defined with respect to content, such as the availability of an image, or with respect to attribute values, such as the possible range of page sizes. In AGBDL, preconditions were used to invalidate entire templates from consideration. Thus, separate templates were necessary for different configurations of content, such as news articles with one, two, or three images. In this work, in order to make the layout templates adapt to the variable structure of the available content, we add preconditions to the individual display elements and call such elements *conditional elements*. Conditional elements can have content and value preconditions. Indeed, placing a content precondition on an element that consumes content, requiring that some content be available, is so natural and useful that we made it implicit. Only one template is now necessary to properly display multiple articles, regardless of the number and orientation of images or the existence of a headline. Figure 3 shows three different articles rendered by the same layout template. Value preconditions can specify the minimum or maximum page size for which an element should be displayed.

In AGBDL, every constraint in the layout template had to be specified by the author. To make positioning of elements easier, we modified the element specification to let a designer specify that an element, such as an image, should always appear fixed at a particular point on the y-axis, or under another element, and always have a specific aspect ratio. The system now generates the necessary constraint system for the designer, which computes the appropriate dimensions and element positions.

Conditional groups

In addition to constraining elements, the designer can also define conditional groups. A *conditional group* defines a set of elements of which only one will be used in a given layout. A *conditional group* is used in the template in Figure 3 to choose from a two-column, one-column, or half-column element depending upon both the aspect ration of the image and the width of the columns. The designer can specify a conditional group containing a layout element for each orientation along with a policy for selecting the most appropriate element. The policies our system currently includes are best-fit, first-fit, and first-good-fit. A *best-fit* group will select the element that produces the best score. A *first-fit* group will select the first element for which content is available. Finally, a *first-good-fit* group selects the first element it examines with a non-negative score.



THE ADAPTIVE NEW YORK TIMES, SEPTEMBER 28, 2007

Gifts From the Gilded Age of Vermont

By LISA W. FODERARO

SOMETHING about Shelburne Farms casts a spell. It may be the arresting landscape: expanses of field and forest, laid out by Frederick Law Olmsted, against a spectacular panorama of the Green and Adirondack Mountains and the glittering giant between them, Lake Champlain. It may be the timeless style of a bygone age in which fresh flowers grace every room and afternoon tea is served faithfully at 3:30.

It may be the sense of purpose. Run by a nonprofit educational organization, Shelburne Farms is not only an elegant inn but also a living museum of the Gilded Age, a working farm and an environmental center.

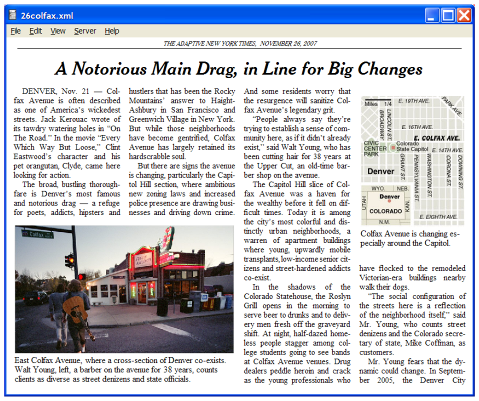
Whatever the source of its power, Shelburne Farms has a way of converting visitors into regulars. My husband and I have tried to bring our children here for a few days each summer since Amelia, who is now 9, was an infant. Now she and our son Sawyer, 6, talk expectantly about Shelburne Farms throughout the year. They cannot wait to wade into the lake, skipping stones and keeping a lookout for Champ, the mythical sea creature that is New England's answer to the Loch Ness Monster.

In the 1880s, while others of their tribe were planting flags in Saratoga and Newport, Dr. William Seward Webb and Lila Vanderbilt Webb, a handsome, young and terrifically wealthy couple, did something downright bohemian by building their country estate in Shelburne, Vt., far from the limestone corridors of Manhattan. Dr. Webb was a physician-turned-railroaddeveloper, and his wife belonged to one of the richest families of the Gilded Age. Captivated by the scenery on this remote peninsula jutting into Lake Champlain, they bought up more than 30 small farms and created a grand summer getaway. They called it Shelburne Farms.

Covering some 3,800 acres, the estate was laced with 20 miles of carriage roads leading to a 100-room Queen Anne mansion. In the summer, crowds of friends and relatives came to stay. A prototype dairy and livestock breeding farm operated in stone-and-shingle barns, themselves architectural achievements.

But the world of servants, steamer trunks and, perhaps most important, tax-free income was not to last. With the estate in decline, the fourth generation of Webbs, horrified by the

A tour outside the Farm Barn, where Shelburne has activities for children.



THE ADAPTIVE NEW YORK TIMES, NOVEMBER 26, 2007

A Notorious Main Drag, in Line for Big Changes

DENVER, Nov. 21 — Colfax Avenue is often described as one of America's wickedest streets. Jack Kerouac wrote of its tawdry watering holes in "On The Road." In the movie "Every Which Way But Loose," Clint Eastwood's character and his pet orangutan, Clyde, came here looking for action.

The broad, bustling thoroughfare is Denver's most famous and notorious drag — a refuge for poets, addicts, hipsters and hustlers that has been the Rocky Mountains' answer to Haight-Ashbury in San Francisco and Greenwich Village in New York. But while those neighborhoods have become gentrified, Colfax Avenue has largely retained its hardscrabble soul.

But there are signs the avenue is changing, particularly the Capitol Hill section, where ambitious new zoning laws and increased police presence are drawing businesses and driving down crime.

East Colfax Avenue, where a cross-section of Denver co-exists. Walt Young, left, a barber on the avenue for 38 years, counts clients as diverse as street denizens and state officials.

And some residents worry that the resurgence will sanitize Colfax Avenue's legendary grit.

"People always say they're trying to establish a sense of community here, as if it didn't already exist," said Walt Young, who has been cutting hair for 38 years at the Upper Cut, an old-time barber shop on the avenue.

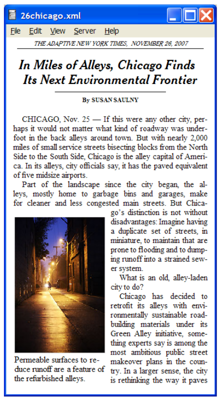
The Capitol Hill slice of Colfax Avenue was a haven for the wealthy before it fell on difficult times. Today it is among the city's most colorful and distinctly urban neighborhoods, a warren of apartment buildings where young, upwardly mobile transplants, low-income senior citizens and street-hardened addicts co-exist.

In the shadows of the Colorado Statehouse, the Roslyn Grill opens in the morning to serve beer to drunks and to delivery men fresh off the graveyard shift. At night, half-dazed homeless people stagger among college students going to see bands at Colfax Avenue venues. Drug dealers peddle heroin and crack as the young professionals who have flocked to the remodeled Victorian-era buildings nearby walk their dogs.

Colfax Avenue is changing especially around the Capitol.

"The social configuration of the streets here is a reflection of the neighborhood itself," said Mr. Young, who counts street denizens and the Colorado secretary of state, Mike Coffman, as customers.

Mr. Young fears that the dynamic could change. In September 2005, the Denver City



THE ADAPTIVE NEW YORK TIMES, NOVEMBER 26, 2007

In Miles of Alleys, Chicago Finds Its Next Environmental Frontier

By SUSAN SAULNY

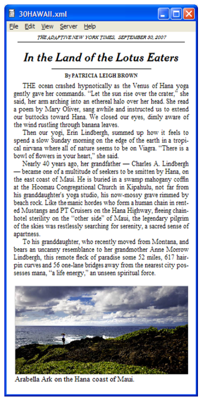
CHICAGO, Nov. 25 — If this were any other city, perhaps it would not matter what kind of roadway was underfoot in the back alleys around town. But with nearly 2,000 miles of small service streets bisecting blocks from the North Side to the South Side, Chicago is the alley capital of America. In its alleys, city officials say, it has the paved equivalent of five midsize airports.

Part of the landscape since the city began, the alleys, mostly home to garbage bins and garages, make for cleaner and less congested main streets. But Chicago's distinction is not without disadvantages: Imagine having a duplicate set of streets, in miniature, to maintain that are prone to flooding and to dumping runoff into a strained sewer system.

What is an old, alley-laden city to do?

Chicago has decided to retrofit its alleys with environmentally sustainable road-building materials under its Green Alley initiative, something experts say is among the most ambitious public street makeover plans in the country. In a larger sense, the city is rethinking the way it paves

Permeable surfaces to reduce runoff are a feature of the refurbished alleys.



THE ADAPTIVE NEW YORK TIMES, SEPTEMBER 30, 2007

In the Land of the Lotus Eaters

By PATRICIA LEIGH BROWN

THE ocean crashed hypnotically as the Venus of Hana yoga gently gave her commands. "Let the sun rise over the crater," she said, her arm arching into an ethereal halo over her head. She read a poem by Mary Oliver, sang awhile and instructed us to extend our buttocks toward Hana. We closed our eyes, dimly aware of the wind rustling through banana leaves.

Then our yogi, Erin Lindbergh, summed up how it feels to spend a slow Sunday morning on the edge of the earth in a tropical nirvana where all of nature seems to be on Viagra. "There is a bowl of flowers in your heart," she said.

Nearly 40 years ago, her grandfather — Charles A. Lindbergh — became one of a multitude of seekers to be smitten by Hana, on the east coast of Maui. He is buried in a swamp mahogany coffin at the Hoomau Congregational Church in Kipahulu, not far from his granddaughter's yoga studio, his now-mossy grave rimmed by beach rock. Like the manic hordes who form a human chain in rented Mustangs and PT Cruisers on the Hana Highway, fleeing chain-hotel sterility on the "other side" of Maui, the legendary pilgrim of the skies was restlessly searching for serenity, a sacred sense of apartness.

To his granddaughter, who recently moved from Montana, and bears an uncanny resemblance to her grandmother Anne Morrow Lindbergh, this remote fleck of paradise some 52 miles, 617 hairpin curves and 56 one-lane bridges away from the nearest city possesses mana, "a life energy," an unseen spiritual force.

Arabella Ark on the Hana coast of Maui.

Figure 3. We can render articles with a variable number of images and image aspect ratios using only one layout template, by placing the possible image locations in a *conditional group*.

Adaptive grids

Many in the design community [9] believe that long lines of text degrade readability; thus, as the width of an element or page expands, adding more columns improves a document's readability. In AGBDL, dynamic growth of columns was implemented by defining templates for multiple-column layouts and switching to a template with more columns when the page grew beyond a certain width. However, creating templates for different numbers of columns along with templates for different combinations of content leads to a combinatorial explosion in the number of templates necessary to handle different content and viewing situations.

To alleviate this growth in the number of templates, we define an adaptive column grid. The grid divides the page into columns based on parameters provided by the designer. Depending on the page width and the grid specification, the system determines the number of columns to use, and sizes the columns, margins, and gutters whenever the template is rendered.

By default, the system will generate as many columns as possible of at least the minimum width specified in the template. Alternatively, the designer can specify that the system include as few columns as possible without going over the maximum width specified. The individual columns in a grid can also be configured to a fixed width, combining fixed- and variable-width columns of different widths and proportions. When the page is resized, columns will be added in left-to-right order as the page gets wider, and will be dropped from right to left when the width decreases. The designer may, however, change the order in which columns are added and dropped by assigning priority values to each column.

Example

We illustrate the interaction between different primitives in the context of an example template. A complete description of the template language for specifying rich displays for aggregated documents is beyond the scope of this paper. This is a code fragment that shows an adaptive grid and a *best-fit* group.

```
<template id="sample">

 <!--- adaptive grid -->
 <grid type="variable" margins="5">
  <adaptive minColumnWidth="210" maxColumns="4"/>
 </grid>

 <elements>

  <!--- conditional element -->
  <element id="body" column="col1,col2" under="headline">
   <content src="bodyText"/>
  </element>

  <!--- best-fit conditional group -->
  <group id="photoGroup" type="bestfit">
   <element id="photo" template="imageTemplate">
    <content src="image"/>

    <instance column="col1" bottom="page.bottom">
     <pass-constraint var="target.aspect"
                      value="portrait"/>
    </instance>

    <instance column="col1-col2" bottom="page.bottom">
     <pass-constraint var="target.aspect"
                      value="landscape"/>
    </instance>

    <constraint var="photo.score"
                value="photo.template.score"/>
   </element>
  </group>
 </elements>
</template>
```

This template specifies an adaptive grid with up to four columns of at least 210 points width. It then defines a conditional element and a best-fit conditional group. The group contains one element description for an image, which uses a template, *imageTemplate*, to lay out the content. The layout template *imageTemplate* includes a bitmap and a caption stream. The best-fit group specifies two possibilities, listed as instances of the element. The first instance occupies the first column and the second instance spans the first two columns. We pass each instance a parameter, *target.aspect*, to calculate a layout goodness score. The first instance generates a positive score if it is a portrait image, and the second instance generates a positive score if it is a landscape image. A constraint with the name of the element and a suffix "score", in this case *photo.score*, evaluates the best-fit. Here it is defined to be the score generated by the template that lays out the element.

HIERARCHICAL DOCUMENTS

When entire articles are encapsulated in an aggregated document, it becomes hierarchical in nature. News aggregators can have deep hierarchies as they include different sections, such as "World", "National", "Health", etc. As we described previously, a document can include other documents, which we call subdocuments, thus creating a hierarchy. Each of these subdocuments will have its own templates, and each one can be recursively paginated and displayed in an element of the parent document's template. But the layout of each subdocument may also be affected by the overall layout of the parent document. To allow for the interaction between elements at different levels in the hierarchy, we allow the designer to pass input and output variables between a parent and a child template.

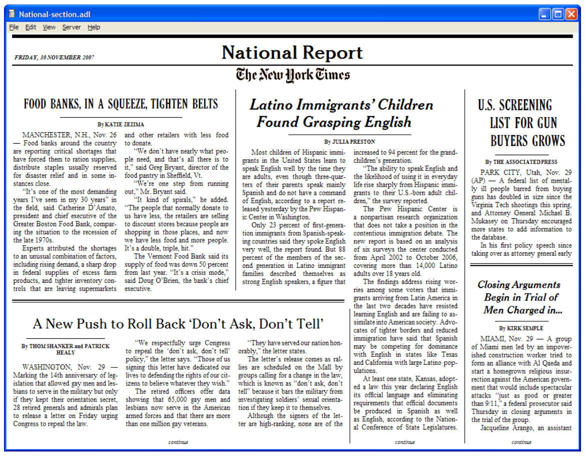
Input variables enable the top-level template to exercise control over the appearance of the subdocuments, while still letting them handle most layout functions independently. Returned values allow the parent template to determine if the given subdocument is a good fit in a particular spot. They can further be used to align other display elements with features in the child's layout. Any constraint in the parent or child template can be passed as a parameter or returned as a result from an adjacent template in the hierarchy. Some of the input variables that we have explored include the number of columns, the amount of padding, and flags for suppressing images or borders. Some of the output variables we have used are layout quality scores and alignment coordinates.

Another way a parent can influence the layout of a child template is by passing it a stylesheet. A designer can override a subdocument's default stylesheet at the element instance. For example, newspapers will typically use different fonts for nearby headlines so that readers can easily distinguish among them. In our New York Times front page examples (see Figure 8), we avoid displaying abutting headlines in the same style by passing a different stylesheet to adjacent story elements.

For visual consistency, it is often desirable to have a subdocument conform to the grid underlying the parent document. Once a grid is defined for the overall document, each element that displays a subdocument can be passed the number of columns that the element spans in the parent. This allows the subdocuments to use the same number of columns in its own layout, as does the layout in Figure 4. If the parent grid is irregular, a more detailed specification can be provided.

Typically, a subdocument is laid out entirely within a single element on the page. However, if the desired layout does not confine the subdocument to a single rectangular region, the designer may specify that different parts of the subdocument be placed in separate elements on the page. For example, in Figure 4 the large front-page image is in one element, and the story that corresponds to that image is in another element directly below the image.

By default, each element consumes content from a separate subdocument, but the designer can constrain any number of



FRIDAY, 30 NOVEMBER 2007

National Report

The New York Times

FOOD BANKS, IN A SQUEEZE, TIGHTEN BELTS

By KATIE ZEZIMA

MANCHESTER, N.H., Nov. 26 — Food banks around the country are reporting critical shortages that have forced them to ration supplies, distribute staples usually reserved for disaster relief and in some instances close.

"It's one of the most demanding years I've seen in my 30 years" in the field, said Catherine D'Amato, president and chief executive of the Greater Boston Food Bank, comparing the situation to the recession of the late 1970s.

Experts attributed the shortages to an unusual combination of factors, including rising demand, a sharp drop in federal supplies of excess farm products, and tighter inventory controls that are leaving supermarkets and other retailers with less food to donate.

"We don't have nearly what people need, and that's all there is to it," said Greg Bryant, director of the food pantry in Sheffield, Vt.

"We're one step from running out," Mr. Bryant said.

"It kind of spirals," he added. "The people that normally donate to us have less, the retailers are selling to discount stores because people are shopping in those places, and now we have less food and more people. It's a double, triple, hit."

The Vermont Food Bank said its supply of food was down 50 percent from last year. "It's a crisis mode," said Doug O'Brien, the bank's chief executive.

Latino Immigrants' Children Found Grasping English

By JULIA PRESTON

Most children of Hispanic immigrants in the United States learn to speak English well by the time they are adults, even though three-quarters of their parents speak mainly Spanish and do not have a command of English, according to a report released yesterday by the Pew Hispanic Center in Washington.

Only 23 percent of first-generation immigrants from Spanish-speaking countries said they spoke English very well, the report found. But 88 percent of the members of the second generation in Latino immigrant families described themselves as strong English speakers, a figure that increased to 94 percent for the grandchildren's generation.

"The ability to speak English and the likelihood of using it in everyday life rise sharply from Hispanic immigrants to their U.S.-born adult children," the survey reported.

The Pew Hispanic Center is a nonpartisan research organization that does not take a position in the contentious immigration debate. The new report is based on an analysis of six surveys the center conducted from April 2002 to October 2006, covering more than 14,000 Latino adults over 18 years old.

The findings address rising worries among some voters that immigrants arriving from Latin America in the last two decades have resisted learning English and are failing to assimilate into American society. Advocates of tighter borders and reduced immigration have said that Spanish may be competing for dominance with English in states like Texas and California with large Latino populations.

At least one state, Kansas, adopted a law this year declaring English its official language and eliminating requirements that official documents be produced in Spanish as well as English, according to the National Conference of State Legislatures.

continue

U.S. SCREENING LIST FOR GUN BUYERS GROWS

By THE ASSOCIATED PRESS

PARK CITY, Utah, Nov. 29 (AP) — A federal list of mentally ill people barred from buying guns has doubled in size since the Virginia Tech shootings this spring, and Attorney General Michael B. Mukasey on Thursday encouraged more states to add information to the database.

In his first policy speech since taking over as attorney general early

Closing Arguments Begin in Trial of Men Charged in...

By KIRK SEMPLE

MIAMI, Nov. 29 — A group of Miami men led by an impoverished construction worker tried to form an alliance with Al Qaeda and start a homegrown religious insurrection against the American government that would include spectacular attacks "just as good or greater than 9/11," a federal prosecutor said Thursday in closing arguments in the trial of the group.

Jacqueline Arango, an assistant

continue

A New Push to Roll Back 'Don't Ask, Don't Tell'

By THOM SHANKER and PATRICK HEALY

WASHINGTON, Nov. 29 — Marking the 14th anniversary of legislation that allowed gay men and lesbians to serve in the military but only if they kept their orientation secret, 28 retired generals and admirals plan to release a letter on Friday urging Congress to repeal the law.

"We respectfully urge Congress to repeal the 'don't ask, don't tell' policy," the letter says. "Those of us signing this letter have dedicated our lives to defending the rights of our citizens to believe whatever they wish."

The retired officers offer data showing that 65,000 gay men and lesbians now serve in the American armed forces and that there are more than one million gay veterans.

"They have served our nation honorably," the letter states.

The letter's release comes as rallies are scheduled on the Mall by groups calling for a change in the law, which is known as "don't ask, don't tell" because it bars the military from investigating soldiers' sexual orientation if they keep it to themselves.

Although the signers of the letter are high-ranking, none are of the

continue

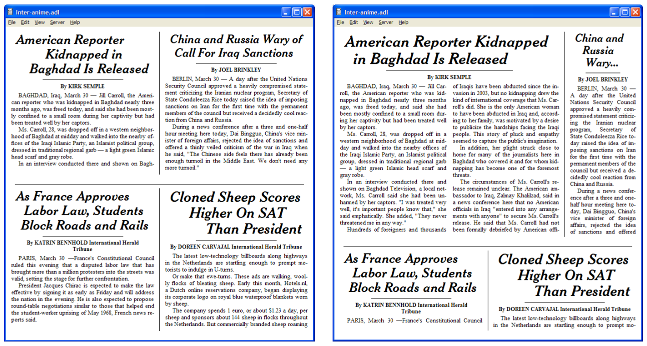
Figure 4. We use recursive masking to adapt subdocuments to overlap. The right-hand story flows around the bottom story.

elements on the page to consume content from the same subdocument. This can be useful when the desired layout of a subdocument does not fit into a rectangular region on the parent template. For example, in Figure 8 the large front-page image is in one element, and the story that corresponds to that image is in another element directly below the image.

A final consideration for displaying hierarchical documents is handling overlapping elements. As described earlier, we accommodate overlap in a single document by letting the designer assign a z-order to the affected elements. The system renders the element with the highest z-order first and creates an occlusion mask for the rendered region. Then it renders the remaining elements, adding to the mask as new regions are rendered. We extended this algorithm to hierarchical documents by making the masking recursive and passing the occupied regions of higher-layer elements down the hierarchy. This allows the righthand story in Figure 4 to flow its text around the overlapping story at the bottom of the page. If a subdocument has multiple possible image locations, the template can favor a location that is not occluded.

USER INTERACTION

In addition to adapting to different screen sizes and constantly changing collections of aggregated content, electronic documents should also be responsive to the reading needs of the viewer. For example, the front page of a typical newspaper seldom contains articles in their entirety. The stories generally continue on an interior page, forcing the reader to scan through the paper before finishing them. With our system, users can read articles without scanning through the entire newspaper. They can simply position the cursor over the story of interest and click on the ”page down” button. This will display the second page of the story in place of the first. Alternatively, they can click on the headline or the "continue" link, which will take them to a page featuring the entire article, if it fits in the window. If it doesn't fit, then they will see a paginated view of the article, and they can use the "page down" key again to see the additional pages. A third possibility is to activate an "expand" link that will alter the



American Reporter Kidnapped in Baghdad Is Released

By KIRK SEMPLE

BAGHDAD, Iraq, March 30 — Jill Carroll, the American reporter who was kidnapped in Baghdad nearly three months ago, was freed today, and said she had been mostly confined to a small room during her captivity but had been treated well by her captors.

Ms. Carroll, 28, was dropped off in a western neighborhood of Baghdad at midday and walked into the nearby offices of the Iraqi Islamic Party, an Islamist political group, dressed in traditional regional garb — a light green Islamic head scarf and gray robe.

In an interview conducted there and shown on Bagh-

China and Russia Wary of Call For Iraq Sanctions

By JOEL BRINKLEY

BERLIN, March 30 — A day after the United Nations Security Council approved a heavily compromised statement criticizing the Iranian nuclear program, Secretary of State Condoleezza Rice today raised the idea of imposing sanctions on Iran for the first time with the permanent members of the council but received a decidedly cool reaction from China and Russia.

During a news conference after a three and one-half hour meeting here today, Dai Bingguo, China's vice minister of foreign affairs, rejected the idea of sanctions and offered a thinly veiled criticism of the war in Iraq when he said, "The Chinese side feels there has already been enough turmoil in the Middle East. We don't need any more turmoil."

As France Approves Labor Law, Students Block Roads and Rails

By KATRIN BENNHOLD International Herald Tribune

PARIS, March 30 —France's Constitutional Council ruled this evening that a disputed labor law that has brought more than a million protesters into the streets was valid, setting the stage for further confrontation.

President Jacques Chirac is expected to make the law effective by signing it as early as Friday and will address the nation in the evening. He is also expected to propose round-table negotiations similar to those that helped end the student-worker uprising of May 1968, French news reports said.

Cloned Sheep Scores Higher On SAT Than President

By DOREEN CARVAJAL International Herald Tribune

The latest low-technology billboards along highways in the Netherlands are startling enough to prompt motorists to indulge in U-turns.

Or make that ewe-turns. These ads are walking, woolly flocks of bleating sheep. Early this month, Hotels.nl, a Dutch online reservations company, began displaying its corporate logo on royal blue waterproof blankets worn by sheep.

The company spends 1 euro, or about $1.23 a day, per sheep and sponsors about 144 sheep in flocks throughout the Netherlands. But commercially branded sheep roaming

American Reporter Kidnapped in Baghdad Is Released

By KIRK SEMPLE

BAGHDAD, Iraq, March 30 — Jill Carroll, the American reporter who was kidnapped in Baghdad nearly three months ago, was freed today, and said she had been mostly confined to a small room during her captivity but had been treated well by her captors.

Ms. Carroll, 28, was dropped off in a western neighborhood of Baghdad at midday and walked into the nearby offices of the Iraqi Islamic Party, an Islamist political group, dressed in traditional regional garb — a light green Islamic head scarf and gray robe.

In an interview conducted there and shown on Baghdad Television, a local network, Ms. Carroll said she had been unharmed by her captors. "I was treated very well, it's important people know that," she said emphatically. She added, "They never threatened me in any way."

Hundreds of foreigners and thousands of Iraqis have been abducted since the invasion in 2003, but no kidnapping drew the kind of international coverage that Ms. Carroll's did. She is the only American woman to have been abducted in Iraq and, according to her family, was motivated by a desire to publicize the hardships facing the Iraqi people. This story of pluck and empathy seemed to capture the public's imagination.

In addition, her plight struck close to home for many of the journalists here in Baghdad who covered it and for whom kidnapping has become one of the foremost threats.

The circumstances of Ms. Carroll's release remained unclear. The American ambassador to Iraq, Zalmay Khalilzad, said in a news conference here that no American officials in Iraq "entered into any arrangements with anyone" to secure Ms. Carroll's release. He said that Ms. Carroll had not been formally debriefed by American offi-

China and Russia Wary...

By JOEL BRINKLEY

BERLIN, March 30 — A day after the United Nations Security Council approved a heavily compromised statement criticizing the Iranian nuclear program, Secretary of State Condoleezza Rice today raised the idea of imposing sanctions on Iran for the first time with the permanent members of the council but received a decidedly cool reaction from China and Russia.

During a news conference after a three and one-half hour meeting here today, Dai Bingguo, China's vice minister of foreign affairs, rejected the idea of sanctions and offered

As France Approves Labor Law, Students Block Roads and Rails

By KATRIN BENNHOLD International Herald Tribune

PARIS, March 30 —France's Constitutional Council

Cloned Sheep Scores Higher On SAT Than President

By DOREEN CARVAJAL International Herald Tribune

The latest low-technology billboards along highways in the Netherlands are startling enough to prompt mo-

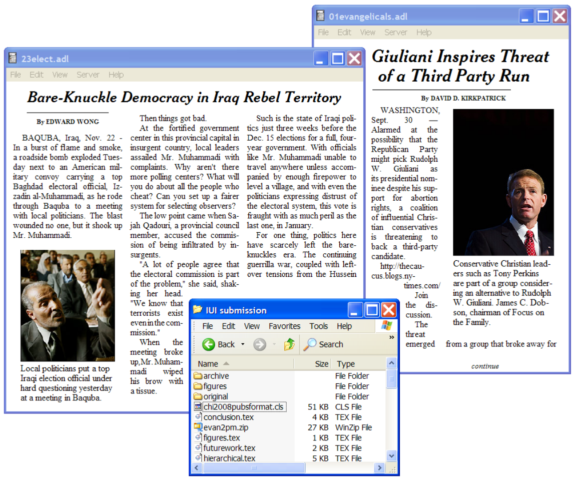
Figure 5. The user clicks on the upper left story. The story expands in place and occupies a larger portion of the overall reading window. The other stories are formatted accordingly.

layout on the front page, so that the story of interest has a larger footprint on the page, making it more convenient to read (and page through if necessary) in place (see Figure 5). When expanding a section of a page, the system animates the transition. A smooth, animated transition makes it clear to the user what is being changed and where various features on the page are moving. We implement animation by varying the constraints that size the elements over time. When one story grows the other stories shrink to accommodate it.

While our system creates documents that look like print media, these documents still have digital qualities and include digital elements such as hyperlinks. For example, the table of contents is a list of hyperlinks. To follow hyperlinks, the user can click on them in the conventional fashion. If the link is in a subdocument, such as in an article displayed on the front page, then the subdocument is typically replaced by the linked content.

Alternatively, the document, which in our example is the newspaper's front page, can be replaced by the linked content, which is useful when the linked document is another main page rather than a single article. The hyperlinked content can also replace different subdocuments. For example, a table of contents can be set up to always load the hyperlinked content in a specific location on the front page. The viewer can also interactively specify where the hyperlinked content should be displayed by dragging hyperlinks and dropping them into a display element. The target element can be any element on the page that displays another subdocument. A user can also delete stories from the page that have already been read and are not of interest.

In addition to flowing content recursively around content elements, we have made it possible for our documents to adapt to overlapping windows of other applications (see Figure 6). Text is reflowed in the available regions, and images are relocated if the template allows for alternate locations. We are able to achieve this flexible layout using the masking we described in the previous section, by initializing the top-level mask with the Windows client region of the document viewer. Adapting to overlapping windows is functionality that is well suited to the multitasking environments common on the desktop today.


01evangelicals.adl
File Edit View Server Help
23elect.adl
File Edit View Server Help
IUI submission
File Edit View Favorites Tools Help
Back
Search
continue

Bare-Knuckle Democracy in Iraq Rebel Territory

By EDWARD WONG

BAQUBA, Iraq, Nov. 22 - In a burst of flame and smoke, a roadside bomb exploded Tuesday next to an American military convoy carrying a top Baghdad electoral official, Izzadin al-Muhammadi, as he rode through Baquba to a meeting with local politicians. The blast wounded no one, but it shook up Mr. Muhammadi.

Local politicians put a top Iraqi election official under hard questioning yesterday at a meeting in Baquba.

Then things got bad.

At the fortified government center in this provincial capital in insurgent country, local leaders assailed Mr. Muhammadi with complaints. Why aren't there more polling centers? What will you do about all the people who cheat? Can you set up a fairer system for selecting observers?

The low point came when Sajah Qadouri, a provincial council member, accused the commission of being infiltrated by insurgents.

"A lot of people agree that the electoral commission is part of the problem," she said, shaking her head. "We know that terrorists exist even in the commission."

When the meeting broke up, Mr. Muhammadi wiped his brow with a tissue.

Such is the state of Iraqi politics just three weeks before the Dec. 15 elections for a full, four-year government. With officials like Mr. Muhammadi unable to travel anywhere unless accompanied by enough firepower to level a village, and with even the politicians expressing distrust of the electoral system, this vote is fraught with as much peril as the last one, in January.

For one thing, politics here have scarcely left the bare-knuckles era. The continuing guerrilla war, coupled with leftover tensions from the Hussein

Giuliani Inspires Threat of a Third Party Run

By DAVID D. KIRKPATRICK

WASHINGTON, Sept. 30 — Alarmed at the possibility that the Republican Party might pick Rudolph W. Giuliani as its presidential nominee despite his support for abortion rights, a coalition of influential Christian conservatives is threatening to back a third-party candidate.

http://thecaucus.blogs.nytimes.com/ Join the discussion.

The threat emerged from a group that broke away for

Conservative Christian leaders such as Tony Perkins are part of a group considering an alternative to Rudolph W. Giuliani. James C. Dobson, chairman of Focus on the Family.

Name	Size	Type
archive		File Folder
figures		File Folder
original		File Folder
chi2008pubsformat.cls	51 KB	CLS File
conclusion.tex	4 KB	TEX File
evan2pm.zip	27 KB	WinZip File
figures.tex	1 KB	TEX File
futurework.tex	2 KB	TEX File
hierarchical.tex	5 KB	TEX File

Figure 6. Our aggregated documents are sensitive to overlap and can flow around any desktop window. The two articles are rendered with the same template, which moves the photo in the left-most article out of the lower-right corner where it would be occluded by the first article and the filesystem folder.

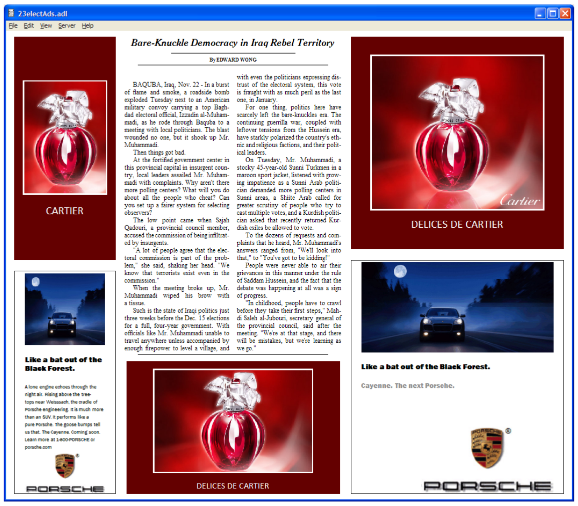
IMPLEMENTATION

We implemented two versions of the system described in this paper, one as a stand-alone client application and the second as a server-side application that delivers HTML webpages. The stand-alone application is far more responsive and provides a better interactive experience, whereas the Web server allows documents to be viewed in any modern Web browser. The main part of our system, the layout engine, is the same for both systems. The only difference is that the server version produces an HTML webpage instead of drawing text and images to the screen. We decided against implementing our work with DHTML because it is difficult to flow text across page elements. Our layout engine implementation is similar to that of AGBDL, described previously in [15]. In this section, we describe the implementation of the new parts of the system and then show results.

We gather the content for our aggregated documents using a variety of techniques. Most content streams provide XML content, which we transform using XSLT (Extensible Stylesheet Language Transformations), a language designed to translate XML content. A manually authored translation script provides rules that govern the transformation. Any arbitrary XML data can be transformed into a document that our system can display, provided a translation file exists. Once a document is translated, it can be displayed as a stand-alone document, or its content can be included in whole or in part in another document.

High-level template primitives

This work adds many new, high-level primitives to the design template language that make it much easier to author templates. In some cases, these new language features ease the production of highly complicated constraint systems, and are similar to macros that get translated into lower-level constraint "code." In other cases, the new language features reflect fundamental new capabilities of the layout system.


23electAds.adl
File Edit View Server Help
CARTIER
DELICES DE CARTIER
Cartier
DELICES DE CARTIER
Like a bat out of the Black Forest.
Cayenne. The next Porsche.
PORSCHE
PORSCHE

Bare-Knuckle Democracy in Iraq Rebel Territory

By EDWARD WONG

BAQUBA, Iraq, Nov. 22 - In a burst of flame and smoke, a roadside bomb exploded Tuesday next to an American military convoy carrying a top Baghdad electoral official, Izzadin al-Muhammadi, as he rode through Baquba to a meeting with local politicians. The blast wounded no one, but it shook up Mr. Muhammadi.

Then things got bad.

At the fortified government center in this provincial capital in insurgent country, local leaders assailed Mr. Muhammadi with complaints. Why aren't there more polling centers? What will you do about all the people who cheat? Can you set up a fairer system for selecting observers?

The low point came when Sajah Qadouri, a provincial council member, accused the commission of being infiltrated by insurgents.

"A lot of people agree that the electoral commission is part of the problem," she said, shaking her head. "We know that terrorists exist even in the commission."

When the meeting broke up, Mr. Muhammadi wiped his brow with a tissue.

Such is the state of Iraqi politics just three weeks before the Dec. 15 elections for a full, four-year government. With officials like Mr. Muhammadi unable to travel anywhere unless accompanied by enough firepower to level a village, and with even the politicians expressing distrust of the electoral system, this vote is fraught with as much peril as the last one, in January.

For one thing, politics here have scarcely left the bare-knuckles era. The continuing guerrilla war, coupled with leftover tensions from the Hussein era, have starkly polarized the country's ethnic and religious factions, and their political leaders.

On Tuesday, Mr. Muhammadi, a stocky 45-year-old Sunni Turkmen in a maroon sport jacket, listened with growing impatience as a Sunni Arab politician demanded more polling centers in Sunni areas, a Shiite Arab called for greater scrutiny of people who try to cast multiple votes, and a Kurdish politician asked that recently returned Kurdish exiles be allowed to vote.

To the dozens of requests and complaints that he heard, Mr. Muhammadi's answers ranged from, "We'll look into that," to "You've got to be kidding!"

People were never able to air their grievances in this manner under the rule of Saddam Hussein, and the fact that the debate was happening at all was a sign of progress.

"In childhood, people have to crawl before they take their first steps," Mahdi Saleh al-Jubouri, secretary general of the provincial council, said after the meeting. "We're at that stage, and there will be mistakes, but we're learning as we go."

Like a bat out of the Black Forest.

A lone engine echoes through the night air. Rising above the treetops near Weisssach, the cradle of Porsche engineering. It is much more than an SUV. It performs like a pure Porsche. The goose bumps tell us that. The Cayenne. Coming soon. Learn more at 1-800-PORSCHE or porsche.com

Figure 7. Adaptive advertisements can be designed using our layout templates. Two mock ads are displayed in different size elements.

The most complicated of the new template primitives is the adaptive grid. When the grid is loaded, the system calculates the transition thresholds where columns should be added and removed. Since the designer has a lot of control over the adaptation to various display widths, the system generates a complicated constraint system that activates and sizes the appropriate number of columns, as well as margins and gutters. Columns that are inactive have their width collapsed to zero so that other constraints that depend upon the column are evaluated normally. Sometimes a perfect transition point does not exist. For example, if the allowable column widths are between 200 and 300 points, then there are some pages (e.g., one that is 350 points wide) that are too big for one column and too small for two. The best solution, we believe, is to absorb any extra width into the margins and gutters, which our system will do by default. Alternatively, the layout can be left- or right-justified and all additional space is left in one margin or the other.

While conditional groups could be implemented using constraint systems alone, a more efficient and powerful approach is to place support for them in the layout engine. The system recognizes these structures, iterates through the given layouts, and selects the appropriate element using the policy defined by the designer and the constraint values generated by the layouts. This also allows the element choice to depend upon the results of a given layout, rather than just the initial conditions.

RESULTS

To demonstrate our ideas, we have developed several example applications. The applications include an adaptive version of the online magazine, Slate; an interactive newsreader for the New York Times; and a front-end for the news-aggregator, MSN Newsbot. Figures 8 and 9 show examples of the New York Times and MSN Newsbot applications. Additionally, for the New York Times demonstration we created a set of adaptive mock advertisements shown in Figure 7. These mock ads are just subdocuments that contain the ad content, along with templates specialized for that content. These ads present a unified visual theme at a wide range of sizes and aspect ratios. We see a lot of potential for this idea, because print media advertising is often sold as a percentage of a page. Our technology allows this established model to be carried into the online world where non-standard page sizes are becoming more and more common.

Our New York Times application uses our new template system and displays the stories of the website's RSS feed as a broadsheet newspaper. To gather the content we combine the RSS feed of the website and a Web scraper that collects the full content of each article from their website. The RSS feed is translated using an XSLT transformation, while the scraped article is converted to our document format using a helper application. The New York Times application displays a set of one- to six- column layouts using only five templates.

We built a Slate magazine application using the website's XML Web feed. We used the earlier AGBDL template system, and it required 74 templates to display four different basic designs; one-, two-, and three-column layouts and a PDA layout. Each one of these templates was four to five times larger than the New York Times templates. It was this initial application that motivated our research in the adaptive layout of dynamically aggregated documents and the development of more powerful templates.

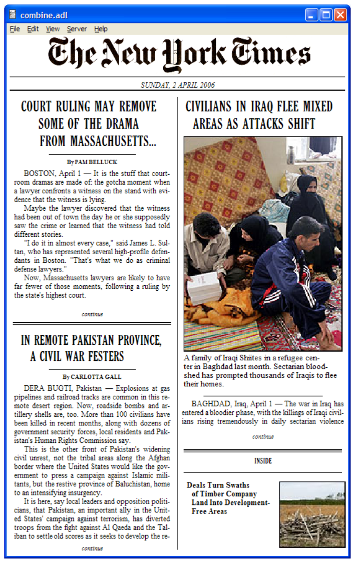
The MSN Newsbot application makes database requests over the Internet to retrieve current breaking news updates from thousands of Web sources and displays them in an attractive adaptive document. This application uses just two top-level templates: one for a small-screen display, and one for all other displays. Each of the stories and each navigation menu of the MSN Newsbot application are subdocuments and use one of a total of four possible subdocument templates.

There are still some major limitations of our system: 1) we currently require designers to author templates in XML code, which will be a barrier for some users; 2) we use a one-way constraint solver for the layout engine (rather than a more general solver such as Cassowary [5] that can handle cycles in the dependency graph), which limits to some extent the page designs that can be described; and 3) the need to write a translation script to parse the raw content from websites into a suitable format for our layout engine, which requires some knowledge of the structure of the targeted website.

The most common application that one-way constraints cannot realize is column-balancing. Multi-column pages that are not entirely full look best when all of the columns are the same length. Since this is common in our domain, we implemented a special primitive that performs iterative balancing on a group of text elements.

FUTURE WORK

There are several ways we would like to expand the system further. We plan to build a graphical template design tool,



The New York Times

SUNDAY, 2 APRIL 2006

COURT RULING MAY REMOVE SOME OF THE DRAMA FROM MASSACHUSETTS...

By PAM BELLUCK

BOSTON, April 1 — It is the stuff that courtroom dramas are made of: the gotcha moment when a lawyer confronts a witness on the stand with evidence that the witness is lying.

Maybe the lawyer discovered that the witness had been out of town the day he or she supposedly saw the crime or learned that the witness had told different stories.

"I do it in almost every case," said James L. Sultan, who has represented several high-profile defendants in Boston. "That's what we do as criminal defense lawyers."

Now, Massachusetts lawyers are likely to have far fewer of those moments, following a ruling by the state's highest court.

continue

IN REMOTE PAKISTAN PROVINCE, A CIVIL WAR FESTERS

By CARLOTTA GALL

DERA BUGTI, Pakistan — Explosions at gas pipelines and railroad tracks are common in this remote desert region. Now, roadside bombs and artillery shells are, too. More than 100 civilians have been killed in recent months, along with dozens of government security forces, local residents and Pakistan's Human Rights Commission say.

This is the other front of Pakistan's widening civil unrest, not the tribal areas along the Afghan border where the United States would like the government to press a campaign against Islamic militants, but the restive province of Baluchistan, home to an intensifying insurgency.

It is here, say local leaders and opposition politicians, that Pakistan, an important ally in the United States' campaign against terrorism, has diverted troops from the fight against Al Qaeda and the Taliban to settle old scores as it seeks to develop the re-

continue

CIVILIANS IN IRAQ FLEE MIXED AREAS AS ATTACKS SHIFT

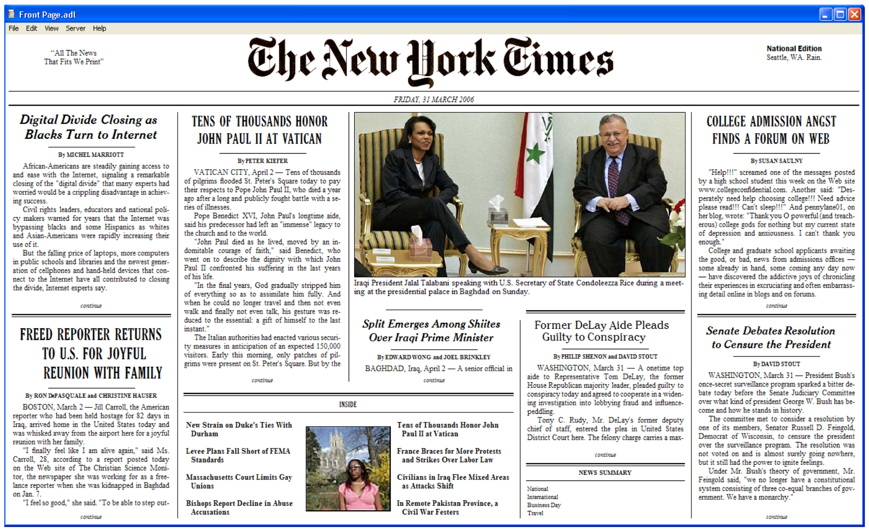
A family of Iraqi Shiites in a refugee center in Baghdad last month. Sectarian bloodshed has prompted thousands of Iraqis to flee their homes.

BAGHDAD, Iraq, April 1 — The war in Iraq has entered a bloodier phase, with the killings of Iraqi civilians rising tremendously in daily sectarian violence

continue

INSIDE

Deals Turn Swaths of Timber Company Land Into Development-Free Areas



"All The News That Fits We Print"

The New York Times

National Edition
Seattle, WA. Rain.

FRIDAY, 31 MARCH 2006

Digital Divide Closing as Blacks Turn to Internet

By MICHEL MARRIOTT

African-Americans are steadily gaining access to and ease with the Internet, signaling a remarkable closing of the "digital divide" that many experts had worried would be a crippling disadvantage in achieving success.

Civil rights leaders, educators and national policy makers warned for years that the Internet was bypassing blacks and some Hispanics as whites and Asian-Americans were rapidly increasing their use of it.

But the falling price of laptops, more computers in public schools and libraries and the newest generation of cellphones and hand-held devices that connect to the Internet have all contributed to closing the divide, Internet experts say.

continue

FREED REPORTER RETURNS TO U.S. FOR JOYFUL REUNION WITH FAMILY

By RON DePASQUALE and CHRISTINE HAUSER

BOSTON, March 2 — Jill Carroll, the American reporter who had been held hostage for 82 days in Iraq, arrived home in the United States today and was whisked away from the airport here for a joyful reunion with her family.

"I finally feel like I am alive again," said Ms. Carroll, 28, according to a report posted today on the Web site of The Christian Science Monitor, the newspaper she was working for as a freelance reporter when she was kidnapped in Baghdad on Jan. 7.

"I feel so good," she said. "To be able to step out-

continue

TENS OF THOUSANDS HONOR JOHN PAUL II AT VATICAN

By PETER KIEFER

VATICAN CITY, April 2 — Tens of thousands of pilgrims flooded St. Peter's Square today to pay their respects to Pope John Paul II, who died a year ago after a long and publicly fought battle with a series of illnesses.

Pope Benedict XVI, John Paul's longtime aide, said his predecessor had left an "immense" legacy to the church and to the world.

"John Paul died as he lived, moved by an indomitable courage of faith," said Benedict, who went on to describe the dignity with which John Paul II confronted his suffering in the last years of his life.

"In the final years, God gradually stripped him of everything so as to assimilate him fully. And when he could no longer travel and then not even walk and finally not even talk, his gesture was reduced to the essential: a gift of himself to the last instant."

The Italian authorities had enacted various security measures in anticipation of an expected 150,000 visitors. Early this morning, only patches of pilgrims were present on St. Peter's Square. But by the

continue

Iraqi President Jalal Talabani speaking with U.S. Secretary of State Condoleezza Rice during a meeting at the presidential palace in Baghdad on Sunday.

Split Emerges Among Shiites Over Iraqi Prime Minister

By EDWARD WONG and JOEL BRINKLEY

BAGHDAD, Iraq, April 2 — A senior official in

continue

Former DeLay Aide Pleads Guilty to Conspiracy

By PHILIP SHENON and DAVID STOUT

WASHINGTON, March 31 — A onetime top aide to Representative Tom DeLay, the former House Republican majority leader, pleaded guilty to conspiracy today and agreed to cooperate in a widening investigation into lobbying fraud and influence-peddling.

Tony C. Rudy, Mr. DeLay's former deputy chief of staff, entered the plea in United States District Court here. The felony charge carries a max-

continue

INSIDE

New Strain on Duke's Ties With Durham

Levee Plans Fall Short of FEMA Standards

Massachusetts Court Limits Gay Unions

Bishops Report Decline in Abuse Accusations

Tens of Thousands Honor John Paul II at Vatican

France Braces for More Protests and Strikes Over Labor Law

Civilians in Iraq Flee Mixed Areas as Attacks Shift

In Remote Pakistan Province, a Civil War Festers

NEWS SUMMARY

National
International
Business Day
Travel

COLLEGE ADMISSION ANGST FINDS A FORUM ON WEB

By SUSAN SAULNY

"Help!!!" screamed one of the messages posted by a high school student this week on the Web site www.collegeconfidential.com. Another said: "Desperately need help choosing college!!! Need advice please read!!! Can't sleep!!!" And pennylane01, on her blog, wrote: "Thank you O powerful (and treacherous) college gods for nothing but my current state of depression and anxiousness. I can't thank you enough."

College and graduate school applicants awaiting the good, or bad, news from admissions offices — some already in hand, some coming any day now — have discovered the addictive joys of chronicling their experiences in excruciating and often embarrassing detail online in blogs and on forums.

continue

Senate Debates Resolution to Censure the President

By DAVID STOUT

WASHINGTON, March 31 — President Bush's once-secret surveillance program sparked a bitter debate today before the Senate Judiciary Committee over what kind of president George W. Bush has become and how he stands in history.

The committee met to consider a resolution by one of its members, Senator Russell D. Feingold, Democrat of Wisconsin, to censure the president over the surveillance program. The resolution was not voted on and is almost surely going nowhere, but it still had the power to ignite feelings.

Under Mr. Bush's theory of government, Mr. Feingold said, "we no longer have a constitutional system consisting of three co-equal branches of government. We have a monarchy."

continue

Figure 8. We show the New York Times newsreader at two different sizes. The content is automatically fetched live from the RSS feed and displayed using a single template. If the featured story includes a photo in landscape orientation and the browser window is wide enough, that photo is pulled up above the story and placed over two columns. The stories appearing as headlines in the table of contents can be placed directly into any of the story boxes interactively.

ideally one that could work alongside a text-based XML editing tool so that templates could be created and edited in either tool interchangeably.

The template language we have described contains a number of high-level primitives that allow constraint systems to be generated by the system for common situations in adaptive page designs. We plan to identify more of these primitives to make the language more powerful and the descriptions more concise. For instance, we have an automated adaptive column grid, but there may be a similar useful construct in the vertical dimension. We would also like to provide support for letting users define new primitives to generate constraint systems that they use repeatedly in their designs. We intend to get feedback from designers to further refine the definition language.

We hope to evaluate the interaction we propose with a user study. We plan to explore more user interactions, such as allowing a user to modify layouts by directly manipulating boundaries of columns and elements. There is a trade-off, however, between the degree of control a designer maintains over the layouts and the latitude allowed the viewer. Finally, we would like to investigate using a more general constraint solver in the layout engine.

SUMMARY AND CONCLUSION

In this paper, we have presented a number of new ideas. These include: 1) the placement of preconditions and design-evaluation metrics on the individual elements of a page, rather than on just the page in its entirety, thereby enabling much richer combinations of page design elements without elaborating each one as a separate template; 2) a new set of high-level primitives that generate constraint systems automatically given some parameters, thereby enabling a more concise template specification by designers who are not programmers; 3) recursive masking for adaptation to multiple desktop windows; 4) novel user interactions that allow users to drag and drop hyperlinked content, read content in context, and interactively grow and shrink regions of interest. We also demonstrated a new application of adaptive layouts for advertising (see Figure 7), an innovation that should make this style of reading more commercially viable. However, the paper's biggest contribution perhaps is in the successful and non-obvious assembly of many smaller ideas into a larger whole — the creation of an innovative, working system that had not been possible before.

Virtually all commercial print media today use high-quality grid-based designs, yet current electronic publication tools support these designs only for documents that are static — both in layout and content. Our system addresses this situation by allowing designs that adapt to different viewing sizes, adapt to different dynamically aggregated content, and can be interactively modified by the reader. As on-line reading becomes more and more prevalent, these capabilities will become increasingly important.

The work presented in this paper, we believe, may have broad relevance in the larger field of user interface design. First, on-line reading is, in and of itself, a user-interface issue. Indeed, our adaptive layout templates embody the UI for online reading. They dictate not only how the reading material will appear to the user, but also how the user will navigate through that material or customize the view. In this regard, our templates define adaptive, graphical user interfaces, and the template specification language provides a tool for building them. Moreover, many of the ideas we present may prove relevant beyond just reading: we expect they may be useful for adaptive presentation of other dynamically created or assembled content as well—synthetic UI controls, results of database searches, or numerical data laid out as charts and graphs — to name a few.

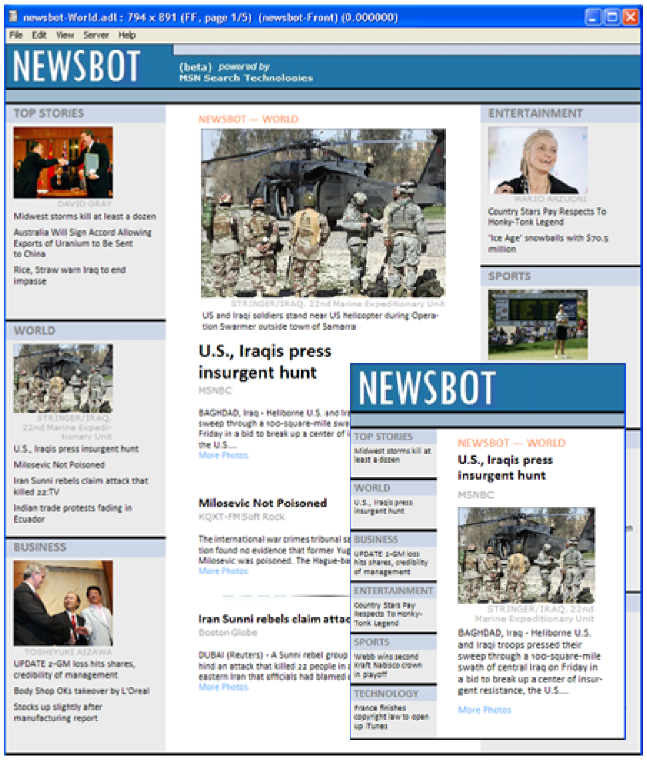


Figure 9. We show the MSN Newsbot reader at two different sizes. At the larger size, navigation menus appear on both the left- and right-hand sides; at the PDA size, these appear on the left only. Images are omitted from the navigation pane of the PDA-size layout. Each of the navigation menus is a paginated document, which can be paged through to see more stories.

ACKNOWLEDGEMENTS

We would like to thank Steven Drucker, Patrick Baudisch, Dan Weld, and Wilmot Li for helping us with this paper. Funding and research facilities were provided by Microsoft Research, Adobe Systems, and the University of Washington GRAIL lab.

REFERENCES

1. Adler, S., Extensible stylesheet language xsl:Version, 2000.
2. Arnold, E., Modern newspaper design, Harper & Row, Publishers, New York, NY, 1969.
3. Badros, G. J., Borning, A., Marriott, K., and Stuckey, P. 1999. Constraint cascading style sheets for the Web. In *Proceedings of the 12th Annual ACM Symposium on User interface Software and Technology* (Asheville, North Carolina, United States, November 07 - 10, 1999). UIST '99. ACM Press, New York, NY, 73-82.
4. Badros, G. J., Tirtowidjojo, J. J., Marriott, K., Meyer, B., Portnoy, W., and Borning, A. 2001. A constraint extension to scalable vector graphics. In *Proceedings of the 10th international Conference on World Wide Web* (Hong Kong, Hong Kong, May 01 - 05, 2001). WWW '01. ACM Press, New York, NY, 489-498.
5. Badros, G. J., Borning, A., and Stuckey, P. J. 2001. The Cassowary linear arithmetic constraint solving algorithm. In *ACM Trans. Comput.-Hum. Interact. 8, 4* (Dec. 2001), 267-306.
6. Bolin, M., Webber, M., Rha, P., Wilson, T., and Miller, R. C. 2005. Automation and customization of rendered web pages. In *Proceedings of the 18th Annual ACM Symposium on User interface Software and Technology* (Seattle, WA, USA, October 23 - 26, 2005). UIST '05. ACM Press, New York, NY, 163-172.
7. Boodman, A. *www.greasespot.net*
8. Borning, A., Lin, R., and Marriott, K. 1997. Constraints for the web. *In Proceedings of the Fifth ACM international Conference on Multimedia* (Seattle, Washington, United States, November 09 - 13, 1997), 173-182.
9. Bringhurst, R., The Elements of Typographic Style. Hartley & Marks, Publishers, Vancouver, BC, Canada, 1996.
10. Dontcheva, M., Drucker, S. M., Wade, G., Salesin, D., and Cohen, M. F. 2006. Summarizing personal web browsing sessions. In *Proceedings of the 19th Annual ACM Symposium on User interface Software and Technology* (Montreux, Switzerland, October 15 - 18, 2006). UIST '06. ACM Press, New York, NY, 115-124.
11. Dontcheva, M., Drucker, S. M., Salesin, D., and Cohen, M. F. 2007. Relations, Cards, and Search Templates: User-Guided Data Integration and Layout. In *Proceedings of the 20th Annual ACM Symposium on User interface Software and Technology* (Newport, Rhode Island, October 7 - 10, 2007). UIST '07. ACM Press, New York, NY.
12. Feiner, S. K. 1988. A grid-based approach to automating display layout. In *Proceedings on Graphics Interface '88* (Edmonton, Alberta, Canada). Canadian Information Processing Society, Toronto, Ont., Canada, 192-197.
13. Gajos, K. and Weld, D. S. 2004. SUPPLE: automatically generating user interfaces. In *Proceedings of the 9th international Conference on intelligent User interfaces* (Funchal, Madeira, Portugal, January 13 - 16, 2004). IUI '04. ACM Press, New York, NY, 93-100.
14. Henry, T. R., Hudson, S. E., and Newell, G. L. 1990. Integrating gesture and snapping into a user interface toolkit. In *Proceedings of the 3rd Annual ACM SIGGRAPH Symposium on User interface Software and Technology* (Snowbird, Utah, United States, October 03 - 05, 1990).
15. Jacobs, C., Li, W., Schrier, E., Bargeron, D., and Salesin, D. 2003. Adaptive grid-based document layout. In *ACM SIGGRAPH 2003 Papers* (San Diego, California, July 27 - 31, 2003). SIGGRAPH '03. ACM Press, New York, NY, 838-847.
16. Kamba, T., Bharat, K., Albers, M. 1995. The Krakatoa Chronicle - An Interactive, Personalized, Newspaper on the Web. In *Proceedings of the Fourth International World Wide Web Conference, 159 170.* (Boston, MA, December 11-14, 1995.)
17. Kandogan, E. and Shneiderman, B. 1997. Elastic Windows: a hierarchical multi-window World-Wide Web browser. *In Proceedings of the 10th Annual ACM Symposium on User interface Software and Technology* (Banff, Alberta, Canada, October 14 - 17, 1997).
18. Lie, H.W., and Box, B. 1996. Cascading style sheets, level 1. W3C recommendation. http://www.w3.org/style/CSS/.
19. Marriott, K., Meyer, B., and Tardif, L. 2002. Fast and efficient client-side adaptivity for SVG. In *Proceedings of the 11th international Conference on World Wide Web* (Honolulu, Hawaii, USA, May 07 - 11, 2002).
20. Myers, B.A., Giuse, D., Dannenberg, R.B., Vander Zanden, B., Kosbie, D., Pervin, E., Mickish, A., and Marchal, P. Garnet: Comprehensive Support for Graphical, Highly-Interactive User Interfaces. IEEE Computer 23, 11 (November 1990), 71–85.
21. Quint, A. 2003. Scalable vector graphics In *IEEE Multimedia, Vol.10, Iss.3, July-Sept. 2003* Pages: 99- 102.
22. W3C CCS3 Working Draft, 6 June, 2007. Lie, H.K., editor. *http://www.w3.org/TR/css3-multicol.*