

# ACTIVIEW: Adaptive data presentation using SuperSQL

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## Abstract

Recently, wireless PDA (Personal Digital Assistant) becomes very popular and it requires to create the HTML pages which adapt to user's browsing environment. Using SuperSQL, we have implemented an adaptive data presentation system. In this demonstration, we show the dynamic generation of view which adapt to user's browsing environment.

## 1 Introduction

Browsing WWW from wireless PDA, like *PalmVII* becomes popular and they require to prepare Web page adapted to each browsing environment. Also, Web technology helps many Web-based businesses, which requires to customize the content of the Web page for each user. Therefore, to meet these requirements, the research of "personalization" and "adaptation" of Web data have become important. We are here concerned with the situation that incorporate the data in database through WWW. In this research, we propose an adaptive data presentation system (ACTIVIEW), which create HTML pages as a result of a query including the idea of "adaptation" and "personalization".

## 2 An Overview of ACTIVIEW

ACTIVIEW is implemented on the basis of SuperSQL system[2]. The feature of ACTIVIEW is that the result of a query changes among user and also changes among user's browsing environment.

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Proceedings of the 27th VLDB Conference,  
Roma, Italy, 2001

### 2.1 An Overview of SuperSQL and TFE

SuperSQL extends SQL with the TFE (Target Form Expression) to generate various kinds of structured publishing/presentation documents. TFE uses new operators (connectors and repeaters) to specify the structure of the document generated as the result of the query. Each connector and repeater is associated with a dimension: when generating a Web document (like ACTIVIEW), the first two dimensions represented by a comma (,) and an exclamation point (!) are associated with the columns and rows of the <TABLE> structure of HTML and the third dimension represented by a percent (%) is associated with hyper-links. A pair of square brackets ([ ]) followed by any of the connectors is a repeater for that dimension. It will connect multiple instances in its associated dimension repeatedly. We have introduced the **GENERATE <medium>**<sup>1</sup> <TFE> clause to SQL syntax to clarify the distinction with the **SELECT <target list>** clause.

### 2.2 Adaptation

It is uncomfortable to see the relation on the Web which is represented in larger table than window size. It is even more bothering to scroll both way, side and vertical. Therefore we focused on this problem and realized ACTIVIEW to modify the layout dynamically and adaptively to the browsing window. More precisely, modify the layout never to be larger than window in width. We adopt two policy as shown below.

**Change of horizontal connection (,) to vertical (!)**  
We set up **rule1a** and **rule1b** to decide which horizontal connection to be given priority to change. **Rule1a** is focused on curly braces ({ }), which specify the precedence of connections and **verb** function<sup>2</sup> in SuperSQL. Figure 1(b) shows that horizontal connection between *verb* and data has changed in comparison to (a). **Rule1b** is prepared to select a horizontal connection and change it to a vertical one. Figure 1(c) is the example of applying rule1b on (b). After applying

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<sup>1</sup>Other target medium designations, which are allowed in the current implementation include LATEX, EXCEL, XML, etc.

<sup>2</sup>SuperSQL function explained in [3]

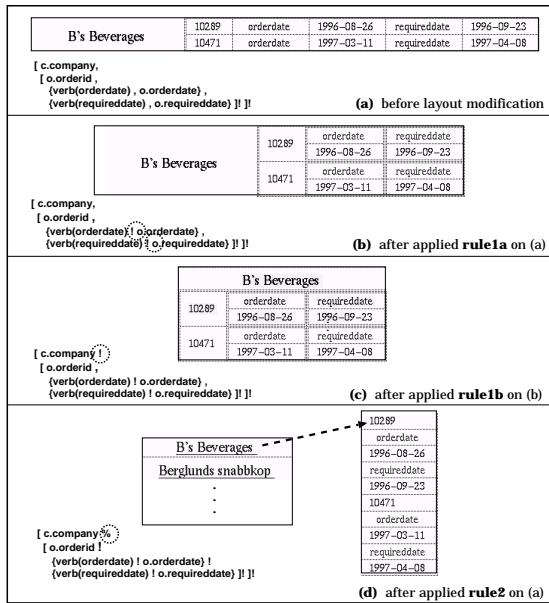


Figure 1: example of layout modification the rule, the system checks whether the width narrower than that of browsing environment. It will repeat applying the rule until the condition satisfies.

Change of horizontal connection to hyper-links (%) In Japan, i-mode<sup>3</sup>: portable phone enable us to search and browse Web. Therefore it is required to prepare Web page tailored for i-mode. The second policy is prepared especially for portable phone like i-mode. For the sake of comfort, it is natural to represent data vertically, but we also think it is better to connect by hyper-link than to align all data vertically. Therefore, showing the representative information as a menu and connect details by hyper-link, it will provide comfortable view. We set up **Rule2**, which follows this policy.

### 3 Demonstration

The main focus of the demo will be on the ability of ACTIVIEW to modify layout according to browsing window size. In this demonstration, we use the information of business administration. In the following, we describe one of the example view, which deals "order information".

#### 3.1 Query and Profile

Figure 2 shows the query and profile of ACTIVIEW. The ACTIVIEW query is parameterized. The value of the parameters are designated in profile. Additional restriction on the query (*>where*) and the color preference of HTML document may also designated in the profile. Profile information is taken from profile database.

Figure 3 shows a sample Web document generated by the query shown in figure 2. Both of the view presented in PDA or i-mode is generated for same user,

<sup>3</sup>proprietary system of "NTT DoCoMo"

```

GENERATE ACTIVIEW@({profile=order.profile})
[e.firstname@{SLfont} ,
[{ c.companyname@{SLfont}%
invoke(/customer.actiview,c.customerid=c.customerid) ,
[o.orderid@{SMfont} ,
{ verb(orderdate)@{SMfont} ,o.orderdate@{SMfont} } ,
{ verb(requireddate)@{SMfont} ,o.orderdate@{SMfont} } ,
{ verb(shippeddate)@{SMfont} ,o.shippeddate@{SMfont} } ] ] ] ]
FROM orders o, employees e, customers c
WHERE o.customerid=c.customerid and
o.employeeid=e.employeeid

```

```

$bgcolor "#ffffff"
$bordercolor "#0000ff"
$Mfont align=center,width=100
$Lfont align=center,width=200,fontsize=5
$title ORDER information
>where e.employeeid=104

```

Figure 2: example of query and profile but differs in browsing environment. Thus, the data in the views are same, but differs in layout.

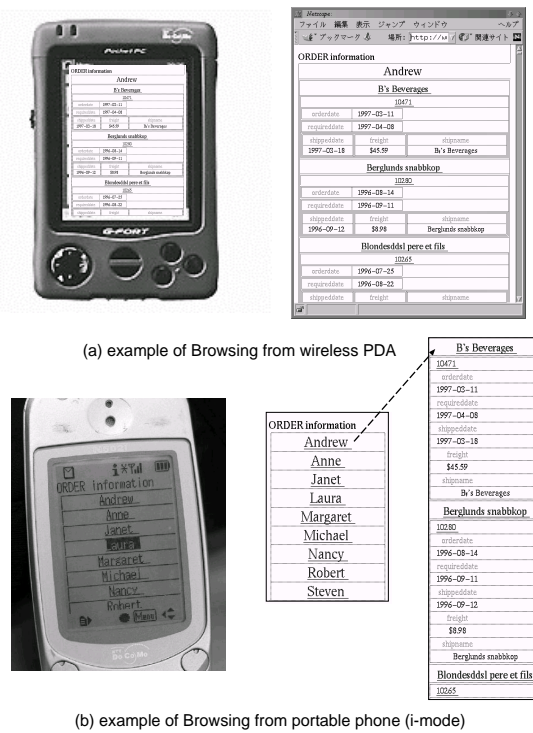


Figure 3: example of ACTIVIEW

### 4 Conclusion

ACTIVIEW realizes not only to present the result from database in Web page but also to adapt and personalize the Web page. Especially, ACTIVIEW modify layout in order to fit automatically to screen size.

### References

- [1] SuperSQL: <http://ssql.db.ics.keio.ac.jp/>
- [2] Motomichi Toyama, "SuperSQL: An Extended SQL for Database Publishing and Presentation," *Proc. ACM SIGMOD '98*, pp. 584-586, 1998
- [3] T. Seto, T. Nagafuji and M. Toyama, "Generating HTML Sources with TFE Enhanced SQL," *Proc. ACM SAC '97*, pp. 96-105, 1997
- [4] S.Ceri,P.Franternali,S.Paraboschi. "Data-Driven One-to-One Web Site Generation for Data-Intensive Applications" *25th VLDB*,1999