"iRemote!" - Research on Webpage-Zapping User Interface

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Abstract – 日常でウェブを閲覧するのに使われる、ブックマークというものがある。ブックマークの機能とは、気に入ったページを登録しておけば、後程そのページに接続できる、というものである。数多くのウェブサイトを登録できる半面、メニュードリブンなインターフェイスは使いづらいという欠点がある。

更には、ブックマークを一つのコンピュータに登録しても、登録したコンピュータ以外には記録されないため、例えば外出先で好みのページを開くことや、出張先からページを登録して、戻ってからゆっくり見る、という使い方は出来ない。

歴史的な観点から見ると、インターネット、はたまたウェブの創成期と違い、現在のウェブは非常にインタラクティブな環境である。文字ばかりであったコンテンツは、スタティックな音声再生や画像表示の時代を経て、リアルタイムでビデオのストリーミング再生が可能な状態まで発展した。世界中に散らかっていた知的コンテンツは、今やエンターテインメントまでもが主流になり、新聞に例えれば日経新聞から子供新聞まで全て包括されている。そのような時代に、ブックマーク ― 「しおり」 ― を使うのは、あまりにもアナクロニスティックである。

そのような問題を解決するために、ウェブブラウジングのための、新たなユーザインターフェース *"iRemote!"* を提案をした。ビデオやテレビのリモコンのように、気軽にインターネットのウェブサイトを再生、録画、そしてザッピングする。気に入ったサイトは、赤い録画ボタンでパーソナルレコードに記録。更には、パーソナルレコードは、家からでも外出先からでもブラウジング出来、記録できる。そのような使い心地を求めたのが、*iRemote!* である。

iRemote! の実装は *Java* で行った。従来のブックマークとの主な相違点として、ブックマークがあくまでブラウザの一機能であり拡張性がないところにある。*iRemote!* を *Java* で動作させて、従来のウェブブラウザと外部で連動することにより、自由に *URL* 情報などの受け渡しが可能になった。かつ、将来的には *Java* 対応のマルチプラットフォームでの動作が可能になる。

また、コンピュータ機器等の通信に用いられる、*Jini* や *BlueTooth* があるが、それらと *iRemote!* を組み合わせることによって、従来のテレビのリモコンそのものでのウェブブラウジングが可能になる。

iRemote! に関する研究の結果、今までとは全く違う、よりパーソナルで、使いやすいユーザインターフェースでのブラウジングが可能になった。

1 Introduction

"Bookmarks" - They are quite useful when reading through long books, such as those written by John Grisham and Ryotaro Shiba. But once the number of books reach 200, and 200 bookmarks must be kept to go with each of the book, cluttered in a shelf, the whole point of having a bookmark disappears - before finding the page one wants to read with that bookmark, one must find The Book first. Just to find the one bookmark inside a John Grisham novel for the bedtime reading, one must go through 199 of the remaining bookmarks.

The partnership between a person and the *Internet* grows according to the total time spent and frequency. At first, Internet is like an Encyclopedia with endless amount of information to look through. But soon, many will grow attached to a certain page of that Encyclopedia. They would go to a certain page every week, every day, or even every hour just to see what is going on. "What's New?", they ask.

At that time, the Internet is more like a TV show. A TV show, a drama, in which life is represented in pictures and texts, rather than moving images. "The Exciting Adventures of the Hypertext Family," if it could be called so [1].

Here comes the question, "what good is a Bookmark when you want to watch a drama?"

And the answer is, *"iRemote!"*

It is a *Zapper*. It is a remote control. And it is *The Internet Remote Control* that allows the *zap-*

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[1]I, for one, look through three internet based BBSs - one for my family, one for jazz, and one for my long graduated friends

ping of webpages and that would be basically all that is needed to fulfill one's Internet couch potato lifestyle. No more Bookmarks, and certainly no more cluttered bookshelves with 52 Volumes of the internet online Encyclopedia Britannica [3], never to be read again.

Imagine this: While browsing the internet, it is often troublesome to search through the numerous Bookmarks that are stored on the local hard disk, just to find a page that is for everyday viewing. Also, while Bookmarks are useful, they can not be referenced from a non-local computer.

This paper proposes a technique pertaining to an internet page bookmarking, which allows the "recording", "playing" and "zapping" of web pages close to the feel of TV and VCR remote control. Also, by programming in Java, the bookmark data can be accessed from a non-local computer via the internet, thereby allowing the user to view their bookmarks from a friend's computer, a computer at some internet cafe, or even out of the country.

A prototype of such system is also described in this paper.

Figure 1: A Typically Cluttered *Internet Explorer* Bookmark [5]

2   Related Systems

Before the *iRemote!* hit the streets, there used to be a number of methods to store and surf the web. However, many of them do not satisfy the individual's urge to zap through the net, because of their cluttered user interface. As an example, described below are three alternatives to using *iRemote!*.

2.1   The Old Bookmark Way

Since the beginning of WWW, web browsers contained within a function called *bookmarks*, thus allowing the storing and retrieving of WWW URL addresses. However, it is a 90s technique of storing URL addresses. Described below are the disadvantages of ordinary *bookmarks*.

Purely Textual in Form The bookmarks store, display and sorts URLs in a textual pulldown menu, much in the same manner as the *Start Button* of Windows 95+. Although the WWW used to be very much textual in context, much times has passed since the beginning, and now the WWW is very Audible and Visual.. Thus, it does not seem suitable to treat such AV-enhanced WWW with such a textual interface,
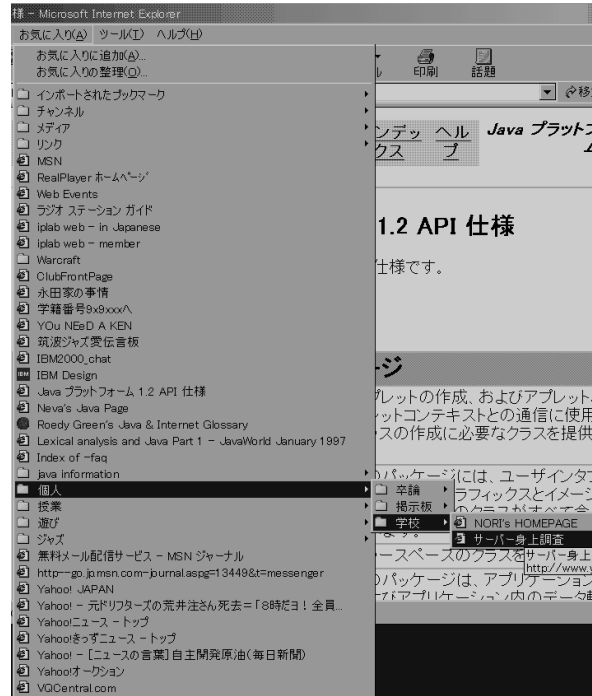
where the user has to remember from the Title of the URL for its contents. In another words, bookmarks are far from intuitive in its way of treating URLs and their corresponding webpages.

It grows, grows and grows... One advantage of Bookmarks is that it can store and sort multiple URLs. However, once the number of bookmarks reach the order of 100, it becomes almost impossible to sort and keep them in a neatly stacked folder manner. Besides, once there are over 100 bookmarks, the 1st bookmark that was stored will probably never see the light of day again. Then, the bookmarks keep on increasing, thereby eating up hard disk space and making the internet a bother to surf.

2.2   Web Bookmark & Portal Sites

In the past few years, *portal sites* such as My Yahoo! and My Netscape! have gained its popularity amongst the Internet community.

The term portal is defined as a:

new term synonymous with gateway, for a World Wide Web site that is or proposes to be a major starting site for users when they get connected to the Web or that users tend to visit as an anchor site. There are general portals ... [which] include Yahoo, Excite, Netscape, Lycos, CNET, Microsoft Network, and America Online's AOL.com. ... Typical services offered by portal sites include a directory of Web sites, a facility to search for other sites, news, ... and sometimes a community forum. [4]
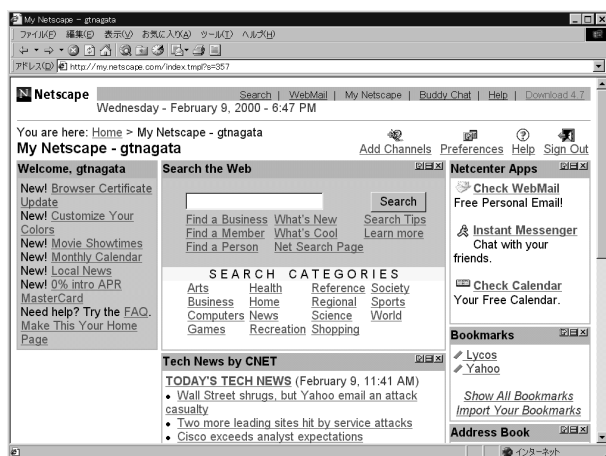

Figure 2: My Netscape - a Major Portal Site [7]

Portal sites' main strengths are the ability to be easily customized to suit the individual needs, and the accesibility from anywhere in the world of internet WWW. Thus, one can check out only the information that are required, and will not have to go through the unwanted information. In addition, that could be all done from a personally owned computer, from one in the office, or even one outside the country. They also offer a complementary function of a web-based bookmark, in which users can store and retrieve URLs from any internet-connected computer, thereby fulfilling the function of a web-based bookmark.

However, there are disadvantages of web-based bookmarks at portal sites.

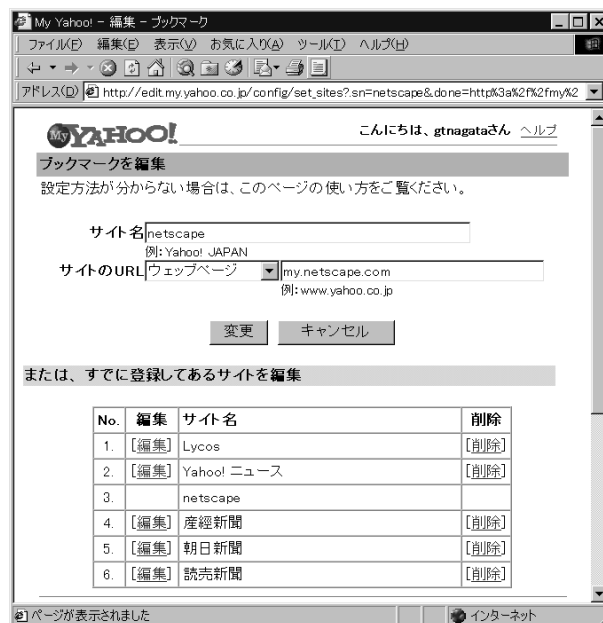**Unease of Use** The use of Portal-based book-

Figure 3: A web bookmark from *My Yahoo!* [6]

marks is severely hindered by its mediocre user interface. Like its counterpart, the Bookmark, it is purely textual in form. Also, in many cases, several menus and commands must be passed on to actually reach the page in which bookmarks are stored from and restored to.

In measurement: It took an average 15 seconds to reach the recording page, 10 seconds to copy the URL, 10 seconds to type in the title of the webpage, and 5 more seconds until the URL was stored to the bookmark. Also, to actually view the page, it took 5 seconds to open the bookmark and another 5 seconds to select and load the required website.

Which all adds up to the fact that it takes almost a minute to store, and about 10 seconds to restore. When watching a television program, 10 seconds is hardly an acceptable value to change from one channel to another. As a result, the web-based bookmark is not exactly popular amongst the population of the internet, however popular the Portal sites are.

Troublesome Not only does it take a few steps to open the bookmark section of the portal sites, it is worse when storing *URLs*. Although there are many portal sites, many of their bookmark

sections handle similarly, and several steps are needed to store a website on the portal-based bookmarks. Those being: 1-Open portal site 2-Open the bookmark section 3-Select the section for storage of *URL*

Unintuitive Since most portal sites are displayed using *CGI*, the user interface is purely textual at best.

Useless Due to such restrictions, portal site based bookmarks are mediocre in their handling of *URLs*, and bookmarks are just an option that no one really uses.

2.3 Bookmark Organizer Softwares Way

There has been various softwares released that are called *Bookmark Organizers*. Such software assists the user in utilizing the bookmark by sorting hundreds and thousands of bookmarks. However, although at first these softwares were popular, their hype has not lasted to this day, partly due to the following disadvantages.
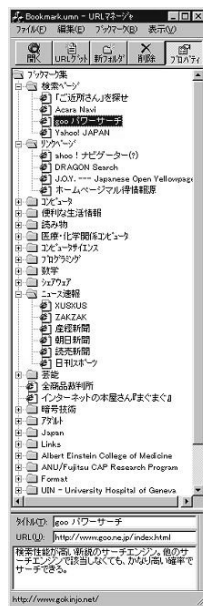

Figure 4: Example of URL manager [12]

No-net It is a basically a solution that works inside a single computer rather than throughout the net. Therefore, the stored data is inaccesible from the other parts of the 'net.

Still text Most bookmark managers are still text based, adding little to the features of the Internet Explorer. Bookmark managers are fine when sorting out hundreds of bookmarks, but they are not exactly ease or intuitive in its handling.

Who needs all these bookmarks? Again, there is not much point in storing hundreds and thousands of bookmarks when looking through the net, partly because the internet is much more of a dynamic world than it used to be. Webpages are updated daily and even hourly, and there is little point in saving the URL of some page that might not even exist two days later.
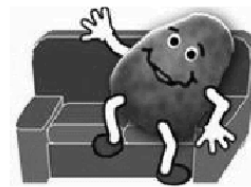

Figure 5: The *iRemote!* Way to Surf the Web

3   the *iRemote!* Way

The question that arose was pointed to whether all the bookmark recordings and sorting out were absolutely necessary. Instead of ruffling through tens and hundreds of useless bookmarks, much smaller number would suit the needs of an individual. Since 7 is the magic number for user interface creation, 7 URL storage would be okay.

Furthermore, instead of treating the Web as a static, booklike media (hence the name *Bookmark*), it would be suitable to treat it like a broadcast. Such as a television or a radio. That is how the idea of *iRemote!* came up.

In essence, *iRemote!* is a user interface for the Web-browsers and Web-browsees that assimilates the remote control of a television.

Explained in detail below are the specifics of *iRemote!*.

Figure 6: *iRemote!* in Action

3.1 Solution to the Problems

Noting the problems of the other systems described below, the *iRemote!* was designed with the following in consideration.

- Purely visual in its appearance. Little or no text interface.

- Direct manipulation [8] calls for WYDIWYS, What You Do is What You See.

- Buttons utilized similar to that of a household appliance remote control for intuitive handling.

- Limited number of URLs stored to 7+-2 to solve the problem of cluttering.

- Network-friendliness allows access from remote computers.

3.2 New ideas pertaining to *iRemote!*

In addition to the above solutions, the following ideas were considered and executed to make *iRemote!* a joy to use.

- Brand new way of checking the net - *"Zapping."* Although nothing new in the TV area, this is the main concept of *iRemote!*.

- Buttons utilized similar to that of a household appliance remote control, such as TV and VCR remote controls.

- 100% Pure Java programming allows the program to be run from any environment that is Java 2 compliant. Therefore, in the future a Jini-compliant remote control hardware may be all that is needed to view the web.

3.3 GUI Unit

As can be seen in the figures below, the function of the *iRemote!* is very much like that of the average household remote control. It combines the VCR-type record and play buttons with TV-type "channel" buttons.
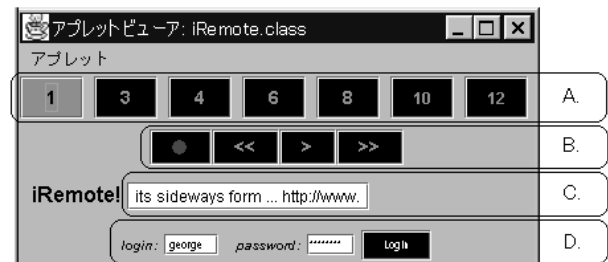

Figure 7: *iRemote!*, The *iRemote!* GUI

A. Channel Buttons The equivalent of a TV-remote control's channel buttons, these buttons allow for a single action-reaction to load a webpage.

B. Rec, Play and *Zap!* From left to right, the buttons are Record, *Zap* back, Play and *Zap* forward. The record button, followed by the push of a channel button allows for a simple action to store a website in view. The Zap forward and Zap backward buttons act exactly

as they do on a TV remote control. With the press of each button, a new URL is loaded from the stored channels, giving the user a couch-potatolike handling of the web. The play button is just a touch to make the *iremote!* more VCR orientated. However, by creating a different mode of operation, *iRemote!* could act so that it would not load a webpage until the Play button is pressed.

C. Channel/URL display In essense, this area displays the title and the URL of a webpage in display. Also, by setting to a different mode of operation, this display could first show what URL a channel corresponds to before actually loading it with the Play button.

D. Login column Everybody should have an *iRemote!* at home. When the *iRemote!* is used solely on a local computer, passwords are not needed. But how would one be distinguished from another if multiple URLs of multiple users are stored on a single server? Therefore, login and passwords are required for the *iRemote!* to be operational via remote network. This may seem troublesome, but considering that all the Portal sites have login and passwords, it should not be too much of a bother.

Although the buttons are VCR-like, note that the *iRemote!* does not actually record the content of the page. Rather, it memorizes the page currently viewed in the Web browser, and allows for a viewing at a later time.

Also, note that this GUI only has 7 buttons. This is due to the concept of mental model[9], and will be described in detail below.

3.4   Advantages of iRemote!

The main advantage of *iRemote!* is in its direct manipulation[8]. Unlike the regular bookmarks, clumsiness is not part of *iRemote!*. One button is all that is needed to store a URL onto a "channel." The user can Zap from one website to another and further by just pressing the Zap forward button, instead of selecting from pulldown menus of the ordinary bookmark. Most of all, by assimilating the websites to a specific channel, the user eventually builds an image map that corresponds from a website to a channel number.

3.5   Television Broadcast and WWW Broadcast

Considering televisions in Japan, the channels around the Kanto area are pretty much fixed. Channels 1 and 3 are NHK, channel 4 is Nippon Television, channel 6 is TBS, channel 8 is Fuji Television, channel 10 is Asahi Television, and channel 12 is Tokyo Television. No one expects to see Pokemon on channel 1 or 3, because it's a channel 12 broadcast. If you want to see the evening news at 7, the easiest bet is on channel 1. Want to watch a drama? Channel 4 - *Nittele-Shiki*. How about some common sense and information on wonderful undersea world? Channel 3 for NHK Education.

The above examples are not common sense amongst the Japanese, but just facts learned from experience.
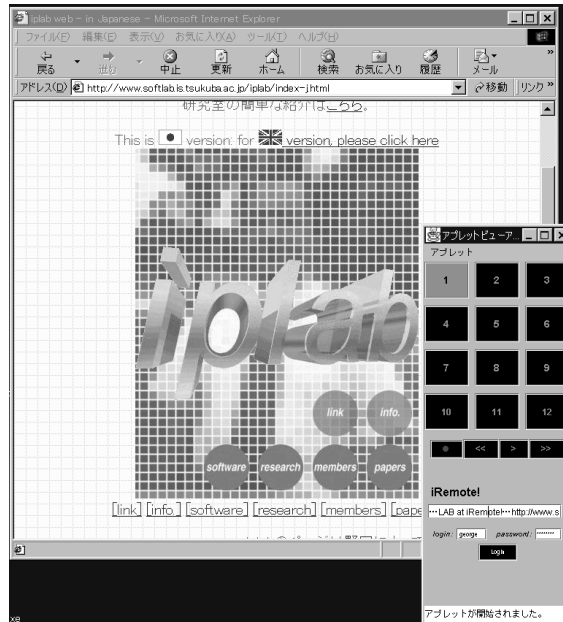

Figure 8: A more ordinary *iRemote!* in Action

This all seems unimportant and unrelated to surfin' the Web, but there is a big similarity. Although the web used to be much more text orientated, these days they are much, much more visual.

Gone are the days where webpages were filled with boring text. The web is starting to fill up with audio and video. Web broadcast is increasing immensely. Already, Amongst the popular broad-

cast websites, there is the Dot-Com guy[10], and Broadcastmusic.com[11], just to name a few. There are many more new ideas of *Dramas* to be broadcasted only on the web, and not on television.

Does it make sense to put *Bookmarks* on a television channel? At this rate of increase in web broadcast, what is going to be the difference of a television broadcast and web broadcast in the near future? Increasingly, it is becoming obvious that bookmarks will be a thing of the past in the next few years. At that time, *iRemote!* and other types of "Web Remote Controllers" will be the interface to use.

3.6 More ordinary remote?

Shown in Figure 9 is another type of *iRemote!* GUI. By programming in Java, the GUI is highly configurable with little trouble. This remote has 12 buttons, mimicking that of a Japanese TV remote.
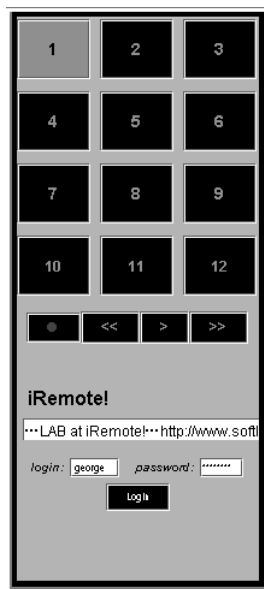

Figure 9: *iRemote!*, designed more like an everyday remote.

Therefore, the GUI can be customized according to the user - it can have just 4 channels for one user, or even 30 channels for a greedy user. The choice is theirs.

3.7 Network Accesibility

Another strength of the *iRemote!* is its network accesibility. The URL data are stored in a remote server, and called up upon request by the user.
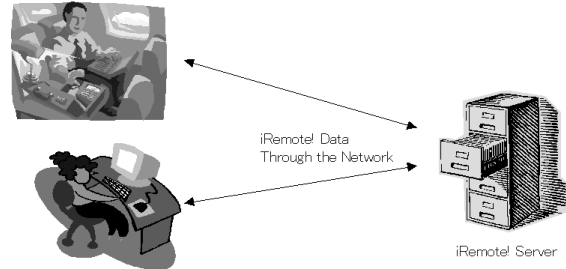

Figure 10: *iRemote!* can access your URL from around the globe.

The advantage of network accesibility is immense.

- Foolproof. When the local computer has its hard disk wiped off for some reason, the user can always check the stored URLs via *iremote!*

- The concept of "Personal Computer" may even disappear in a few years. Then, where will the URLs be stored? There is not going to be any local computer, because all computers are public. At that time, the URLs must be intensively stored in a server. Anyhow, it's handy to be able to refer to the bookmarks when on a business trip or at a friend's house.

3.8 100% Pure Javaness

iRemote! is programmed in Java, and only java. The advantage of this is its ability to be ran in any environment that complies to Sun Microsystems' Java 2 standards, whether it be Windows, Mac, iMode or else. The Java applet runs beside a web browser.

To allow the applet's interaction with the web browsers, JavaDDE[1] was utilized. JavaDDE enables java applets and applications to interact with Windows applications and other applets/applications using Dynamic Data Exchange Protocol, supporting Poke, Execute and Request DDE transactions.

Through JavaDDE, when Netscape Navigator has a new URL loaded, the *iRemote!* receives the

last loaded URL thereby allowing the storage of URL.

Also, when the user Zaps with the *iRemote!*, OpenURL is executed and sent to Netscape Navigator through JavaDDE.

In short, JavaDDE is an essential part of *iRemote!* that processes the input/output of URL information.

4   Conclusion   and   Future   Prospects

As it stands, *iRemote!* is nothing but a simply designed remote controller for the PC and for the Internet WWW. It has achieved its main objectives, being the direct manipulation between the Man and the Web, assimilation of Web URL to TV broadcast channels, and network accesibility. However, its appearance may open up a whole new style of web browsing.

Consider Bluetooth and Jini.

> Bluetooth is a ... specification that describes how mobile phones, computers, and personal digital assistants (PDAs) can easily interconnect with each other ...
>
> The technology requires that a low-cost transceiver chip be included in each device. Products with Bluetooth technology are expected to appear in large numbers beginning in 2000. [4]
>
> Jini ... is a ... "spontaneous networking." Using the Jini architecture, users will be able to plug printers, storage devices, speakers, and any kind of device directly into a network and every other computer, device, ...
>
> Jini can be viewed as the next step after the Java programming language toward making a network look like one large computer. [4]

Where all this is going to - is networking by the ordinary everyday module. A watch. A Keitai-Denwa. A TV-remote control. What once was a household electricity good will be the part of a network.

This *iRemote!*, a simple Java program, can be assimilated to a real hardware remote, hooked up by technologies such as Bluetooth and Jini. By that era, it will be common sense to view the web with a remote control of some kind. Perhaps people will be using their *Keitai Denwa* to zap through the web on a 21-inch LCD monitor.

And when someone mentions the term "bookmark," they would reply,

"Bookmarks? Why do you need a bookmark for the web?"

http://www.softlab.is.tsukuba.ac.jp/~george

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