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<td><strong>Author(s)</strong></td>
<td>Tatsuhito Nagaya</td>
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Integrated Services Television: Digital Age TV with a Built-in Home Server

Tatsuhito Nagaya,
Executive Researcher, NHK Broadcasting Culture Research Institute
Tokyo, Japan (URL: http://www.nhk.or.jp/bunken/)

Abstract:

Television, one of the greatest inventions of this century, has led to a giant media industry which exerts major influence on society; it is also the most characteristic cultural development of the 20th century. But TV is a passive medium, to be enjoyed by an unspecified number of people. This is sometimes a cause for ridicule. But because of such wide availability, TV has become the leading form of media, used by the largest number of people.

Amid the growing trend toward the use of digital technology, TV tends to be regarded as comparatively dull, because it lacks an interactive system. There is even speculation that the current form of TV will be taken over by PC-related Internet-type TV, through the fusion of broadcasting and communication systems. Is interactive TV really an inevitable step? If so, how is TV to adopt interactivity?

It is, of course, a matter of time until digital technology transcends the barrier of cable and wireless technologies and combines them to give birth to an “ultimate TV” with both individual and interactive functions.

It seems inevitable that the current form of TV will eventually evolve into a visual integrated portable terminal, that is, a receiver capable of a variety of communications involving a personal computer, fax, printer and TV telephone.

The problem is how successfully TV entrepreneurs will be able to cope with the new situation, once the system barriers are removed through the fusion of the digital environment, broadcasting, communications and computing. What services will they be able to provide? In which directions should individual selectivity be expanded and to what extent should it be absorbed?

Detailed study of information activity reveals major differences in the goals, quantity, frequency and quality between the individual, selective type of such activity and the passive, moderate type such as TV-viewing (Figure 1). This means the point is not rivalry between personal computers and TV. Rather, the multimedia-type of TV, evolved from a form meeting mass demand and the PC related individual order-type media, capable of selecting and referring to individual information at any time and as much as possible, must be developed hand in hand for the next generation. However, differences between the two types of information media should not be neglected. To overemphasize individual selectivity and interactivity when developing mass-oriented TV into Internet-type TV, or into a media that simply unifies various functions, undermines human interfacing and is not good for either viewers or TV enterprisers.

This author proposes the idea of Integrated Services TV (ISTV) as an evolved form of television that absorbs individual interactive functions into the current form of TV after the digitization of TV-related media.

ISTV is a multimedia-type TV with a built-in home server. It has three major characteristics:
1) Its built-in server would enable viewers to instantly call up news and other information which would be constantly updated automatically through home interactivity.
2) Its media fusion capability would enable joint use of TV with other media.
3) Its learning ability would make TV more "intelligent."

Naturally, ISTV could function as a personal computer with a large Hi-Vision screen by simply switching the mode. This evolutionary form of TV would be remote-controlled, easy to handle,
reasonably priced and accessible. It would also be interactive, while taking advantage of TV's current features.

This idea is based on the Constraints-Programmed Macro-Model of Information Selection, which analyses macro and micro information activities (Figure 2). In short, people are not designed to take in information endlessly; their information activity is limited by the constraints of disposable time, money and interest. Therefore, Integrated Services TV (ISTV) has, as its basic framework, a combination of the information activities pursued by the largest number of viewers, with arrangement of quantity and types. Besides being inexpensive and easy to use, ISTV would be most likely to lay a social foundation for information-related infrastructure capable of the universal supply of news and information.

Broadcasters, too, would find ISTV a comparatively inexpensive investment, allowing them to provide multi-window services for their software and to make step-by-step advances into the multimedia age with comparative ease.

With the TV broadcasters' decision to use a TV with a built-in home server as a standard TV receiver of the digital age, TV will probably revive as node for all types of media, a primary access medium to information and entertainment and also a basic form of infrastructure for the newly extended distribution of information.

1. Details of Services Cannot Be Decided Until a System is Selected

Details about software for new services in the multimedia age cannot be determined only on the basis of their technological functions, characteristics features or creators' ability. First, decisions must be made on such factors as media (transmission means), the household receiver or terminal, the main broadcaster, and costs. Until that is done, it will be impossible to create concrete images of software, forms of services and time-related service types.

Arguments and discussions under way today are so concerned with transmission methods and the separate development of presentation methods that they lack the requirements for balanced and detailed discussions of the new services for multimedia-type TV. Among the most important requirements is to determine the functions of a household terminal and its standardization. The future of media services depends on the extent to which a standard multimedia-type TV is to be equipped with additional functions, including those of a personal computer, laser disks, printer and communication devices.

Regarding the current broadcasting media, it is advisable that the search for the identity of broadcasting should be continued in all seriousness, rather than being swayed back and forth by discussions on multimedia technologies and functions. The definition of broadcasting as "wireless transmission for an unspecified number of people" was based on the physical characteristics of broadcast waves, reflecting the technological standard of the past. Many goals of broadcasters still remain to be achieved. But the multimedia technologies hold the key to solve some of the problems they face.

2. TV as the Node for Electronic Media

From the viewpoints mentioned above, integrated services digital broadcasting (ISDB) can be proposed as a social system capable of providing multimedia-type broadcasting in an integrated manner and at low cost. NHK's future visions of broadcasting and other media described in its "guideline for mid to long term administration" (issued in January, 1995) include an integrated receiving terminal display with 1,125 scanning lines. What is envisioned here are integrated services ranging from terrestrial, satellite, CATV and digital Hi-Vision broadcasting to facsimile, high-function teletext, telemusic, PCM audio broadcasting and a program guide all presented through the node of an integrated display screen.

3. Integrated Services Television (ISTV) as Highly Evolved TV

Personal computers and other multimedia equipment for home use have made remarkable progress as individual tools. TV-related media, on the other hand, have not been generally receptive to absorbing individual, interactive functions.

So, we examined the possibility of developing individual, interactive multimedia functions into a mass selection receiver-type TV. In short, the goal is highly evolved TV of the multimedia-type.
(1) Evolving TV

Unlike personal computers, TV is not an extension of what's called reference communication, designed to be called up item by item at any time viewers like. ISTV aims to identify the most common information behavior on a daily basis and to become a simpler, more convenient and more accessible medium by linking media with media, applications with applications and software with software of any sort, while providing a common basis for reference.

70 to 80% of Needs to be Covered

Menu Screen (right photo) shows one example of ISTV, a combination of a receiver and services for the digital broadcasting age, which was on display at the technology exhibition of NHK Broadcasting Science and Technology Laboratories held in May, 1996. The basic concept of this multimedia-type terminal for household use is an application of my "constraints-programmed macro-model of information selection." It is impossible for the mass reception-type media alone to provide services that can be called up and accessed by every user.

TV is not a personal computer and is not made to cater to peoples desires 100%. Even so, TV should aim at covering 70 to 80% of most people's information behavior, in terms of application and software (Figure 3).

(2) Media Fusion: TV for inter-media use

Multimedia type TV would connect a large variety of media to enhance their conveniency. The idea is to make the TV terminal the node of an electronic-related network. Linkage with electronic newspapers and the Internet has become possible. Considering combined use with electronic newspapers, the full mutual use of the display is only possible with ATV which has high-quality picture resolution. The Current TV is not able to present many characters clearly on the screen.

(3) Personal TV: TV with a built-in self-editing function

It is quite natural for TV to make best use of computer functions. A personal TV would automatically identify its user, be able to learn his usage habits at certain times and days of the week, and also have a built-in self-editing function to choose various programs and information.

4. Menu Screen, Category Screen, Item Screen

The above concept has led to the appearance of a multimedia-type TV with the following features:

An initialization screen like that of a personal computer can be seen on the TV screen. The menu has several windows that account for 60 to 70% of the basic needs of media users. The menu picture is designed to give users an overview of what's available, by staying on the screen for 7 to 15 seconds. (Users set their own convenient length of time.) If a user does nothing, the main picture appears automatically. In the menu picture are shown a TV newspaper with various categories of automatically updated news.

If users want to read some article in more detail after looking at the TV newspaper, they can call up that particular news item from the server and read it on a separate page. If a user needs an overview of a variety of news of different types, a category page can be called up for general, economic, international, sports, or culture/entertainment news, etc. After that, users can further select individual news items or click back to the electronic newspaper or other internet services.

With the menu screen, category screen and individual news item page, multimedia TV will be able to cover daily the 100 to 200 news items transmitted by the current TV and the 400 to 600 headline stories of a newspaper. In other words, 70 to 80% of the general viewers' needs can be met.

(Those who want more specialized news and information in greater quantity could obtain that by concluding a special subscription agreement.)

Installation of Home Interactive Systems

It is assumed that ISTV will have a built-in home server with a storage capacity of about 10 hours. Considering that 90% of Japanese households today own video tape-recorders, it is not unreasonable to assume that the combination of TV and a home server will spread in a few years time. In the more distant
future, the server function will be extended to about 10-100 hours.

Broadcasters will be able to conduct automatic transmissions with an automatic updating system. Currently, the following six functions can be assumed for the ISTV for household use.

1) "Anytime" news (including headline news, sports news, with automatic 24 hour updating of major categories.)

2) Anytime weather forecasts

3) Anytime program schedule and guide (showing programming of other media)

4) Anytime video (automatic recording of a variety of videos, which can be called up on the screen with the touch of a key.)

5) Latest Menu (constant indication of software available on line or stored in the server. The TV will have a learning function to record preferred programs, based on previous experience.)

6) Anytime audio (radio news, English news and music can be heard at the touch of a key.)

The important thing is to provide functions that enable the TV to respond to information needs regarding news, sports news, weather forecasts and program guides that are often selected throughout the day. It is difficult to standardize from the start services that are linked to individual selection and a matter of personal interests, unless there is an increase in both the number of service items and the amount of expensive usage.

**Built-in Self-Editing TV Newspapers**

Along with the "anytime" news function, the most important function of TV is to offer fast-breaking important news. It automatically broadcasts round the clock news and weather forecasts and updates them to suit the need of users. It will be possible in the future to give weight to the contents of news and weather forecasts and also the number of items according to users' tastes and circumstances.

These applications make it possible for users to select images and information that they prefer. For example, headlines of general top news (corresponding to the first page of a newspaper), international, politics, economy, sports, society, culture/entertainment, and local matters will all be constantly updated automatically. (The number of categories and items are to be determined by trends in needs.) Of course, further references can be made regarding each item to obtain additional information.

The overall concept obtained from the above discussion is one in which broadcasters transmit stock-type programs for each day all at once, perhaps at a fixed time in the morning, and constantly broadcast at fixed intervals automatically updated news and weather information so that users can watch them at home at the most convenient times through a simple "home interactive" system. By attaching a printer to the TV set, it would also be possible to transmit at any time a TV newspaper the size of a tabloid edition. All these services depend on to what extent personal computers, laser discs, printers and communication functions can be standardized and installed.

**5. Evaluation of ISTV**

Coinciding with this ISTV technology exhibition, the NHK Broadcasting Science and Technical Research Laboratories conducted a questionnaire survey on people inside and outside NHK, the Laboratories's staff, as well as the production staff: producers, directors, cameramen and so on, as well as other researchers. The results of this survey are as follows in Table 1 (Number of respondents, 402, June 1996).

"Fantastic, simple and pleasant!" These words are used in advertisements to describe household electric appliances, and this description should be the essence of multimedia-type TV. An immediate goal of its developers is not far from that of the conventional TV -- to be a medium enjoyed while one is relaxing, or occasionally sitting up straight to watch more closely when a topic is interesting. ISTV should be developed vigorously to suit viewers' interests and tastes, physiology, and budget.

**Summary**

As long as people cannot take in information endlessly and there is a limit to their information gathering behavior in terms of disposable time, money and interest, ISTV will prepare a social foundation for an information-related infrastructure, thanks to its economy, convenience and universal supply of information.

I believe that such evolution for TV will lead to the revitalization of TV in the digital age, as the node of all other electronic media and the first window of contact with information. Other media will develop around
Thanks to the decision by TV broadcasters to designate "TV with a server" as the standard TV receiver for the digital age, TV will probably continue to play a role as a node for all media and the primary means of access to all sorts of information and entertainment in the 21st century. Television will revive as basic infrastructure for the newly expanded distribution of information.

Thanks and Acknowledgements

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References

N.B. 
1. The space location is an imagined one.
2. Media that lose out in market competition are omitted from the circle plane.
3. Based on this mental map, the audience behaves "selectively" floating freely in the information space.

Figure 1. Formation of the audience sphere (1995, Nagaya)

Figure 2. Constraints-programmed macro-model of information selection (1995, Nagaya)

Table 1. Survey Results

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<th>Semi-Habitual Function</th>
<th>Selective Function</th>
<th>Interactive Mode Switching</th>
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<td>60 - 80%</td>
<td>50 - 60%</td>
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Figure 3. ISTV: The Range of Coverage (1996, Nagaya)
The Next Generation: The Evolution toward Integrated Services TV

ISTV is a completely new type of intelligent TV, combining the functions of a personal computer and video deck. It is also high-definition TV, able to show exceptionally clear images and text. ISTV in the Multimedia Age will be able to provide many services through just one screen.

Evolving TV in the Multimedia Age

TV can transmit around the clock news and other information considered important for viewers. If such an enormous amount of information can be stored in a TV set at home, TV will definitely become more attractive and accessible.

- Built-in Home Server
  Easy Interactivity at home
- Menu Screen
- Media Fusion
  Browser for All Media
- Intelligent Agent Functions

NHK is promoting the research and development of a revolutionary type of TV transmission system, known as Integrated Services Digital Broadcasting (ISDB), for the 21st century. ISTV means a receiver for ISDB.

**Multimedia-type TV with high-definition display**

ISTV is an integrated services terminal with a high-definition TV display for the home, combining computer, video storage, with communication and other functions.

**Media fusion (TV for inter-media use)**

ISTV can connect a large variety of media to enhance viewers' convenience. The idea is to make just one TV set the node of electronic-related media coming into the home.
1 Anytime functions

ISTV is to have a "built-in home server" for automatic recording and reproduction. Broadcasters can transmit stock-type programs for each day all at once, perhaps at a fixed time in the morning, and then broadcast at fixed intervals automatically updated news and weather information. Viewers can watch these at home at any time they like through a simple "home interactive" system. This is called the "anytime functions."

Anytime news
This function allows viewers to select the latest news in a variety of ways. For example, the latest news items can be recorded automatically in the built-in home server, so that they can be retrieved with a click of the remote control on the screen icons. Headline news on the TV Newspaper can also be called up by item, by category or in full detail.
- Automatic recording and one-touch retrieval of TV news
- 24 hour headline news on the TV Newspaper
- 24 hour radio news

Anytime weather forecasts
Viewers can acquire the latest weather information, updated automatically. By clicking 'weather forecasts' on the menu screen, the latest weather information appears on the full screen, followed by local weather in detail.

Anytime program schedule and guide
This shows a program guide on the screen, just like the content guide of a newspaper or magazine. If a program indicated on the screen is selected, the home server records it automatically.

Anytime video
A variety of videos can be automatically recorded and be called up on the screen at a click.

Anytime audio
Audio programs such as radio news and music are as easily available as the TV services.

2 "My Menu"

ISTV will be "intelligent TV" with learning ability to memorize what individual viewers want to watch. "My menu" shows, on the small screen windows, programs currently on the viewer's favorite channels and those programs stored in the home server.

3 TV Newspaper headlines

The TV Newspaper shows important items, updated around the clock, by category: general, international, economic, social, culture/entertainment, local and sports. Full-length news items can then be clicked onto the screen.
BRIDGING THE GAP:
FOREIGN AND LOCAL PROGRAMMING

Hugh Leonard
Shinichi Shimuzu
TOPIC: Bridging the Gap: Foreign and Local Programming

- Current local programming and responses to international programmers

- Asian programming and marketing strategies in a multimedia environment

BIODATAS:

Mr. Hugh Leonard

Mr. Hugh Leonard is the Secretary-General of the Asia Pacific Broadcasting Union, Kuala Lumpur, which is a professional association of radio and TV organisations with nearly 100 members in 49 countries, took up his present post in 1985. He had begun his broadcasting career in New Zealand.

Mr. Shinichi Shimizu

Mr. Shinichi Shimizu has made several notable contributions to the Japanese broadcasting and media industry. He is now the Executive Advisor (International Affairs) of the Hoso-Bunka Foundation Inc. Some of the notable contributions in English language publications and articles are: Asia Speaks Out: Toward Greater TV Programme Diversity in Asia and Introduction to Japanese TV and Film Market.