

APPARATUS FOR CONTROLLING TELEVISION APPARATUS

The present invention relates to apparatus for controlling television apparatus in accordance with an individual television program list which it provides.

5 In U.S.P. 4,745,549 by the same applicant, television program scheduling in accordance with customer preferences is carried out by a computer based system. However, improved service to subscribers at remote locations, for instance, disposal of subscriber's complaints and scrolling of the program schedule display, are desirable.

10 The present invention is set out in Claim 1.

An example of the invention will now be described with reference to the accompanying drawings in which:-

Figure 1 is a block diagram of the preferred television program automatic control system.

15 Figure 2 is a block diagram of a main portion for

making a television program in Figure 1.

Figure 3 is an explanatory view of a preferred program for a main central computer in accordance with the invention.

Figure 4 is an explanatory view of preferred data processed in the program for making a television program.

Figure 5 is a flow chart for carrying out registration, inquiry (amendment) of subscriber's data.

Figure 6 is a flow chart which is continued from Figure 5.

Figure 7 is a flow chart of a process of printing out from a hard disk as a television program data storage means.

Figure 8 is an exemplary chart printed out in accordance with the process of Figure 7.

Figure 9 is a flow chart of a step corresponding with processing of a "claim" subroutine.

Figure 10 is a flow chart of a program which controls transmitting by a public telephone line of a television program list.

Figure 11 is a flow chart of an auxiliary central computer (MSX).

Figure 12 is a flow chart of a program for receiving a claim of a central computer, when a long-distance user sends a claim to the computer center through a public telephone line.

Figure 13 is a flow chart of a program for inputting a claim which is forwarded to a computer center through means other than a public telephone line.

Figure 14 is an explanatory view of a program for the computer of a long-distance user.

Figure 15 is a flow chart of a program for

controlling a TV and a VCR.

Figure 16 is a flow chart of a program for amending an individual television program list of a TV and VCR.

Figure 17 is a flow chart of programming when a floppy diskette is used.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

The detailed description of the preferred embodiments according to the present invention will be now described with reference to the accompanying drawings.

An entire structure of this application is made of four groups as shown in Figure 1.

1. Function of a central computer in a service center
2. Function of an auxiliary computer in a service center
3. Function of a computer of a general user (hereinafter called a long-distance user) side
4. Function of a computer of a specified user side

A structure of each function of the four groups is described in Figure 1 as follows.

The central computer in the service center is made of:

1. means for making an individual television program list in accordance with a questionnaire,
2. means for processing a claim (by a linear program),
3. means for transmitting a television list to a public telephone line,
4. means for receiving a claim from the long-distance user through a public telephone line, and for storing it in a computer,
5. means for transmitting data to the auxiliary computer in the service center in order to input the

individual television program list for the specified user to the floppy diskette.

The auxiliary computer in the service center is made of:

1. means for receiving the individual television list for a specified user from the central computer in the service center and for inputting the received data to the floppy diskette which is handed to the specified user.

The computer of the long-distance user side is made of:

1. means for receiving the individual television program list sent from the service center through the public telephone line,
2. means for transmitting the claim to the individual television program list sent from the service center to the central computer in the center through a public telephone line,
3. means for controlling automatically the VCR and the TV in accordance with the individual television program list made in the service center and sent,
4. means for displaying and amending contents of the individual television program list made in the service center and sent,
5. means for displaying contents (a program guide) stored in a storage medium by a person who edits and issues all the television programs.

The computer of the specified user side is made of the same means as 3, 4, and 5 in the computer of the long-distance user side.

The structure and operation of each means are shown briefly in Figure 2. The structure and operation of each means will be described as follows:

1. Function of the computer in the service center

The function when it is expressed as a structural representation of the program is shown in Figure 3.

- (1) Means for inputting a result of questionnaire from each subscriber

Figure 4 shows one of example of a paper for the questionnaire which is used as an input means therefor and which defines an individual taste. In Figure 4, each day of the week is entered in the longitudinal section and a channel number of the television per broadcast time (each fifteen minutes) is entered in the horizontal section. This embodiment uses the following questionnaire, for example, as a fundamental questionnaire to make a paper that summarizes the questionnaire from each subscriber.

Q1. How many people do you have in your family?

- . I am single.
- . I am married but have no child.
- . I am married and have an infancy.
- . I am married and have a school child.
- . I am married and have a junior high school child and older.

Q2. How old are you?

- . I am under 25 years old.
- . I am under 35 years old.
- . I am under 45 years old.
- . I am under 55 years old.
- . I am over 56 years old.

Q3. Do you like watching the NHK program (state operated broadcasting)?

- . I do not watch it at all.
- . I sometimes watch a news program or the program in a morning in it.

- . I watch an educational program in it.
- Q7. How often do you watch a documentary program?
 - . I always watch it.
 - . I often watch it.
 - . I sometimes watch it.
 - . I seldom watch it.
 - . I do not watch it at all.
- Q8. How often do you watch a news program?
 - . I always watch it.
 - . I watch it at least once a day.
 - . If have any other favorite programs, I do not watch it.
 - . I seldom watch it.
 - . I do not watch it at all.
- Q9. Do you like an entertainment program?
 - . I like it very much.
 - . I like it.
 - . I like it passably.
 - . I dislike it.
 - . I hate it.
- Q10. Do you like a sports program?
 - . I like it very much.
 - . I like it.
 - . I like it passably.
 - . I dislike it.
 - . I hate it.
- Q11. Do you like a general interest program?
 - . I like it very much.
 - . I like it.
 - . I like it passably.
 - . I dislike it.
 - . I hate it.
- Q12. Do you like a quiz program?
 - . I like it very much.

- . I like it.
- . I like it passably.
- . I dislike it.
- . I hate it.

Q13. Do you like a variety show program?

- . I like it very much.
- . I like it.
- . I like it passably.
- . I dislike it.
- . I hate it.

Q14. Do you like rock-and-roll and pop music in a music program?

- . I like it very much.
- . I like it.
- . I like it passably.
- . I dislike it.
- . I hate it.

Q15. Do you like popular songs and folk songs in a music program?

- . I like it very much.
- . I like it.
- . I like it passably.
- . I dislike it.
- . I hate it.

Q16. Do you like classical music in a music program?

- . I like it very much.
- . I like it.
- . I like it passably.
- . I dislike it.
- . I hate it.

Q17. Do you like a historical drama?

- . I like it very much.
- . I like it.
- . I like it passably.

- . I dislike it.
 - . I hate it.
- Q18. Do you like a home drama, or a comedy?
- . I like it very much.
 - . I like it.
 - . I like it passably.
 - . I dislike it.
 - . I hate it.
- Q19. Do you like a suspense drama or an action drama?
- . I like it very much.
 - . I like it.
 - . I like it passably.
 - . I dislike it.
 - . I hate it.
- Q20. Do you like a foreign movie?
- . I like it very much.
 - . I like it.
 - . I like it passably.
 - . I dislike it.
 - . I hate it.

As above, five selective answers to twenty questions are set, and the amount of questionnaire items $20 \times 5 = 100$ is set. Twenty questionnaire items are about family, age, time field of not watching television, whether or not one likes the NHK program, what one's favorite drama is, whether or not one likes movies, news programs and what one is interested in, etc. An amount of items is twenty, and each item has five selective answers. Accordingly a number is given to each item to practice linear processing as follows: P(1) - P(5) are given to the item 1, P(6) - P(10) are given to the item 2, P(11) - P(15) are given to the item 3, and similarly, P(96) - P(100) are given to item 20.

The flow chart of a registration/reference (amendment) of each subscriber's data is shown in Figure 5.

(2) Means for evaluating television programs

Means for evaluating television programs will be described as follows: The similar form of paper of a questionnaire explained in (1) as means for evaluating television programs is used. In this embodiment, for example,

Evaluation of television program
(corresponding with the questionnaire)

E1. Generation for which this program is made

- . infancy
- . school children
- . young men
- . middle age
- . old men

E2. Political and economical factor

- . strong
- . medium
- . weak
- . little
- . no

E3. Scientific and informational factor

- . strong
- . medium
- . weak
- . little
- . no

E4. Historical and educational factor

- . strong
- . medium
- . weak
- . little

- . no
- E5. Documentary factor
 - . strong
 - . medium
 - . weak
 - . little
 - . no
- E6. Factor of a news and a source
 - . strong
 - . medium
 - . weak
 - . little
 - . no
- E7. Factor of entertainment
 - . strong
 - . medium
 - . weak
 - . little
 - . no
- E8. Factor of a sports program
 - . strong
 - . medium
 - . weak
 - . little
 - . no
- E9. Factor of a general interest program
 - . strong
 - . medium
 - . weak
 - . little
 - . no
- E10. Factor of a quiz program
 - . strong
 - . medium

- . weak
- . little
- . no
- E11. Factor of a variety show program
 - . strong
 - . medium
 - . weak
 - . little
 - . no
- E12. Factor of rock-and-roll and pop music
 - . strong
 - . medium
 - . weak
 - . little
 - . no
- E13. Factor of popular song music
 - . strong
 - . medium
 - . weak
 - . little
 - . no
- E14. Factor of classical music
 - . strong
 - . medium
 - . weak
 - . little
 - . no
- E15. Factor of a historical drama
 - . strong
 - . medium
 - . weak
 - . little
 - . no
- E16. Factor of home drama and comedy

- . strong
- . medium
- . weak
- . little
- . no

E17. Factor of suspense drama and action drama

- . strong
- . medium
- . weak
- . little
- . no

E18. Factor of a foreign movie

- . strong
- . medium
- . weak
- . little
- . no

The above factors are linked with the contents of the questionnaire to the subscriber. The data registration of the television program are shown by the flow chart in Figure 6.

(3) Means for processing by linear program method

A fundamental logic to practice linear programming on the evaluation described in (1) and (2) will be explained. The system presupposes the following expression 1, namely,

$$pl(i) = \sum_{j=1}^n Pc(j) \cdot p(j) \cdot T(i,j) \dots 1$$

Where:

$pl(i)$ means a degree of concern to program i expected by a subscriber (it is expressed by a number of points, wherein Point 0 means that a subscriber is not interested in the program i at all).

i means program i when twenty one hours from 5 AM to 2 AM is cut by every fifteen minutes.

$P(j)$ means whether item j in the questionnaire is checked or not. For example, if 3 of the question No. 3 is checked, it is expressed as follows.

$$p(11) = p(12) = p(14) = p(15) = 0$$

$$p(13) = 1$$

N means 20 questions $\times$ 5 selective answers = 100

$T(i,j)$ means whether the evaluation of item j is checked in the television program i . It takes the value of 1 or 0.

$P_c(j)$ is an unknown coefficient which takes a value of $0 \leq P_c(j)$. (It does not rely on a subscriber.)

The expression 1 is to evaluate how much common interest there is between human beings and the television program. The coefficient $P_c(j)$ is decided commonly on all the human beings. In the value of $P_c(j)$, feedback is practiced by an accumulation of a claim from the subscribers as will be explained later, and as a result, the value of $P_c(j)$ is decided more correctly.

In the above linear processing (programming), the expression 1 is expressed as a primary expression to evaluate common interest between human beings and the television program. The coefficient $P_c(j)$ is decided as the common value between human beings, and also, the value of $P_c(j)$ is calculated more correctly doing a feed back (study) by an accumulation of a claim from the subscribers. The detailed explanation will be described later.

(4) Means for storing and printing out the data

In this invention, a hard disk as a means for storing data is used. The flow chart of processing of the data input of the hard disk is printed out by a printer is shown in Figure 7. Accordingly, supposing that data of many people can be stored individually in

the hard disk, and that an individual code number has been decided previously, a television program which well fits each subscriber is printed out. An example print-out is shown in Figure 8. The print-out means confirmation of this process rather than the television program is reported finally to the client. Namely, what is printed out is tested for confirmation. The step for making a more perfect television program is shifted by collecting a claim appearing in the test and practiced by the collected feedback of claims.

(5) Processing of claims

The value of $P_c(j)$ is obtained correctly by an accumulation of claims from the subscribers, as the above explanation in the last part of a fundamental logic of data processing. The example of receiving claims can be shown as follows. As an example of claims, the following result of calculation is obtained for one subscriber.

pl (Tuesday/19:30) TBS = 4.9 (points of interest)

pl (Tuesday/19:30) NHK = 4.8 (points of interest)

Accordingly, this invention suggests TBS at 19:30 on Tuesday to the subscriber. But a claim appears on the result of the above calculation. Namely it changes to $pl(i1) < pl(i2)$, because $pl(i1) \geq pl(i2)$ does not fit the subscriber. Reference symbol Y_i expresses how much $pl(i2)$ is bigger than $pl(i1)$ as points of interest. In other words, it relates to how much points of fact of claiming is evaluated (in the present time, it is evaluated to Y_{i-1}). Accordingly, $pl(i2) - \{pl(i1) + Y_i\} \leq 0$

This expression is arranged by the expression 1, as a result,

$$\sum_{j=1}^n P_c(j) \cdot p(j) \cdot \{T(i1,j) - T(i2,j)\} - Y_i \leq 0$$

and supposing as follows,

$$p(j) \cdot \{T(i1,j) - T(i2,j)\} = Aij$$

$$Pc(j) = Xj$$

The expression $\sum_{j=1}^n Aij \cdot Xj - Yi \leq 0$ is shown. Also, on assumption that the right side is Vi , the expression $Vi = \sum_{j=1}^n Aij \times Xi - Yi$ is shown. In this expression, Xi must be decided so that the value of Vi becomes a smaller value. The sum V of only Vi (the television program with which dissatisfaction appears) which takes positive values to evaluate the above is considered. It results in $V = \sum_k^m Vi$ ($Vi > 0$), wherein m is the total of an element of Vi which is $Vi > 0$. Namely, the correct Xi can be changed by decreasing the value of V in accordance with receiving many claims from the subscribers.

The flow chart of the step corresponding to processing of claims is shown in Figure 9. As shown, in the processing of claims, a series of steps from "setting to the initial condition for linear project" to "looking for improving scheme" is most important. Namely, setting to the initial condition means recalculation of the $Pc(j)$, and improving scheme means changing to the value calculated after the different value is calculated. This step involves mathematical processing, and is the most important step of processing claims, namely, a studying function. The $Pc(j)$ is improved by this step, and as a result, the precision of this system is improved. It is thus possible to present a more fitting television program to the client.

- (6) Means for giving the data for an individual television program list to the user

The data for the individual television program list calculated and made by the central computer in the service center in accordance with contents of

questionnaire corresponding with an individual interest is input to the user's computer in two ways. In both, the data for the individual television program list are finally stored in the memory device (floppy diskette) kept by the user, and control automatically the VCR and the TV.

There are two ways of inputting the data in the floppy diskette which fits the computer kept by the user. The two ways will be described as follows. When the central computer in the service center is connected to the computer of the user, any kind of computer can be used in this way. The data are stored in the user's floppy diskette through the modem and in accordance with the function of computer kept by the individual.

The flow chart of this operation is shown in Figure 10. This process is carried out by the program on the left side of Figure 10 which controls an operation of the central computer in the service center, and the program on the right side of the figure which controls the computer kept by the long-distance user. An arrow which connects the flow charts of two programs means communication data between two computers through a public telephone line. Data transmission is started by executing the program "TENSO.GET" by the user at the time which has been decided previously by telephone communication to the long-distance user from the center. This practice is done by pushing the one-touch function key.

The service center side calls out the central computer, and at this time, the user side computer outputs three letters "PLS" which means finishing of preparation to the central computer. The communication between the central computer in the service center and the long distance user uses an echo back method to

recover data in the event of signal degradation by noise on the telephone line. In the echo-back method, a receiving side always transmits data received to the transmitting side, and as a result, the transmitting side can check the transmitted data. If the data is different from the data transmitted by the transmitting side, the transmitting side transmits the same data again to the receiving side. In the echo-back method, the time for transmitting becomes longer but any problem on the data by noises etc. can be avoided.

Finishing of data processing after transmitting and receiving the data is judged by receiving the code "OK" and the operation continues. Finishing of data transmission to the long-distance user's computer from the central computer is judged by sending the five letters "OWARI". Namely, transmitting procedure is controlled by an application program level.

Another method for making the floppy diskette in which the data for individual television program list is stored will be described as follows. The floppy diskette is decided in accordance with various hardware conditions kept by the specified user and also the floppy diskette is made on the auxiliary computer in correspondence with the kind of computer which has been used. For example, the method for making the data to the specified user which has 3.5 inch floppy disk drive of MSX 2 will be described as follows.

The flow chart of the program is shown in Figure 11. This operation is made as the data transmitting program by an on-line transmission between the central computer in the service center and the auxiliary computer (MSX 2). Finishing of preparation of the auxiliary computer side is informed to the central computer by sending a null code 0. This way also uses

the echo-method to avoid problems created by noise etc. on the telephone line in the same manner as the long-distance user's case. The floppy diskette of data for the individual television program list for the auxiliary computer made by this process is delivered to the subscriber.

(7) Receiving claims

The means for inputting claims from the user will be described as follows. There are two methods for receiving claims from the user. First, the long-distance user inputs claims to the individual television program list. Namely, in this method, the claim is transmitted to the computer in the service center through a public telephone line by operating the personal computer. Second, the specified subscriber inputs directly claims delivered to the service center to the central computer by manual operation by the operator.

The flow chart of the program with which the long-distance user outputs claims to the individual television program list is shown in Figure 10. This flow chart has two programs to communicate the data between two CPU through a public telephone line. In Figure 12, the left side is the flow chart of the program of the central computer in the service center side, and the right side is the flow chart of program in the long-distance user side. The line which connects two flow charts indicate transmission/reception of the signal through a public telephone line. "Referring to record" in Figure 12 means that the long-distance user refers to the data record which mentions the contents registered in the central computer in the service center. When the user is registered, it is supposed that an ID number has

been given to the user previously. Figure 13 is a flow chart of the program to input directly the claim delivered by the other method to the service center in the central computer by the specified user (who does not use a public telephone line).

2. The function of the computer of the user side

An explanation of the program for the user's computer is given in Figure 14, wherein. The program of the specified user which is not connected to the central computer in the service center through a public telephone line is also same except "TENSO.GET" and "TENSO.PUT" in Figure 14. The computer of the user side controls the TV, or the VCR in accordance with the individual television program list delivered and usually calculated by the central computer in the service center, as shown in Figure 14. The user creates an interrupt by pushing the function key (the long-distance user will push the F1 - F4 key, the specified user will push the F1 or F2 key) of the computer kept by the user in accordance with the object, and the program having the function of the object is practiced by one-touch.

Next, each function will be described; however means for receiving the individual television program list through a public telephone line, and means for transmitting the claims to the service center, are omitted to avoid repetition.

(1) Means for controlling the TV and the VCR

The flowchart of the program for controlling the computer of the user is shown in Figure 15. This program is executed by the central computer in the service center, and takes out the data for individual television program list input in the floppy diskette

used in the user's computer, in correspondence with days of a week, time, and transmits the data for individual television program list to the port connected to the control device (this applicant has already filed an application on this control device) of the TV and the VCR. The method for calling other functions by the user adapts the method that the interruption is made by the function key.

(2) Means for referring to and amending an individual television program list

This means indicates the function for referring to the contents of the individual television program list made for the user and for amending a part of the contents thereof in correspondence with the user's necessity during controlling the TV or the VCR by the computer kept by the user. This function is practiced by pushing the function key of No. 1 in the computer kept by the user during controlling of the TV or the VCR.

The flowchart of the program of the function is shown in Figure 16. When the program is called, the program knows the present time and displays the individual television program list of a half day with the present time on the display (TV screen). All the individual television program list can be called out on the display, and all the individual television program lists show a half day (from 0 AM to 12 AM, from 12 AM to 24 PM). If the user wants to amend a part of the individual television program list, the program is shifted to the operation for receiving an amendment by pushing No. 3 of the function key. The indication of the method for amendment is displayed on the television display. The amended data is stored in the floppy diskette each time, and the control of the TV and the

VCR thereafter is practiced in accordance with the amended individual television program list.

4. Means for guiding the television program on all channels at a voluntary time

This function displays the program guide of each television station telecasted at the voluntary time on the display. The contents of the guide presupposes to store the above in the memory medium by the person who edits and issues all the television programs. The various media of magnetic, optical, etc. including various floppy diskettes can be used as the memory medium. For example, the flowchart of the program using the floppy diskette is shown in Figure 17. This function is practiced by pushing No. 2 of the function key of the user's computer during controlling the TV or the VCR.

When the program is called out, this program knows the present time by a clock in the computer. 24 hours of one day is divided to fifteen minute intervals, and the data record which describes the contents of the television program from the point including the present time is referred to. The data record presupposes that the television program guide of all the television stations during broadcasting is input, and the computer reads out the data record and displays it on the display. The data of each fifteen minute interval before and after the present time can be referred to in order.

As the above explanation, comparing this invention with conventional approaches, when the individual television program list is made and the claim about evaluation of the program is stated by the user side, it is possible to amend by communication of the information which is sent and is received by the user

side through the telephone to the center each time, and it is possible to be controlled and to amend TV or VCR programming temporarily without amending the original data. In order to hear in a restricted time after the user comes back home the programs recorded during the user's absence, the user can make a priority order to the programs, and it is possible to play back, preferentially, important programs for the user. When the user uses the channel designated in the individual television program list at home, for example, when the channel is a sports program, it is possible to designate sports programs, for example swimming, which is liked by the user by displaying as a scroll all sports programs telecasted at the same time, together, to confirm which sports the user likes. The above functions have many superior merits compared with the conventional system the practical effect is increased.

~~Although certain preferred embodiments have been shown and described, it should be understood that many changes and modifications may be made therein without departing from the scope of the invention.~~



CLAIMS:

1. Apparatus for providing an individual television program list wherein television channels and corresponding time intervals of optimal programs among all the television programs are listed for each individual and for controlling a TV or VCR at a subscriber's premises in accord with the individual television program list, comprising;
 - subscriber taste evaluating means for obtaining subscriber taste data from a questionnaire;
 - television program evaluating means for obtaining television program data;
 - linear programming means for obtaining optimal program list data according to said subscriber taste data and television program data;
 - means for storing said optimal program list data into a hard disc;
 - means for printing out an individual television program list from said stored data in the hard disc;
 - feedback means for inputting subscriber's complaints against said printed out program list, thereby to improve prediction reliability of a subsequent program list;
 - a computer at the subscriber's premises;
 - bi-directional communication means for informing a remote computer center of subscriber's complaints against an individual television program list stored in the subscriber's premises computer through a telephone line, and sending out through the telephone line to the subscriber's premises a new individual television program list provided according to said complaints; and
 - means for automatically controlling said TV or VCR in response to the most recent individual television program list received through the television line.
2. Apparatus according to Claim 1, wherein said means for



controlling a TV or VCR comprises:

reading means for reading the content of said individual television program list;

means responsive to said content read by said reading means
5 for automatically controlling a TV or VCR;

means controllable by said subscriber for displaying said program list if the list is to be corrected by the subscriber;

means for storing a corrected program list on a floppy diskette; and

10 means for controlling the TV or VCR again in accordance with the corrected individual program list data, wherein said television program list data is corrected, selectively, temporarily or permanently.

3. Apparatus according to Claim 1, including means for
15 displaying in the form of a list all programs recorded automatically during the absence of a subscriber from his premises;

means for specifying a priority order of playback of said programs in accordance with a total given time for playback; and

means for automatically rewinding or fast-forwarding a VCR in
20 accordance with said priority order;

whereby it is possible for the subscriber to watch said programs within said total given time in the specified priority order.

4. Apparatus according to Claim 1, including means for displaying program contents of each TV station at any hour specified by
25 the subscriber in one TV "screen", and means for scrolling said "screen" before or after said specified hour.

5. Apparatus for providing an individual television program list and for controlling a TV or VCR in accordance with that list substantially as hereinbefore described with reference to the
30 accompanying drawings.
