

APPARATUS FOR DISPLAYING CHARACTERS OF AT LEAST TWO
DISTINCT TYPES RECEIVED IN THE FORM OF A DATA STREAM
COMING FROM A CENTRAL UNIT

The present invention relates in general to
5 apparatus for displaying at least two distinct types of
characters. These various types of character, e.g.
European characters and Chinese characters, are received
by a display apparatus in the form of a stream of
successive data items coming from a central unit. By way
10 of example, in an Internet environment, each data stream
forms a portion of the information that is transmitted in
a hypertext markup language (HTML) or in a wireless
markup language (WML) in order to display a page.

In the prior art, it is known to encode characters
15 of different types in the form of encoded characters,
e.g. by using the UTF8 or UCS2 alphabet as standardized
by the standards authorities, typically for
interpretation after reception by an Internet browser.

An Internet type network now makes it possible to
20 access information distributed over the entire world.
The information is stored in data bases or "servers" that
are accessible by means of a terminal which may be fixed
(e.g. a TV, a PC) or mobile (e.g. a mobile telephone) and
that includes display apparatus. Some servers could
25 contain characters of different types, for example
European characters and Chinese characters, that are
already encoded and that can be transmitted to a terminal
in a single stream of encoded characters. The display
apparatus typically comprises an interpreter which
30 receives the stream of encoded characters and which
responds by displaying the associated characters on a
screen, e.g. an LCD or a bitmap, by illuminating pixels
on the screen. As shown in Figure 1, the interpreter 10
receives the stream of encoded characters, e.g. using the
35 UTF8 alphabet or the UCS2 alphabet or indeed the ISO-
LATIN-ONE alphabet, etc. ..., and it controls the display
of the corresponding characters on a screen 11 over a

control bus. In a manner known in the prior art for an LCD type screen, the screen 11 is associated with a video memory (not shown). The interpreter 10 writes "0" or "1" bits in memory cells of the video memory that are
5 associated with respective corresponding pixels of the screen 11. The video memory is scanned periodically in read mode for the purpose of illuminating each of the pixels that corresponds to a memory cell in the "1" state.

10 Typically, in the prior art, the interpreter is initialized as a function of the type of each received character. Since all languages do not use identical characters or ideograms, it can be necessary to display
15 characters of some given language with a display size or dimension on the screen that is greater than the size required for some other language so as to ensure that the characters are equally distinguishable.

The more numerous and more complex the characters in any one language, the greater the display size or
20 resolution level that needs to be given to each character in order to make it easy to read and to enable the user to distinguish between such characters.

When a display apparatus receives characters of different types, e.g. European characters and Chinese
25 characters, the prior art technique then leads to certain characters in one given type being displayed on the screen with one format while other characters of another type are displayed with another format, giving rise to a display of successive characters of different types that
30 is poor in appearance, or even illegible. The term "format" is used herein to designate the size or dimension used by each character. The term "character" designates either a letter of an alphabet such as Arabic, European, or Russian, or an ideogram for a language such
35 as Chinese or Japanese.

An object is thus to provide a central unit suitable for informing the display apparatus that characters of

different types exist in the transmitted character stream. Another object of the invention is to provide display apparatus suitable for providing an optimal display of the received encoded characters as a function
5 of the information supplied by said central unit.

To this end, the invention provides display apparatus for displaying characters of at least two types, referred to as a first type and as a second type, the apparatus comprising a screen reproducing in graphic
10 and legible character form the encoded characters received in a data stream, the characters of said first and second types being reproduced on said screen with respective mutually distinct formats when only one type of character is received in a given data stream, the
15 apparatus being characterized in that it includes a detector for detecting an element that indicates the existence of at least two types of character in the same received data stream in order to activate selection of a common display format on said screen for characters of
20 said first and second types.

In a variant of the invention, the screen is an LCD screen associated with a video memory, and it includes an interpreter for interpreting the received encoded characters as bits which are written in memory cells of a
25 video memory associated with respective pixels of said screen. This interpreter operates with at least two distinct display formats, the two display formats being used respectively for characters of the first type and for characters of the second type when only one type of
30 character is received in a given data stream. However, a single display format, which can be one of said two display formats, is used for both types of character when both types are received in the same data stream.

The invention also provides a central unit
35 transmitting data streams. This central unit transmits successive data streams to at least one terminal, a data stream comprising encoded characters to be reproduced in

the form of legible characters on a screen of said terminal, the data stream comprising either only characters of a first type, or only characters of a second type, or indeed characters of at least said first and second types, said central unit inserting an element in an initial portion of the data stream to indicate the existence of at least two types of character in said data stream when said data stream comprises at least characters of said first and second types.

Other characteristics and advantages of the present invention will appear more clearly on reading the following description given with reference to the accompanying drawing, in which:

- Figure 1 is a block diagram of display apparatus;

- Figure 2 is a flow chart of an algorithm included in an interpreter of received encoded data, forming a portion of the Figure 1 apparatus.

In the invention, a central unit transmits successive data streams to at least one remote terminal, which may be fixed or mobile. Each data stream transmitted by the central unit includes characters in an encoded form that are to be reproduced in the form of characters that can be read on the screen of the terminal. The data stream comprises either only characters of a first type, or only characters of a second type, or indeed at least characters of both the first type and the second type. For example, each data stream can be an HTML page, or an extensible markup language (XML) page corresponding to an HTML page after translation by a gateway in application of the recommendations of the wireless access protocol (WAP) forum. According to the invention, the central unit inserts in an initial portion of the data stream to be transmitted an element that indicates the existence of at least two types of character in the data stream when the data stream includes at least one character of the first

type and at least one character of the second type. For this purpose, prior to transmitting the data stream, the central unit analyzes the content of the data stream whose characters are to be displayed on the screen of the terminal, which characters are in encoded form, e.g. using the UTF8 alphabet or the UCS2 alphabet. As soon as the presence of two types of character is detected, the central unit inserts said element indicating the existence of at least two types of character in the data stream.

As shown in Figure 2, the interpreter 10 of the invention includes a detector 20 for detecting an "Indic" element that indicates the existence of at least two types of character in a single received data stream, in order to activate selection of a common display format on said screen for displaying said characters of the first and second types, when both of these types of character are present in the received data stream. As described above, and by way of example for an LCD type of screen, the screen 11 is associated with a video memory. The interpreter 10 writes binary "0" or "1" digits into the memory cells of said video memory that are associated with respective pixels of the screen 11. The video memory is scanned periodically in read mode to switch on each of the screen pixels that corresponds to a memory cell in the "1" state. The interpreter 10 then activates internal display management means which can be implemented partially or completely in software form to manage the video memory as a function of the received successive encoded characters. As shown by steps 21 and 22 in Figure 2, if no "Indic" element indicating the existence of at least two types of character in a given received data stream is detected, then the interpreter 10 activates either that one of the display management means D1 that is appropriate for displaying characters C1 of the first type, or that one of the display management means D2 that is appropriate for displaying characters C2

of the second type. Which one of these two display means D1 or D2 is selected depends on the type of the first character to be received.

5 However, if an "Indic" element indicating the
existence of at least two types of character in the same
received data stream is detected (20), then the
interpreter 10 activates common display management means
D3 for using the same format to display both characters
C1 of the first type and characters C2 of the second
10 type. In the context of the invention, the term "display
management means" is used to distinguish between circuits
implemented partially or completely in software form for
processing received encoded characters and using distinct
display formats on the screen 11. In the invention, the
15 common display management means D3 used for displaying
both characters C1 of the first type and characters C2 of
the second type can use the display format of one or
other of the two display means D1 and D2, or else some
other display format that is distinct from the respective
20 display formats of the display means D1 and D2.

 In the above description, the term "screen" is used
to designate all or part of a display medium. It could
well be the case that the display medium, e.g. for
ergonomic reasons, is split into two portions, one
25 portion for displaying a menu and another portion for
displaying received data. Under such circumstances, the
portion allocated to displaying the menu could well use
characters of a size greater than that used for the
received data, and this can be independent of the way the
30 invention is implemented.



CLAIMS

- 1/ Display apparatus for displaying characters of at least two types, referred to as a first type and as a second type, the apparatus comprising a screen (11) reproducing in graphic and legible character form the encoded characters received in a data stream, the characters of said first and second types being reproduced on said screen with respective mutually distinct formats when only one type of character is received in a given data stream, the apparatus being characterized in that it includes a detector for detecting an element that indicates the existence of at least two types of character in the same received data stream in order to activate selection of a common display format on said screen for characters of said first and second types.
- 2/ Display apparatus according to claim 1, characterized in that said screen is an LCD screen associated with a video memory, and in that it includes an interpreter for interpreting the received encoded characters as bits which are written in memory cells of a video memory associated with respective pixels of said screen.
- 3/ Display apparatus according to claim 2, characterized in that said interpreter operates with at least two display formats, said two display formats being used for characters of said first and second types respectively when only one type of character is received in the same given stream, and a single display format, which could be one of said two display formats, being used for both types of character when they are received in the same data stream.
- 4/ A fixed or mobile terminal, characterized in that it includes display apparatus according to any one of claims 1 to 3.



- 5/ A central unit transmitting successive data streams to at least one terminal according to claim 4, a data stream comprising encoded characters to be reproduced in the form of legible characters on a screen of said terminal, said data stream comprising either only characters of a first type, or only characters of a second type, or indeed characters of at least said first and second types, said central unit inserting an element in an initial proton of the data stream to indicate the existence of at least two types of character in said data stream when said data stream comprises at least characters of said first and second types.
- 6/ A central unit according to claim 5, characterized in that said data stream is an HTML page or a WML page.