

ELECTRONIC APPARATUS AND DATA OUTPUT METHOD OF ELECTRONIC APPARATUS

[Field of the Invention]

5 [0001]

The present invention relates to an electronic apparatus and a data output method of an electronic apparatus suitable for learning languages.

[Background Art]

10 [0002]

Electronic dictionaries have recently been taking the place of paper dictionaries because of their convenience and portability. The electronic dictionaries incorporate various dictionaries as databases and, at the same time, have multiple functions, including a history recording function and a wordbook
15 function.

[0003]

With the history recording function, a retrieved word (i.e., an entry word) is stored automatically as history data for the future use. A user can easily read, from the history data, the word that has been retrieved in the past and check the word
20 again.

[0004]

With the wordbook function, words to be memorized are stored as wordbook data so that a user can easily learn desired words by displaying, in a switched manner, words and their meanings stored in the wordbook data as if he or she is
25 using a paper wordbook.

[0005]

There has been proposed a related art data replay apparatus that can be used when a user memorizes data, the apparatus including: storing a plurality of sets of data including text data, such as words, idioms and text, audio data, such as
30 sound, image data, such as a still image, or video data, such as a moving image; and reproducing each piece of data upon receiving an operation command (see Patent Literature 1: Japanese Patent Application Publication No. 2006-330520).

[0006]

Further, there has also been proposed an electronic dictionary apparatus in
35 which dictionary data is taken, from an electronic dictionary, into a portable display apparatus provided separately from the electronic dictionary so that a user can learn words with high portability by displaying the taken-in data at hand of the user and

making sound of pronunciation output from an earphone (see Patent Literature 2: Japanese Patent Application Publication No. 2009-266024).

[0007]

Further, there has also been proposed a portable self-test learning machine with which a user can learn desired words easily. In the learning machine, words and meanings of the words are taken sequentially as image data of their character strings, and each piece of the taken image data is read and displayed in an order in accordance with a user operation (see Patent Literature 3: Japanese Patent Application Publication No. 08-83039).

[0008]

However, there is a demand to learn languages more effectively in addition to such simple outputting of a plurality of words and means, stored as electronic data, in a switched order in each of the related art apparatuses.

[0009]

The present invention has been made in view of the foregoing circumstances and an object thereof is to provide an electronic apparatus and a data output method of an electronic apparatus with which languages can be learned more effectively.

[Summary of the Invention]

[0010]

An electronic apparatus according to the present invention includes:
a storage that stores sets of first expressions and second expressions corresponding to the first expressions;
a question outputter that outputs one of the first expressions as a question;
an answer inputter that accepts an input of an answer expression as an answer to the question;
a correctness informer that informs correctness in a case where the answer expression is a second expression corresponding to the question; and
an incorrectness informer that outputs a first expression corresponding to the answer expression in a case where the answer expression is not the second expression corresponding to the question.

[Effect of the Invention]

[0011]

According to the present invention, languages can be learned more effectively.

[Brief Description of Drawings]

[0012]

Fig. 1 is a front view illustrating an exterior configuration of an electronic wordbook 10 according to an embodiment of an electronic apparatus of the present invention.

Fig. 2 is a block diagram illustrating a configuration of an electronic circuit of the electronic wordbook 10.

Fig. 3 is a diagram illustrating details of question data for learning words stored in a question database 22c of the electronic wordbook 10.

Fig. 4 is a flowchart illustrating a word learning process in accordance with a learning program of the electronic wordbook 10.

Fig. 5 is a diagram illustrating an operating state (first) in the word learning process of the electronic wordbook 10.

Fig. 6 is a diagram illustrating an operating state (second) in the word learning process of the electronic wordbook 10.

[Description of Embodiments]

[0013]

Hereinafter, an embodiment of the present invention will be described with reference to the drawings.

[0014]

Fig. 1 is a front view illustrating an exterior configuration of an electronic wordbook 10 according to an embodiment of an electronic apparatus of the present invention.

[0015]

The electronic wordbook 10 is configured as a portable apparatus provided exclusively for an electronic wordbook described below. Alternatively, a program for executing the flowchart described below may be installed in, for example, a touch panel electronic dictionary, a personal digital assistant (PDA), a personal computer (PC), a cellular phone, an electronic book, and a portable game machine to use as an electronic wordbook.

[0016]

The electronic wordbook 10 includes a card sized main body case. On a front surface of the main body case, a touch panel display 15 is provided. A key input interface 11 is provided along a lower end of the front surface of the main body case.

[0017]

The key input interface 11 is provided with an [Enter] key 12, a [O] key 13a, a [x] key 13b, and a [return] key 14.

[0018]

Fig. 2 is a block diagram illustrating a configuration of an electronic circuit of the electronic wordbook 10.

[0019]

The electronic circuit of the electronic wordbook 10 is configured by a computer that reads programs recorded on various recording media. An operation of the computer is controlled by the read programs. The electronic circuit is provided with a central processing unit (CPU) 21.

[0020]

This CPU 21 controls an operation of each part of the circuit by using RAM 26 as working memory in accordance with a wordbook control program 22a stored in advance in storage 22. The wordbook control program 22a may be taken into the storage 22 from an external recording medium 23, such as a ROM card, by a recording medium reader 24, or may be taken into the storage 22 from a web server (in this case, a program server) 30 on the Internet N by a communication unit 25.

[0021]

The wordbook control program 22a stored in the storage 22 is activated in response to an input signal in accordance with a user operation from the key input interface 11 and the touch panel display 15, or in response to a communication signal with each web server 30 on the Internet N connected via the communication unit 25 or with an external electronic apparatus (e.g., an electronic dictionary).

[0022]

The storage 22, the recording medium reader 24, the communication unit 25, the RAM 26, the key input interface 11, the touch panel display 15, and the sound output unit 27 are connected to the CPU 21.

[0023]

The wordbook control program 22a includes a system program that controls the entire operation of the electronic wordbook 10, a communication program for performing data communication with, for example, an external apparatus, a dictionary retrieval program that retrieves data in a dictionary database 22b, and a learning program based on a question database 22c.

[0024]

Various dictionaries, including a Japanese dictionary, an English-Japanese dictionary, a Japanese-English dictionary, and an English dictionary, are stored in the dictionary database 22b.

[0025]

Fig. 3 is a diagram illustrating details of question data for learning stored in the question database 22c of the electronic wordbook 10. In the embodiment, the question database 22c configures a storage that stores sets of first expressions and second expressions corresponding to the first expressions. Note that the expression may be any one of words and idioms.

[0026]

The question data for learning is constituted by a pair of a first word and a second word corresponding to the first word. In particular, the question data for learning includes: question data of Japanese to English in which meanings of English words and idioms (in Japanese) as questions are correlated with English words and idioms as answers as illustrated in Fig. 3(A); and question data of English to Japanese in which meanings of Japanese words (in English) as questions are correlated with Japanese words as answers as illustrated in Fig. 3(B).

[0027]

The question data for learning is not limited to the pair of English and Japanese, and may be question data in which other languages are correlated with each other. Alternatively, the question data may be the same language: for example, a first word and a second word, which is an antonym or a synonym of the first word, may be stored.

[0028]

Storage areas, such as input data memory 26a and display data memory 26b, are provided in the RAM 26.

[0029]

In the input data memory 26a, each piece of input data in response to user operations of the key input interface 11 and the touch panel display 15 are stored sequentially.

[0030]

In the display data memory 26b, display data to be displayed on a screen of the touch panel display 15 is developed to a bit map pattern and is stored.

[0031]

The thus-configured electronic wordbook 10 implements the later-described functions in the following manner: the CPU 21 controls an operation of each part of the circuit in accordance with a command described in the wordbook control program 22a (including the dictionary retrieval program and the learning program), and software and hardware operate cooperatively.

[0032]

Next, an operation of the thus-configured electronic wordbook 10 is described with reference to a flowchart of Fig. 4.

[0033]

An example in which a user has selected question data of Japanese to English stored in the question database 22c (see Fig. 3(A)) is described. When start of learning is instructed, a first question (i.e., a meaning in Japanese) is acquired from the selected question data and displayed on the display 15 (step S1). In this case, as illustrated in Fig. 5(A), it is supposed that a meaning "seikou suru" in Japanese has been acquired and displayed. In the embodiment, the display 15 configures a question outputter that outputs one of the first expressions as a question.

[0034]

When the user checks the displayed question and presses the [Enter] key 12 in the key input interface 11 (step S2 (Yes)), the question display is disappeared and a screen on which the user inputs an answer by handwriting is displayed on the touch panel display 15 (step S3).

[0035]

When "succeed" is input by handwriting with a pen P (step S3) on an answer input screen as illustrated in Fig. 5(E) and the [Enter] key 12 is pressed (step S4 (Yes)), the English word input by handwriting is recognized (step S5). In the embodiment, the key input interface 11, the touch panel display 15, the CPU 21 and the RAM 26 configure an answer inputter that accepts an input of an answer expression as an answer to the question. Moreover, the touch panel display 15 configures a touch panel screen used for inputting handwriting characters, and the CPU 21 configures a character recognizer that recognizes the handwriting characters as the answer expression.

[0036]

Then correctness/incorrectness determination is made as to whether the recognized English word coincides with the English word "succeed" that is the answer of the question (step S6). If the answer is determined to be correct (step S7 (Yes)), as illustrated in Fig. 5(F), the English word "succeed" that is the answer of the question and a mark "o" indicating that the input answer is correct are displayed on the display 15. At the same time, sound "dingdong" indicating that the input answer is correct is output from the sound output unit 27 (step S8). In the embodiments, the display 15, the sound output unit 27, the CPU 21 and the RAM 26 configure a correctness informer that informs correctness in a case where the answer expression is a second expression corresponding to the question.

[0037]

After that, when the [Enter] key 12 is pressed (step S9 (Yes)), the process returns to step S1 and the next question is displayed.

[0038]

5 On the other hand, it is supposed that, after the question of Fig. 5(A) is displayed, an incorrect English word "proceed" is input by handwriting as illustrated in Fig. 5(B) (step S3). When the [Enter] key 12 is pressed (step S4 (Yes)), the characters input by handwriting are recognized in the same manner as described above (step S5) and a correctness/incorrectness determination process is performed
10 (step S6). Since it is determined that the input answer is incorrect (step S7 (No)), then it is determined whether the recognized English word "proceed" is stored in the dictionary database 22b (step S10).

[0039]

15 If it is determined that the word "proceed" is stored in the dictionary database 22b (step S10 (Yes)), as illustrated in Fig. 5(C), "susumu," which is a meaning in Japanese of the word "proceed" and a mark "x" indicating that the input answer is incorrect are displayed on the display 15. At the same time, sound "beep" is output from the sound output unit 27, informing the user that the input answer is incorrect (step S11). In the embodiments, the display 15, the sound output unit 27,
20 the CPU 21 and the RAM 26 configure an incorrectness informer that outputs a first word corresponding to the answer expression in a case where the answer expression is not the second expression corresponding to the question.

[0040]

25 Here, when the [Enter] key 12 is pressed (step S12 (Yes)), as illustrated in Fig. 5(D), the English word "succeed," which is the answer to the question, is displayed on the display 15 as the correct answer (step S13).

[0041]

After that, when the [Enter] key 12 is pressed (step S9 (Yes)), the process returns to step S1 and the next question is displayed.

30 [0042]

 If the [return] key 14 is pressed in a state in which the meaning of the word "proceed" and the mark "x" are displayed (step S11) as illustrated in Fig. 5(C) (step S14 (Yes)), a screen on which the user inputs an answer by handwriting is displayed again on the display 15 (step S3). Then, the user can input another answer.

35 [0043]

 On the other hand, it is supposed that, an incorrect English word "sucseed" is input by handwriting as illustrated in Fig. 6(B) to the question illustrated in Fig.

5(A) (step S3). When the [Enter] key 12 is pressed (step S4 (Yes)), the characters input by handwriting are recognized in the same manner as described above (step S5), the correctness/incorrectness determination process is performed (step S6), and it is determined that the answer is incorrect (step S7 (No)).

5 [0044]

If it is determined that the wrongly spelled word "sucseed" does not exist in a dictionary (step S10), determination regarding an error in spelling is made on the basis of a comparison with the English word "succeed," which is the answer of the question. In this example, a spelling error is determined by coincidence between a predetermined number of characters (e.g., two) or less. If it is determined to be a spelling error (step S15 (Yes)), a strikeouts e is added to the wrongly spelled part "s" to highlight the same as illustrated in Fig. 6(C). At the same time, a mark "x" is displayed and sound "beep" is output from the sound output unit 27, informing the user that the input answer is incorrect (step S16). In the embodiment, the CPU 21 configures a spelling determinator that determines whether a spelling of a word in the answer expression is incorrect. The display 15, the sound output unit 27, the CPU 21 and the RAM 26 configure a spelling error indicator that makes a user recognize a portion determined as a wrongly spelled portion by the spelling determinator.

20 [0045]

The method for highlighting the wrongly spelled part "s" and informing the user is not limited to adding the strikeouts e: other methods, such as adding an underline, making wrongly spelled characters blinking, displaying wrongly spelled characters in a thin color, and deleting wrongly spelled characters, may also be used.

25 [0046]

Here, when the [Enter] key 12 is pressed (step S20 (Yes)), an English word "succeed," which is the answer of the question, is displayed as a correct answer as illustrated in Fig. 6(D) (step S21).

[0047]

30 On the other hand, if the [return] key 14 is pressed in a state in which the strikeouts e is added to the wrongly spelled part "s" and the mark "x" is displayed, informing the user that the input answer is incorrect as illustrated in Fig. 6(C) (step S16) (step S17 (Yes)), a screen for the reinput on which the wrongly spelled part "s" is replaced with a blank d is displayed as illustrated in Fig. 6(E) (step S18).

35 [0048]

When the a character is input by handwriting in the blank d of "suc□eed" and the [Enter] key 12 is pressed (step S18, S19 (Yes)), the character input by

handwriting is recognized in the same manner as described above (step S5), the correctness/incorrectness determination process is performed (step S6), and it is determined whether the input answer is correct or incorrect (step S7).

[0049]

5 In the step S15, the degree to which it is determined whether the English word input by handwriting has wrongly spelled is determined by the number of characters of which spelling is not coincident with the spelling of the English word that is the answer of the question.

[0050]

10 On the other hand, if it is determined that the input incorrect word does not include even a spelling error (step S15 (No)), the mark "x" is displayed on the entire screen of the display 15 and, at the same time, sound "beep" is output from the sound output unit 27, informing the user that the input answer is completely incorrect (wrong) (step S22).

15 [0051]

Then the English word, which is an answer of the question data, is displayed on the display 15 as the correct answer (step S23).

[0052]

20 According to the word learning function by the thus-configured electronic wordbook 10, when a meaning of a word in Japanese is displayed on the touch panel display 15 as a question and an English word is input by handwriting as an answer, it is determined whether the input answer coincides with the answer English word and, if the input answer is correct, a mark "o" is displayed to inform the user of correctness. On the other hand, if the input answer is incorrect, the English word
25 input as the answer is retrieved from entry words of the dictionary database 22b and the meaning in Japanese of the English word is displayed with a mark "x" to inform the user of incorrectness.

[0053]

30 Therefore, if the English word the user input as an answer to the meaning in Japanese as a question is a different English word, the meaning of that different English word is displayed to inform the user of incorrectness, whereby the user can learn words more effectively.

[0054]

35 According to the word learning function by the thus-configured electronic wordbook 10, in a case where the English word the user answered is incorrect and spelling of that word is wrong, the wrongly spelled portion is highlighted with, for example, a strikeouts e, and the English word that is the answer is displayed when

the [Enter] key 12 is pressed.

[0055]

Therefore, if there is a wrongly spelled portion in the answered English word, the user can recognize that wrongly spelled portion, whereby the user can learn words more effectively.

[0056]

In the description of the operation of the above embodiment, the word learning process based on the question data of Japanese to English as illustrated in Fig. 3(A) is described. However, a word learning process based on the question data of English to Japanese as illustrated by the Fig. 3(B) may also be implemented similarly.

[0057]

In particular, when a meaning of a word "succeed" in English is displayed as a question and a word "seikou" in Japanese is input as an answer, a mark "o" is displayed to inform the user of correctness. On the other hand, if "susumu" is input as an answer, the meaning of the word in English, "proceed," is displayed with a mark "x" to inform the user of incorrectness. If the answer is input with an incorrect Chinese character, the wrongly input Chinese character is displayed in an identified manner with a mark "x" to inform that the answer is incorrect.

[0058]

The technique of the process and the database by the electronic wordbook described in the above embodiment, i.e., each technique, such as the word learning process illustrated in the flowchart of Fig. 4, and each database, such as the dictionary database 22b and the question database 22c, may be stored, as programs that a computer may be made to execute, in a medium of an external recording apparatus, such as a memory card (e.g., a ROM card and a RAM card), a magnetic disk (e.g., a floppy disk and hard disk), an optical disk (e.g., CD-ROM and a DVD) and semiconductor memory, and may be distributed. A computer (CPU) of an electronic apparatus provided with a touch panel display reads a program stored in a medium of the external storage into storage, and an operation of the computer is controlled by this read program. Therefore, the word learning function described in each of the above embodiments can be implemented and the same process by each of the above techniques can be performed.

[0059]

The data of the program for implementing each of the above techniques may be transmitted on a communication network (N) as a form of a program code, and the data of the program can be taken, from a computer apparatus (i.e. a program server)

connected to this communication network (N), into an electronic apparatus provided with a touch panel display and the data can be stored in storage, thereby implementing the word learning function described above.

[0060]

5 The present invention is not limited to each of above embodiments and may be modified variously without departing from the scope thereof in the implementation. Further, each of the above embodiments includes inventions in various stages. Various inventions may be extracted by suitably combining a plurality of constituent features disclosed.

10

Claims

1. An electronic apparatus, comprising:
 - a storage that stores sets of first expressions and second expressions
 - 5 corresponding to the first expressions;
 - a question outputter that outputs one of the first expressions as a question;
 - an answer inputter that accepts an input of an answer expression as an answer to the question;
 - a correctness informer that informs correctness in a case where the answer
 - 10 expression is a second expression corresponding to the question; and
 - an incorrectness informer that outputs a first expression corresponding to the answer expression in a case where the answer expression is not the second expression corresponding to the question.
- 15 2. The electronic apparatus according to claim 1, wherein
 - the storage stores expressions of a first language as the first expressions, and
 - stores expressions of a second language corresponding to the expressions of the first language as the second expressions.
- 20 3. The electronic apparatus according to claim 2, comprising:
 - a spelling determinator that determines whether a spelling of a word in the answer expression is incorrect; and
 - a spelling error indicator that makes a user recognize a portion determined as a wrongly spelled portion by the spelling determinator.
- 25 4. The electronic apparatus according to claim 1, wherein
 - the answer inputter includes a touch panel screen used for inputting handwriting characters, and a character recognizer that recognizes the handwriting characters as the answer expression.
- 30 5. The electronic apparatus according to claim 1, wherein
 - the first expression is a Japanese expression,
 - the second expression is an English expression,
 - the question outputter outputs the Japanese expression as the question; and
 - 35 the answer inputter accepts the English expression as the input of the answer expression.

6. The electronic apparatus according to claim 1, wherein
the first expression is an English expression,
the second expression is a Japanese expression,
the question outputter outputs the English expression as the question; and
5 the answer inputter accepts the Japanese expression as the input of the
answer expression.

7. A data output method of an electronic apparatus provided with a storage that
stores sets of first expressions and second expressions corresponding to the first
10 expressions, the method comprising:

a question output step for outputting one of the first expressions as a
question;

an answer input step for accepting an input of an answer expression as an
answer to the question;

15 a correctness informing step for informing correctness in a case where the
answer expression is a second expression corresponding to the question; and

an incorrectness informing step for outputting a first expression
corresponding to the answer expression in a case where the answer expression is not
the second expression corresponding to the question.

20 8. The data output method of the electronic apparatus according to claim 7,
wherein

the storage stores expressions of a first language as the first expressions, and
stores expressions of a second language corresponding to the expressions of the first
25 language as the second expressions.

9. The data output method of the electronic apparatus according to claim 8,
further comprising:

30 a spelling determination step for determining whether a spelling of a word in
the answer expression is incorrect; and

a spelling error indicating step for making a user to recognize a portion
determined as a wrongly spelled portion in the spelling determination step.

10. The data output method of the electronic apparatus according to claim 7,
35 wherein

the electronic apparatus includes a touch panel screen used for inputting
handwriting characters; and

the answer input step includes a step for recognizing the handwriting characters as the answer expression.

11. The data output method of the electronic apparatus according to claim 7,
5 wherein

the first expression is a Japanese expression,

the second expression is an English expression,

in the question output step, the Japanese expression is output as the question; and

10 in the answer input step, the English expression is accepted as the input of answer expression.

12. The data output method of the electronic apparatus according to claim 7,
wherein

15 the first expression is an English expression,

the second expression is a Japanese expression,

in the question output step, the English expression is output as the question;
and

in the answer input step, the Japanese expression is accepted as the input of
20 answer expression.