

【DESCRIPTION】

【Invention Title】

METHOD AND SYSTEM FOR PROVIDING FEEDBACK FOR COGNITIVE
BEHAVIORAL THERAPY BASED ON LANGUAGE MODEL

【Technical Field】

[1] The present invention relates to a method and system for providing feedback for cognitive behavioral therapy based on a language model.

【Background Art】

[2] Cognitive behavioral therapy (CBT) is a psychological therapy method that works on the premise that a person's thoughts, feelings, and behaviors are closely interconnected, and in the course of therapy, patients themselves recognize their feelings, identify faulty thoughts, and change problematic behaviors.

[3] In recent years, the cognitive behavioral therapy has been increasingly used to treat mental health issues such as depression, anxiety, insomnia, and pain, as the effects of cognitive behavioral therapy have been scientifically proven.

[4] Meanwhile, as technology advances, electronic devices (e.g., smartphones, tablet PCs, etc.) have become more popular, and accordingly, there is an increasing dependency on the Internet for many aspects of daily life.

[5] As such, with the development of various technologies, including the Internet, consumption patterns that were previously highly dependent on offline activities have gradually shifted to online, and currently, online-based consumption has been experiencing exponential growth.

[6] In response to this trend, even offline-based fields of industry with characteristics of services, such as the healthcare industry, are increasingly attempting to provide healthcare services online.

- [7] For example, Korean Patent No. 10-2195512 discloses a technology related to a server and system that provides an online healthcare platform and provides information on healthcare service provision points to patients online.
- [8] Further, as artificial intelligence (AI) technology has recently developed rapidly, large language models (LLMs) capable of natural conversation with humans has emerged.
- [9] Unlike conventional chatbots constructed manually and providing only limited answers, the large language model communicates naturally, almost like humans, provides fast and accurate information, and shows innovative technical performance in the artificial intelligence market.
- [10] However, there still exists a need for a method capable of providing more diverse medical services by utilizing a large language model for medical services provided online.

【Disclosure】

【Technical Problem】

- [11] The present invention is directed to providing a method and system for providing feedback for cognitive behavioral therapy, which may generate appropriate feedback based on a user's pain level, competence, mood, and short records, and provide the generated feedback to the user.
- [12] More specifically, the present invention is directed to providing a method and system for providing feedback for cognitive behavioral therapy, which may generate prompts of a generative language model by using answer data for a questionnaire related to cognitive behavioral therapy, and input the generated prompts to the generative language model to generate feedback related to the questionnaire answer data.

[13] Further, the present invention is directed to providing a method and system for providing feedback for cognitive behavioral therapy, which may provide feedback related to answer data to the user.

[14] Furthermore, the present invention is directed to providing a method and system for providing feedback for cognitive behavioral therapy based on a language model, which may provide cognitive behavioral therapy for pain patients based on a digital device.

【Technical Solution】

[15] To solve the aforementioned objects, there is provided a method for providing feedback for cognitive behavioral therapy based on a language model, according to the present invention. The method may comprise: providing at least one questionnaire related to cognitive behavioral therapy on a user terminal; receiving answer data to the questionnaire via the user terminal; generating a prompt to be input to a generative language model by using the answer data; generating feedback related to the answer data by inputting the prompt to the generative language model; and providing the generated feedback to the user terminal.

[16] Further, the questionnaire may include an objective questionnaire corresponding to an objective type, the objective questionnaire may be configured such that the question related to the cognitive behavioral therapy and a plurality of selectable items respectively corresponding to a plurality of different responses to the question are paired, and in the generating of the prompt, the prompt may be generated by using the question and a response to a specific selectable item selected from among the plurality of selectable items in the user terminal.

[17] Further, different scores related to the cognitive behavioral therapy may be respectively matched with and exist in the plurality of different responses, and the

prompt may include a keyword for the question and a score matched to the specific selectable item.

- [18] Further, the questionnaire may further include a subjective questionnaire corresponding to a subjective type, the answer data may include memo information received from the user terminal for the questionnaire of the subjective type, and in the generating of the prompt, the prompt may be generated by using the memo information.
- [19] Further, the method may further comprise: analyzing a meaning of the memo information that is answer data for the subjective questionnaire and a meaning of the specific selectable item for the objective questionnaire, and may further comprise: performing different processes according to a degree of similarity between the meaning of the memo information and the meaning of the specific selectable item as an analysis result.
- [20] Further, in the performing of the different processes, when the degree of similarity is equal to or greater than a preset criterion value, the prompt may be generated by using the memo information and the response to the specific selectable item.
- [21] Further, the method may further comprise: performing a re-questionnaire when the degree of similarity is less than the preset criterion value, and in the performing of the re-questionnaire, guide information regarding a reason for performing the re-questionnaire may be provided together on the user terminal when the re-questionnaire is performed.
- [22] Further, a server may store, upon matching, a plurality of therapy programs respectively matched to different topics, a plurality of therapy programs may be sequentially provided on the user terminal according to therapy weeks respectively set for the plurality of therapy programs so that a user performs the cognitive behavioral

therapy according to each of the plurality of therapy programs, in which the method may further comprise: extracting user information for the user registered in the server and information on a specific therapy program provided on the user terminal among the plurality of therapy programs, and in the generating of the prompt, the prompt may be generated by combining at least some of the answer data, the user information, or information on the specific therapy program.

[23] Further, the user information may include at least one of a gender, an age, a tendency, or a disease of the user, and the information on the specific therapy program may include information on a specific therapy week corresponding to the specific therapy program, a specific topic matched to the specific therapy program, and therapy history information of the user up to the specific therapy week.

[24] Further, the feedback may include summary information regarding at least some of the answer data, the user information, or the information on the specific therapy program included in the prompt, and recommendation information regarding a specific therapy program scheduled to be conducted in a week following the specific therapy week corresponding to the specific therapy program.

[25] Meanwhile, there is provided a system for providing feedback for cognitive behavioral therapy based on a language model, according to the present invention. The system may comprise a control unit configured to provide, on a user terminal, at least one questionnaire related to cognitive behavioral therapy, in which the control unit may be configured to: receive questionnaire answer data for the questionnaire through the user terminal; generate a prompt to be input to a generative language model by using the answer data; input the prompt to the generative language model to generate feedback related to the answer data; and provide the generated feedback to the user terminal.

[26] Meanwhile, there is provided a program capable of being stored in a computer-readable recording medium, executed by one or more processes in an electronic device, according to the present invention. The program may comprise instructions to perform: providing at least one questionnaire related to cognitive behavioral therapy on a user terminal; receiving answer data to the questionnaire via the user terminal; generating a prompt to be input to a generative language model by using the answer data; generating feedback related to the answer data by inputting the prompt to the generative language model; and providing the generated feedback to the user terminal.

【Advantageous Effects】

[27] As described above, a method and system for providing feedback for cognitive behavioral therapy based on a language model according to the present invention may receive a user's response in real time through a questionnaire provided online, and by providing feedback based thereon, the user may receive continuous therapy support related to cognitive behavioral therapy, even in a case where regular face-to-face counseling is difficult.

[28] In addition, the method and system for providing feedback for cognitive behavioral therapy based on a language model according to the present invention may identify a user's condition and needs from various perspectives through objective and subjective questionnaires. Through this, more sophisticated feedback may be provided to the user, and a therapy plan corresponding to actual user's needs may be provided.

[29] Further, the method and system for providing feedback for cognitive behavioral therapy based on a language model according to the present invention may input to a generative language model a prompt generated by combining a user's answer data for

a questionnaire, a user's gender, age, tendency, disease information, and information on a specific therapy program, and may generate user-customized feedback by using the generative language model. Through the customized feedback, the user may more deeply understand state information related to one's pain level and cognitive distortion degree, and may be provided with an effective therapy direction corresponding thereto.

【Description of Drawings】

- [30]** FIG. 1 is a conceptual diagram for explaining a system for providing feedback for cognitive behavioral therapy based on a language model according to the present invention.
- [31]** FIG. 2 is a flowchart for explaining a method for providing feedback for cognitive behavioral therapy based on a language model according to the present invention.
- [32]** FIGS. 3A, 3B, 4A, 4B, 4C, 4E, 4F, 4G, 5, and 6 are conceptual diagrams for explaining a method for providing feedback for cognitive behavioral therapy based on a language model according to the present invention.
- [33]** FIGS. 7A, 7B, and 7C are conceptual diagrams for explaining a method for providing a cognitive behavioral therapy program through feedback.

【Mode for Disclosure】

- [34]** Hereinafter, exemplary embodiments disclosed in the present specification will be described in detail with reference to the accompanying drawings. The same or similar constituent elements are assigned with the same reference numerals regardless of reference numerals, and the repetitive description thereof will be omitted. The suffixes "module", "unit", "part", and "portion" used to describe constituent elements in the following description are used together or interchangeably in order to facilitate the description, but the suffixes themselves do not have distinguishable meanings or

functions. In addition, in the description of the exemplary embodiment disclosed in the present specification, the specific descriptions of publicly known related technologies will be omitted when it is determined that the specific descriptions may obscure the subject matter of the exemplary embodiment disclosed in the present specification. In addition, it should be understood that the accompanying drawings are provided for easy understanding of the embodiments disclosed in the present specification, and the technical teachings disclosed in the present specification are not limited by the accompanying drawings, and includes all alterations, equivalents, and alternatives that are included in the teachings and the technical scope of the present invention.

- [35]** The terms including ordinal numbers such as "first," "second," and the like may be used to describe various constituent elements, but the constituent elements are not limited by the terms. These terms are used only to distinguish one constituent element from another constituent element.
- [36]** When one constituent element is described as being "coupled" or "connected" to another constituent element, it should be understood that one constituent element can be coupled or connected directly to another constituent element, and an intervening constituent element can also be present between the constituent elements. When one constituent element is described as being "coupled directly to" or "connected directly to" another constituent element, it should be understood that no intervening constituent element exists between the constituent elements.
- [37]** Singular expressions include plural expressions unless clearly described as different meanings in the context.
- [38]** In the present application, it should be understood that terms "including", "having", and the like are intended to designate the existence of characteristics, numbers, steps,

operations, constituent elements, and components described in the specification or a combination thereof, and do not exclude a possibility of the existence or addition of one or more other characteristics, numbers, steps, operations, constituent elements, and components, or a combination thereof in advance.

[39] The present invention is for generating appropriate feedback based on a user's pain level, competence, mood, and short records, and providing the generated feedback to the user, and particularly relates to a method and system for providing feedback for cognitive behavioral therapy of pain patients, focusing on pain patients with musculoskeletal disorders.

[40] More specifically, the present invention relates to a method and system for providing feedback for cognitive behavioral therapy, which may generate a prompt of a generative language model by using answer data for a questionnaire related to cognitive behavioral therapy, and may generate feedback related to the questionnaire answer data by inputting the generated prompt to the generative language model.

[41] In the present invention, the questionnaire described may include questions related to cognitive behavioral therapy for checking at least one of a user's pain level, cognitive distortion degree, pain duration, pain severity, mood during pain experience, negative emotion degree toward pain, stress degree regarding pain, physical health condition, or mental health condition.

[42] Here, the term "pain level" may be understood as a scale indicating the intensity or severity of pain experienced by an individual. Pain is a subjective and personal experience, and the way people perceive and interpret pain may vary from person to person, and pain may accompany physical discomfort, emotional discomfort, suffering and the like. Various methods may be used to evaluate such pain level. For example, a numeric scale (numeric rating scale, NRS) may be provided to a patient so

that the patient may evaluate the intensity of pain experienced (e.g., no pain, mild pain, severe pain, etc.).

[43] In addition, “cognitive distortion” means a cognitive error that leads to false assumptions or incorrect concepts about pain, surrounding situations, or events, and the term “cognitive distortion degree” may be understood as an expression of terms representing the extent to which a patient experiences cognitive distortion. In the present invention, the cognitive distortion degree may be quantified as a “cognitive distortion score” or a “cognitive distortion point”.

[44] Further, the term “pain patient” described in the present invention may mean a patient who feels pain caused by a disease, and in the present invention, the term pain patient may be used interchangeably with “patient” or “user”.

[45] In the present invention, for convenience of explanation, the focus is placed on “musculoskeletal disorders”, but the invention is not necessarily limited thereto. That is, the pain patient described in the present invention may include not only patients having musculoskeletal disorders, but also patients having various diseases (e.g., cancer, diabetes, hypertension, etc.).

[46] Meanwhile, a system for providing feedback for cognitive behavioral therapy based on a language model (hereinafter referred to as a “feedback providing system”) according to the present invention may be implemented in various platform forms, such as an application, software, or website.

[47] According to a software-based implementation of the feedback providing system according to the present invention, the embodiments such as procedures and functions described in the present specification may be implemented as separate software therapy modules. Each of the software therapy modules may perform one or more functions and operations described in the present specification.

- [48] As such, the feedback providing system implemented as software may be downloaded through a program (e.g., Play Store, App Store, etc.) that allows downloading an application on a user terminal (or patient terminal), or may be implemented through an initial installation program on the user terminal. In this case, at least one of the constituent elements of the feedback providing system may be utilized as a constituent element of the user terminal.
- [49] In the present invention, the term “terminal” may also be referred to as a “mobile terminal” or “electronic device”, and the terminal described in the present invention may include at least one of a cell phone, smart phone, notebook computer, laptop computer, slate PC, tablet PC, ultrabook, desktop computer, digital broadcasting terminal, personal digital assistant (PDA), portable multimedia player (PMP), navigation, or wearable device (e.g., smartwatch, smart glass, HMD (head mounted display)).
- [50] Meanwhile, the feedback providing system may exist inside a server (hereinafter referred to as a server) constructed for performing specific purposes (e.g., functions related to providing feedback for cognitive behavioral therapy), separately from the user terminal, and may also exist as a system separate from the server. When the feedback providing system exists inside the server, various services related to the present invention (e.g., a feedback providing service for cognitive behavioral therapy or a cognitive behavioral therapy providing service) may be provided through at least one constituent element located inside the server, or through constituent modules performing functions similar to those constituent elements. In this case, the application may provide various services related to the present invention on the user terminal where the application is installed, through communication with the server.

- [51] In addition, the feedback providing system may interoperate with a central server or an external server to provide to the user terminal a feedback providing method for cognitive behavioral therapy and a cognitive behavioral therapy providing method according to the present invention.
- [52] Furthermore, the feedback providing system may diagnose a patient's pain level with respect to pain and cognitive distortion degree using the user terminal, and, in consideration thereof, may provide appropriate summaries and feedback for cognitive behavioral therapy, or may provide various services related to cognitive behavioral therapy (e.g., providing a therapy program for cognitive behavioral therapy).
- [53] Meanwhile, a patient may diagnose one's own pain level with respect to pain and cognitive distortion degree through an application or a webpage provided by the feedback providing system according to the present invention, and may receive appropriate feedback according to one's pain level and cognitive distortion degree. In addition, the patient may receive various services related to cognitive behavioral therapy (e.g., providing a cognitive behavioral therapy program) and may manage at least one of mental health or physical health conditions.
- [54] In this case, the patient may have a user account registered in the feedback providing system. In the present specification, for convenience of explanation, the account of the patient user shall be referred to as a "patient account" or a "user account".
- [55] The "account" described above may be generated through a page linked to the feedback providing system described above. Alternatively, the "account" may also be generated in at least one other system linked with the feedback providing system.
- [56] Accordingly, in the present specification, the accounts issued in the system are not distinguished separately, and all accounts based on the feedback providing system

according to the present invention shall be referred to as “accounts previously registered in the feedback providing system according to the present invention.”

[57] In the present specification, for convenience of explanation, the feedback providing system according to the present invention shall be described in an embodiment implemented as an application on a user terminal.

[58] Meanwhile, in the case of a pain patient, even when having the same disease (or illness), the pain level and cognitive distortion degree occurring daily may vary for each patient.

[59] Accordingly, in the present invention, appropriate feedback may be generated based on a user’s pain level, competence, mood, short records and the like, and the generated feedback may be provided to the user.

[60] Hereinafter, with reference to the accompanying drawings, a configuration of a system for providing feedback for cognitive behavioral therapy based on a language model according to the present invention will be described in more detail. FIG. 1 is a conceptual diagram for explaining a system for providing feedback for cognitive behavioral therapy based on a language model according to the present invention.

[61] As illustrated in FIG. 1, a feedback providing system 100 according to the present invention may include at least one of an input unit 110, a communication unit 120, a storage unit 130, or a control unit 140.

[62] The input unit 110 may receive a user (or patient) input through input unit components provided in a user terminal (or patient terminal 10) (e.g., a touch screen, a virtual key, a physical key (or hardware button), an input sensor, a microphone, etc.).

[63] Specifically, the input unit 110 may be configured to receive a selection of a user’s response for at least one questionnaire related to cognitive behavioral therapy by using the input unit components provided in the user terminal 10. Here, the term “receive

a selection” may mean receiving a selection signal (or input signal or user input) corresponding to the user’s selection made through the input unit components provided in the user terminal 10.

- [64]** The communication unit 120 may be connected to a server and devices through a wireless or wired network, and may be configured to receive or transmit various data and information required for the feedback providing system 100.
- [65]** Specifically, the communication unit 120 may include one or more therapy modules that enable wireless or wired communication between the feedback providing system 100 and the user terminal 10, or between the feedback providing system 100 and an artificial intelligence server (or LLM server 200), a central server, or an external server. In addition, the communication unit 120 may include one or more communication modules for connecting the feedback providing system 100 to one or more networks.
- [66]** For example, the communication unit 120 may receive (or collect) answer data for at least one questionnaire related to cognitive behavioral therapy from at least one source through the user terminal 10. In another example, the communication unit 120 may receive from the user terminal 10 a request for providing a specific therapy program for cognitive behavioral therapy.
- [67]** Further, the communication unit 120 may support various communication methods according to communication standards of communicating devices.
- [68]** For example, the communication unit 120 may be configured to communicate with a communication target using at least one of wireless LAN (WLAN), wireless-fidelity (Wi-Fi), wireless-fidelity (Wi-Fi) direct, digital living network alliance (DLNA), wireless broadband (WiBro), world interoperability for microwave access (WiMAX), high speed downlink packet access (HSDPA), high speed uplink packet access (HSUPA), long term evolution (LTE), long term evolution-advanced (LTE-A), fifth

generation mobile telecommunication (5G), Bluetooth™, radio frequency identification (RFID), infrared communication (infrared data association (IrDA)), ultra-wideband (UWB), ZigBee, near field communication (NFC), Wi-Fi direct, or wireless universal serial bus (wireless USB) technologies.

- [69] Meanwhile, a storage unit 130 may also be referred to as a database (DB) or memory, and may be configured to store various information related to the present invention. In the present invention, the storage unit 130 may be provided in the feedback providing system 100 itself. Additionally, at least a part of the storage unit 130 may be configured as a cloud server (or cloud storage). That is, it is sufficient that a storage unit 130 may be understood as a space in which information necessary for the operation of the feedback providing system 100 according to the present invention is stored, and it may be understood that there is no limitation on physical space. Hereinafter, the storage unit 130, a cloud server (or cloud storage), and a storage of a server (not illustrated) interoperating with the feedback providing system 100 will not be distinguished separately, and all of them will be referred to as the storage unit 130.
- [70] User information registered in the feedback providing system 100 (or server) may be stored and exist in the storage unit 130. For example, the user information may include information related to at least one of a user's gender, age, tendency (or personality), or disease (or illness). However, the user information may further include, in addition to the information listed above, various information such as a user's disease occurrence date, therapy (or medical treatment) history, occupation, interests, and hobbies.
- [71] Furthermore, information on a specific therapy program provided to a user may be stored and exist in the storage unit 130. For example, the information on a specific therapy program may include at least one of information on a specific therapy week

corresponding to the specific therapy program, a specific topic matched to the specific therapy program, or a user's therapy history information up to the specific therapy week.

[72] Meanwhile, the control unit 140 may also be referred to as a processor, and may cooperate with a memory to perform a role of controlling overall operations of the feedback providing system 100 related to the present invention. The control unit 140 may process signals, data, and information input or output through the components described above, or may perform a series of data processing operations for providing or processing appropriate information and functions for a user.

[73] According to one embodiment of the present invention, the control unit 140 may generate a prompt(s) of a generative language model by using answer data for a questionnaire related to cognitive behavioral therapy, and may generate feedback related to the questionnaire answer data by inputting the generated prompt(s) to the generative language model. Further, the control unit 140 may provide the feedback generated using the generative language model to the user terminal 10.

[74] Hereinafter, based on the configuration of the feedback providing system 100 described above, a method for providing feedback for cognitive behavioral therapy based on a language model according to the present invention will be described in more detail. FIG. 2 is a flowchart for explaining a method for providing feedback for cognitive behavioral therapy based on a language model according to the present invention. FIGS. 3A, 3B, 4A, 4B, 4C, 4E, 4F, 4G, 5, and 6 are conceptual diagrams for explaining a method for providing feedback for cognitive behavioral therapy based on a language model according to the present invention. FIGS. 7A, 7B, and 7C are conceptual diagrams for explaining a method for providing a cognitive behavioral therapy program through feedback.

- [75] Meanwhile, in the present invention, a process of providing at least one questionnaire related to cognitive behavioral therapy on a user terminal may be performed (S210, see FIG. 2).
- [76] For example, as illustrated in FIG. 3A, the control unit 140 may provide, on a user terminal 10, a questionnaire page (or service page) including a plurality of questionnaires. In this case, the page including the plurality of questionnaires may be output through a touch screen (or display) of the user terminal 10.
- [77] Here, the questionnaire (or question, or problem, or item, or test) provided on the page may include a questionnaire for relative evaluation of factors related to pain.
- [78] The factors related to pain in the present invention may be various. For example, the factors related to pain may include various elements for evaluating a patient's condition related to pain, such as pain level, pain duration, mental health, and physical health. However, the factors described above are merely one example, and the factors related to pain described in the present invention may include all elements for evaluating a patient's condition.
- [79] Such factors related to pain may include credible questionnaires actually used in the department of psychiatry for diagnosing a patient's condition. In addition, the control unit 140 may periodically update the questionnaire by additionally collecting questionnaires for diagnosing a patient's condition through a central server, an external server, or a website, etc.
- [80] Meanwhile, in the present invention, the questionnaire related to cognitive behavioral therapy may include both an objective questionnaire corresponding to an objective type, and a subjective questionnaire corresponding to a subjective type.
- [81] The objective questionnaire may be configured such that a question related to cognitive behavioral therapy and a plurality of selectable items respectively corresponding to a

plurality of different responses to the question are paired. For example, as illustrated in FIG. 3A and FIG. 3B(a), a first questionnaire 310 corresponding to the objective type may be configured such that a question related to cognitive behavioral therapy (e.g., “How is your pain today?”, 311) and a plurality of selectable items 311a, 311b, 311c, 311d, and 311e respectively corresponding to a plurality of different responses to the question (e.g., “no pain”, “almost mild pain”, “normal”, “slightly severe pain”, “terrible pain”) are paired.

[82] In addition, different scores related to cognitive behavioral therapy may be respectively matched with and exist in association with a plurality of different responses. For example, among a plurality of different responses configured in a first questionnaire 310 (e.g., “no pain,” “almost mild pain,” “normal,” “slightly severe pain,” and “terrible pain”), a first response (e.g., “no pain”) may be matched with and exist in association with a first score related to cognitive behavioral therapy (e.g., “score 0”), and a fifth response (e.g., “terrible pain”) may be matched with and exist in association with a fifth score related to cognitive behavioral therapy (e.g., “score 4”).

[83] Accordingly, a user may select a specific item that the user considers to be most suitable (or appropriate, or accurate) for the user’s state among a plurality of selectable items respectively corresponding to a plurality of different responses as a response for any one of the displayed questionnaires.

[84] Further, a subjective questionnaire may include a question related to cognitive behavioral therapy and a response area (or input area) configured to allow a response to the question to be entered as text. For example, as illustrated in FIG. 3A, a fourth questionnaire 340 corresponding to the subjective questionnaire may include a question related to cognitive behavioral therapy (e.g., “One-line memo” or “Record today’s note as a one-line memo!”) and a response area 341 configured to allow a

response to the question to be entered as text. In this case, the fourth questionnaire may be a questionnaire configured to receive information related to various user states (e.g., pain level, competence, mood, etc.) as text, and to detect user's state information based on the text.

[85] In the present invention, for convenience of explanation, the answer data for a subjective type of questionnaire will be referred to as "memo information."

[86] In this case, in the present invention, when the memo information, which is answer data for the subjective questionnaire, is received from the user terminal 10, the meaning of the memo information may be analyzed based on a preset criterion.

[87] Here, the term "analyzing the meaning of the memo information" may be understood as analyzing whether the meaning of the text content included in the memo information corresponds to a positive meaning or a negative meaning.

[88] To this end, in the feedback providing system 100 according to the present invention, a criterion for analyzing the meaning of memo information may be preset and exist. For example, as illustrated in FIG. 3B(b), when the memo information corresponds to a positive meaning, text related to positive state expressions (e.g., "Today is the best!," "mood is really good," "Feeling great and in top condition!," "pretty good day," or "neither good nor sad...") may be included. In another example, when the memo information corresponds to a negative meaning, text related to negative state expressions (e.g., "Today is the worst!," "mood is really bad," "in too much pain so condition is the worst," "don't want to do anything," "body is the worst and mood is also the worst," "mood is not so good," or "feel frustrated...") may be included.

[89] However, in the present invention, the manner in which a user performs responses to a plurality of questionnaires is not limited to any one way. For example, all of the first questionnaire 310, second questionnaire 320, and third questionnaire 330

corresponding to an objective questionnaire may also be configured such that a response can be made through text input, as in the fourth questionnaire 340 corresponding to a subjective questionnaire. Furthermore, in the present invention, the response to the questionnaire may be made not only through a specific item selection or text input, but also through voice, image, video inputs, or the like.

[90] Next, in the present invention, a process of receiving answer data for the questionnaire through the user terminal may be performed (S220, see FIG. 2).

[91] As described above, in the present invention, the questionnaire related to cognitive behavioral therapy may include an objective questionnaire corresponding to an objective type, and a subjective questionnaire corresponding to a subjective type.

[92] The answer data for the questionnaire corresponding to the objective type may be a selection signal for any one of a plurality of selectable items, and a control unit 140 may determine a specific selectable item corresponding to the received selection signal as answer data.

[93] The control unit 140 may receive the answer data for the objective questionnaire through the user terminal 10. For example, as illustrated in FIG. 3A, the control unit 140 may, based on that a specific selectable item 311e among a plurality of selectable items 311a, 311b, 311c, 311d, and 311e configured in a first questionnaire 310 is selected, receive from the user terminal 10 a selection signal corresponding to the specific selectable item 311e. Further, the control unit 140 may receive the specific selectable item 311e corresponding to a received selection signal as answer data for the first questionnaire.

[94] Further, the control unit 140 may, through a user terminal 10, receive answer data for a subjective questionnaire. For example, the control unit 140 may, based on that memo information 342 (e.g., “Everything is the worst today due to severe leg pain...”)

is input into a response area 341 configured in a fourth questionnaire 340, receive from the user terminal 10 an input signal corresponding to the memo information 342. Further, the control unit 140 may receive the memo information 342 corresponding to the received input signal as answer data for the fourth questionnaire.

[95] Meanwhile, in a server interoperating with a feedback providing system 100 according to the present invention, a plurality of therapy programs respectively matched to different topics may be matched and stored.

[96] Accordingly, in a user terminal 10, a plurality of therapy programs may be sequentially provided according to therapy weeks respectively set for the plurality of therapy programs, so that a user may perform cognitive behavioral therapy according to each of the plurality of therapy programs. Hereinafter, for convenience of explanation, the description will be made with the control unit 140 as a main body, without describing a server interoperating with the feedback providing system 100 as a main body.

[97] In the present invention, the term “therapy week” may be understood as an order (or period) of providing (or activating) a therapy program through a user terminal 10 so that a user performs cognitive behavioral therapy according to a therapy program. In the present invention, a “total number of therapy weeks” and a “therapy period for each week” corresponding to each therapy week may be preset and exist. Further, in the present invention, an “entire therapy period” may be understood as being predefined. The entire therapy period may be determined as a product of a preset total number of therapy weeks and a preset therapy period for each week. For example, when a total number is “8” and a therapy period for each week is one week (7 days), a preset entire therapy period may be “8 weeks.”

[98] Hereinafter, for convenience of explanation, a case in which different therapy weeks occur “eight times,” once for each therapy period of one week, will be described as an

example. That is, in the present invention, a first therapy week may occur in a first therapy session, and a second therapy week may occur in a second therapy session. Accordingly, in the present invention, the term “therapy week” may be used interchangeably with “therapy session,” “therapy round,” “therapy period,” or “therapy order.”

[99] As described above, in the present invention, a total number of therapy weeks (e.g., “8”) may be predefined and exist. For example, as illustrated in FIG. 4A, in the present invention, a total number of therapy weeks (e.g., “8 sessions”) may be predefined and exist. Herein, it is assumed that a plurality of therapy programs, “a first therapy program to an eighth therapy program,” exist. In this case, in each of first therapy program through eighth therapy program, any one of first therapy week through eighth therapy week may be set and exist.

[100] In each of a plurality of therapy programs (e.g., first therapy program through eighth therapy program), a plurality of topics may be respectively corresponded to (or matched with) and exist. For example, i) a first therapy program may be for training or therapy related to a first topic (e.g., motivation enhancement), ii) a second therapy program may be for training or therapy related to a second topic (e.g., emotion identification), iii) a third therapy program may be for training or therapy related to a third topic (e.g., behavioral strategy), iv) a fourth therapy program may be for training or therapy related to a fourth topic (e.g., attention diversion), v) a fifth therapy program may be for training or therapy related to a fifth topic (e.g., thought shifting), vi) a sixth therapy program may be for training or therapy related to a sixth topic (e.g., thought recording), vii) a seventh therapy program may be for training or therapy related to a seventh topic (e.g., management strategy), and viii) an eighth therapy program may be for training or therapy related to an eighth topic (e.g., future self).

- [101]** In addition, each of the plurality of therapy programs may include at least one therapy module related to a specific topic matched to a specific therapy program. For example, a first therapy program may be configured with a plurality of therapy modules related to a first topic (e.g., motivation enhancement).
- [102]** Here, a “therapy module” may mean content related to a detailed category (or sub-topic) related to a specific topic for cognitive behavioral therapy of a pain patient. In the present invention, a therapy module included in a therapy program related to a specific topic may be named as a “specific topic corresponding therapy module,” and the term “therapy module” may be used interchangeably with “chapter.”
- [103]** In the present invention, specific therapy modules constituting a plurality of specific therapy programs may be sequentially provided to a user terminal 10 according to therapy weeks set for each of the plurality of specific therapy programs. For example, the control unit 140 may sequentially provide to a user terminal 10 a plurality of therapy modules constituting a first therapy program in a first therapy week.
- [104]** Here, a “therapy module order” may be understood as an order in which a plurality of therapy modules included in a specific therapy program are provided.
- [105]** Further, a “therapy module activation mode” may be understood as a mode in which viewing (or use) of a therapy module is available. In contrast, a “therapy module deactivation mode” may be understood as a mode in which viewing (or use) of a therapy module is unavailable.
- [106]** Further, in the present invention, based on that cognitive behavioral therapy according to a therapy module corresponding to a specific order is completed according to a therapy module order, a mode of a therapy module corresponding to a next order of the specific order may be changed (or switched) from a deactivation mode to an activation mode.

- [107] For example, it is assumed that a first therapy program is composed of a first therapy module to a fifth therapy module. The control unit 140 may, based on that cognitive behavioral therapy according to a first therapy module is completed, switch a mode of a second therapy module from a deactivation mode to an activation mode.
- [108] That is, each of a plurality of therapy programs may be configured to include at least one therapy module related to a topic matched to each therapy program, and such a therapy program may mean a program for performing therapy according to a topic matched to a specific therapy program.
- [109] Meanwhile, each of a plurality of therapy programs may include a worksheet module for checking at least one of a pain level, a pain duration, a mental health condition, or a physical health condition of a pain patient.
- [110] In this case, in each worksheet module, user response information for checking at least one of a pain level, a pain duration, a mental health condition, or a physical health condition of a pain patient related to a specific topic of a therapy program including the worksheet module may be input. Further, in each worksheet module, not only contents related to a specific topic of a therapy program but also various user response information for checking at least one of a pain level, a pain duration, a mental health condition, or a physical health condition of a pain patient may be input.
- [111] For example, a worksheet module included in a first therapy program may receive as input user response information for checking at least one of a pain level, a pain duration, a mental health condition, or a physical health condition of a pain patient in relation to a first topic (e.g., motivation enhancement).
- [112] In another example, a worksheet module included in a second therapy program may receive as input user response information for checking at least one of a pain level, a

pain duration, a mental health condition, or a physical health condition of a pain patient in relation to a second topic (e.g., emotion identification).

- [113]** Such worksheet modules may be provided at various points in each therapy program. For example, a worksheet module may also be located at a last part or a middle part of each therapy module. That is, a position at which a worksheet module is included in each therapy program may be variously changed according to a condition of a pain patient.
- [114]** Meanwhile, a worksheet module may be provided as a last module in each therapy program. The worksheet module may be arranged as a last module among therapy modules constituting each therapy program so that a pain patient proceeds with the worksheet module after performing all therapy modules of the corresponding therapy program. This may include a purpose of receiving a therapy effect, objectification, or feedback of a pain patient regarding the corresponding therapy program.
- [115]** Further, worksheet modules respectively included in therapy programs may be configured such that a pain patient scores (e.g., by selecting or inputting a score, etc.) regarding pain severity, mood during pain experience, negative emotion degree toward pain, and stress degree regarding pain. The control unit 140 may determine whether a therapy program including a corresponding worksheet module was helpful or effective to a pain patient by using a score received from the worksheet module.
- [116]** In this regard, as illustrated in FIG. 4B, the control unit 140 may control to output, through a display unit (or a touch screen) provided in the user terminal 10, a page 400 (or service page) for providing a cognitive behavioral therapy service. Such a page 400 may be output on the user terminal 10 through an application or a webpage installed in the user terminal 10.

- [117] The page 400 is a page linked with a feedback providing system 100 (or a server interoperating with the feedback providing system) according to the present invention and is configured to be controlled by the feedback providing system 100 according to the present invention.
- [118] Further, when the page 400 is provided in a form of an application, the page 400 may be controlled by a Central Processing Unit (CPU) of a user terminal 10 in which the application is installed. In this case, the CPU of the user terminal 10 may provide a service related to cognitive behavioral therapy to a pain patient based on information provided by the feedback providing system 100 according to the present invention.
- [119] The control unit 140 may, according to therapy weeks respectively set for the plurality of therapy programs, sequentially provide the plurality of therapy programs on a user terminal 10 in which a user account (U) is logged in.
- [120] Specifically, the control unit 140 may activate a state of a specific therapy program such that the specific therapy program in which a specific therapy week is set may be provided on a user terminal 10 during a therapy period corresponding to the specific therapy week. Hereinafter, in order to avoid confusion of terms, a state of a specific therapy program will be referred to as a “mode” of the specific therapy program.
- [121] In the present invention, a “therapy program activation mode” may be understood as a mode in which viewing (or use) of at least a part of a plurality of therapy modules included in a therapy program is available. In contrast, a “therapy program deactivation mode” may be understood as a mode in which viewing (or use) of all of a plurality of therapy modules included in a therapy program is unavailable.
- [122] For example, it is assumed that a cognitive behavioral therapy week of a user account (U) is a “first therapy week (e.g., first week)”. As illustrated in FIGS. 4C and 4D, the control unit 140 may, on a user terminal 10, activate a state of a first therapy program

410 (e.g., a program related to motivation enhancement) such that, during a therapy period corresponding to the first therapy week, the first therapy program 410 in which the first therapy week is set may be provided on the user terminal 10.

[123] Further, the control unit 140 may provide, on the user terminal 10, worksheet modules included in a specific therapy program and may receive user's response information for the worksheet modules. For example, the control unit 140 may provide, on the user terminal 10, a first worksheet module 411 (e.g., "Which aspect of knee pain is most difficult to handle?") and a second worksheet module 412 (e.g., "Future myself who can manage pain well") included in a first therapy program 410, and may receive a first response information (e.g., "physical aspect") of a user for the first worksheet module 411 and a second response information (e.g., "myself who can travel with a healthier body") of the user for the second worksheet module 412. In this case, the control unit 140 may receive the first response information and the second response information as worksheet answer data for the first worksheet module and the second worksheet module.

[124] Further, a control unit 140 may, when a next therapy week comes, activate a mode of a specific therapy program corresponding to the next therapy week. For example, when a first therapy week passes and a next therapy week which is a second therapy week (e.g., second week) comes, the control unit 140 may activate a mode of a second therapy program in which the second therapy week is set.

[125] Accordingly, a patient may sequentially use a plurality of therapy programs according to preset therapy weeks and may be provided with cognitive behavioral therapy systematically.

[126] Meanwhile, the control unit 140 may calculate (or derive, or compute) a user's pain score and cognitive distortion point based on worksheet answer data (or user's

response information) for at least one worksheet module included in a specific therapy program.

- [127]** As described above, in each worksheet module, user response information for checking at least one of a pain level, a pain duration, a pain severity, a mood during pain experience, a negative emotion degree toward pain, a stress degree regarding pain, a mental health condition, a physical health condition, or a therapy effect of a user for a therapy program may be input.
- [128]** The control unit 140 may calculate a user's pain score and cognitive distortion point from worksheet answer data by using various methods. In this case, a worksheet module may be configured to include a worksheet corresponding to any one of an objective type or a subjective type, and the worksheet corresponding to the objective type may be configured to include a plurality of selectable items with different scores matched thereto. For example, the control unit 140 may use (or calculate) worksheet answer data corresponding to the objective type to calculate a user's pain score and cognitive distortion point.
- [129]** Further, the control unit 140 may match a user's pain score and cognitive distortion point with the user's user account (U) and store them in the storage unit 130. For example, as illustrated in FIG. 4G, the control unit 140 may match a user's pain score (e.g., "24 points") and cognitive distortion point (e.g., "26 points") calculated based on the result of the user's cognitive behavioral therapy, and a user's cognitive behavioral therapy week (e.g., "second week") with the user account (U) and may store them in the storage unit 130.
- [130]** In this case, the pain score and the cognitive distortion point may be scores calculated based on a user's pain level, pain duration, pain severity, mood during pain experience, negative emotion degree toward pain, stress degree regarding pain, mental health

condition, physical health condition, feedback, or therapy effect of a user for a therapy program, etc., which are collected through a user terminal 10 during the user's cognitive behavioral therapy process. That is, the scores may be scores calculated based on the result of cognitive behavioral therapy up to a specific therapy week that the user is currently performing.

[131] In this regard, the control unit 140 may provide summary information on a result of cognitive behavioral therapy up to the specific therapy week that the user is currently performing, on the user terminal 10. For example, as illustrated in FIGS. 4E and 4F, the control unit 140 may output, on the user terminal 10, a page 420 including summary information 421 and 422 about a result of a user's cognitive behavioral therapy.

[132] In this case, information included in the summary information 421 and 422 may include at least one of a pain score, a competence score, or a mood score, which are calculated based on user's response information for a worksheet module including at least one of a user's pain level, a pain duration, a pain severity, a mood during pain experience, a negative emotion degree toward pain, a stress degree regarding pain, a mental health condition, a physical health condition, feedback, or a therapy effect of a user for a therapy program.

[133] That is, the summary information 421 and 422 included in the page 420 may be information calculated based on a user's response for at least one worksheet module included in a specific therapy program.

[134] Further, such summary information 421 and 422 may be provided in various forms so that a user may intuitively check a detection result of the user's state information by therapy week (or date). For example, first summary information 421 may be provided in a form of a graph (or a chart, or a table), and second summary information 422 may be provided in a form of text.

- [135] As such, in the present invention, by providing an interface with high readability to a user performing cognitive behavioral therapy, a user may intuitively check the user's, namely, his or her own state information and may continuously check and compare a result trend before and after cognitive behavioral therapy, thereby providing a user environment in which the user may intuitively monitor changes.
- [136] Meanwhile, the control unit 140 may extract user information on a user registered in a server and information on a specific therapy program among a plurality of therapy programs provided to a user terminal 10.
- [137] In the server (or in the feedback providing system 100), user information matched with a user account (U) may be stored and exist. For example, the user information may include at least one of a user's gender, age, disease (or illness), disease occurrence date, therapy (or medical treatment) history, personality (or tendency), occupation, interest, or hobby.
- [138] Further, information on a specific therapy program provided to a user terminal 10 may include at least one of information on a specific therapy week corresponding to the specific therapy program, a specific topic matched with the specific therapy program, or a user's therapy history information up to the specific therapy week.
- [139] Here, a user's therapy history information may include, for example, a pain level, a pain duration, a mental health condition, and a physical health condition of a user's pain, a mood during pain experience, a negative emotion degree toward pain, a stress degree regarding pain, a therapy effect of a user for a specific therapy program, and the like.
- [140] That is, the control unit 140 may extract, from a server, a user's user information and information on a specific therapy program provided to a user terminal 10. Such

information may be partially utilized in a process of generating a prompt to be input to a generative language model. More specific details thereof will be described later.

[141] Meanwhile, the control unit 140 may compare a response for a subjective questionnaire of a user with a response for an objective questionnaire and may determine whether the user made consistent responses during a cognitive behavioral therapy process. As a result of the determination, the control unit 140 may generate a prompt by using the responses for the questionnaire based on that it is determined that the user made consistent responses. In contrast, when the control unit 140 determines that the user did not make consistent responses, the control unit 140 may perform a re-questionnaire and may generate a prompt by using responses obtained as results of the re-questionnaire.

[142] The control unit 140 may determine whether a user's response is consistent, thereby securing accuracy about a recognition result perceived by the user and providing more effective feedback based on an accurate response.

[143] To this end, the control unit 140 may perform a semantic analysis on memo information received from a user terminal for a subjective questionnaire and on a specific selectable item selected from the user terminal for an objective questionnaire, and may calculate a degree of semantic similarity between the memo information and the specific selectable item.

[144] The control unit 140 may determine whether the degree of semantic similarity satisfies a preset criterion. For example, the control unit 140 may calculate the degree of semantic similarity as a numerical value and may determine whether the calculated numerical value is equal to or greater than a preset criterion value. In this case, the degree of semantic similarity may be such that the higher the calculated numerical value is, the higher the degree of semantic similarity between memo information and

a specific selectable item is, and the lower the calculated numerical value is, the lower the degree of semantic similarity between memo information and the specific selectable item is.

[145] Here, a preset criterion (or a preset criterion value) may be previously set or may be set by medical staff. In addition, the control unit 140 may specify a customized cognitive preset criterion for each user based on a user's cognitive behavioral therapy history (e.g., responses to questionnaires). For example, the control unit 140 may specify a preset criterion so as to correspond to a previously calculated degree of similarity based on a cognitive behavioral therapy history. A degree of similarity of a user who has made consistent responses in the past may be high, and the control unit may set the preset criterion to be high for the user who has made consistent responses so as to strictly determine consistency of responses. In contrast, a degree of similarity of a user who has made inconsistent responses in the past may be low, and the control unit 140 may set the preset criterion to be low for the user who has made inconsistent responses so as to flexibly determine consistency of responses.

[146] Meanwhile, the control unit 140 may perform different processes related to prompt generation depending on whether the degree of semantic similarity satisfies the preset criterion.

[147] Among the different processes, a first process may generate a prompt based on that the degree of similarity satisfies the preset criterion by using memo information and a specific selectable item. The control unit 140 may generate a prompt so that feedback to be provided to a user is provided by using memo information and a specific selectable item based on that memo information for a subjective questionnaire and a specific selectable item for an objective questionnaire satisfy consistency according to the preset criterion.

- [148] Further, among the different processes, a second process may generate a prompt by using memo information different from the above memo information based on that the degree of similarity does not satisfy the preset criterion.
- [149] More specifically, the control unit 140 may, according to the second process, perform a re-questionnaire for at least one of an objective questionnaire and the subjective questionnaire. In this case, the control unit 140 may provide, to a user terminal, at least one of the objective questionnaire or the subjective questionnaire according to the re-questionnaire, and guide information including a reason for performing the re-questionnaire.
- [150] The guide information may be configured in various ways. For example, when the subjective questionnaire is re-performed, the control unit 140 may provide, as guide information, information explaining a reason why memo information previously input by a user is inconsistent with a specific selectable item selected by the user for an objective questionnaire and the specific selectable item.
- [151] Meanwhile, when a degree of similarity between memo information and a specific selectable item does not satisfy a preset criterion, the control unit 140 may determine which questionnaire among the subjective questionnaire and the objective questionnaire is to be re-performed.
- [152] The control unit 140 may determine which questionnaire among the subjective questionnaire and the objective questionnaire is to be re-performed through comparison between the degree of similarity and a threshold value. In this case, the threshold value may be lower than a set criterion value.
- [153] More specifically, when the degree of similarity is less than the preset criterion value and is equal to or greater than the threshold value, the control unit 140 may re-perform any one of the subjective questionnaire and the objective questionnaire. The control

unit 140 may perform a re-questionnaire for any one that is more recently performed among the subjective questionnaire and the objective questionnaire or may re-perform the subjective questionnaire. Generally, since a user finds it more difficult to objectively express one's thoughts in the subjective questionnaire than in the objective questionnaire, although a user's cognition is normally made, a mistake may be made in expressing the subjective questionnaire. Accordingly, the control unit 140 may perform a re-questionnaire for the subjective questionnaire.

[154] Further, when the degree of similarity is less than the threshold value, the control unit 140 may re-perform both the objective questionnaire and the subjective questionnaire. When the degree of similarity is less than the threshold value, the control unit 140 may determine that cognition of the user about oneself is not properly made, and may provide guide information for guiding the cognition of the user together with questionnaires.

[155] Meanwhile, in the present invention, a process of generating a prompt to be input to a generative language model may be performed by using received questionnaire answer data (S230, refer to FIG. 2).

[156] The control unit 140 may generate a prompt to be input to a generative language model based on received questionnaire answer data and various information described above by using a prompt generation unit 150.

[157] First, the prompt may include a role that is predefined to derive feedback related to cognitive behavioral therapy from the generative language model. For example, as illustrated in FIG. 5, the control unit 140 may prepare a prompt 500 by predefined information on a role (e.g., "Act as a therapist deriving appropriate summaries and feedback for cognitive behavioral therapy based on the patient's pain level and

cognitive distortion degree.”, 510) for deriving feedback related to characteristic information and questionnaire answer data from the generative language model.

[158] Further, the control unit 140 may generate the prompt 500 by using memo information, which is answer data for a subjective questionnaire, and a response to a specific selectable item, which is answer data for an objective questionnaire. In this case, it may be understood that the memo information and the response to the specific selectable item used in generation of the prompt 500 satisfy that a degree of similarity between the memo information and the response to the specific selectable item is equal to or greater than a preset criterion value.

[159] The control unit 140 may generate the prompt 500 by using answer data for an objective questionnaire. More specifically, the control unit 140 may generate the prompt 500 by using a question configured in the objective questionnaire and a response to a specific selectable item selected from among a plurality of selectable items in a user terminal. For example, as illustrated in FIGS. 3A and 5, when it is assumed that, from a user terminal 10, a fifth item (e.g., “4 points”, “terrible pain”, 311e) is selected as a response to a first questionnaire (e.g., “pain”, “How is your pain today?”), a first item (e.g., “0 points”, “no confidence at all”, 312a) is selected as a response to a second questionnaire (e.g., “competence”, “Do you feel confident in performing daily activities despite pain?”), and a first item (e.g., “0 points”, “very bad”, 313a) is selected as a response to a third questionnaire (e.g., “mood”, “How was your mood today?”). The prompt 500 may include a response (e.g., “In today’s questionnaires, the patient’s pain score is 4 points, the competence score is 0 points, and the mood score is 0 points...”, 540) regarding a specific selectable item selected at the user terminal 10 from among a plurality of selectable items configured in each

of a plurality of objective questionnaires 310, 320, and 330 and a question configured in each of the plurality of objective questionnaires 310, 320, and 330.

[160] In addition, the control unit 140 may generate the prompt 500 by using memo information (e.g., “Everything is the worst today due to severe knee pain”) that is answer data for a subjective questionnaire. For example, the prompt 500 may include memo information (e.g., “In the one-line memo, it is written that ‘Everything is the worst today due to severe knee pain.’”) that is answer data for a subjective questionnaire.

[161] Further, the control unit 140 may generate the prompt 500 by combining at least some of user information or information on the specific therapy program. For example, as illustrated in FIG. 5, the control unit 140 may generate a system prompt 151 including a user’s age (e.g., “30 years old”), gender (e.g., “male”), disease (e.g., “knee sprain”), cognitive behavioral therapy week (e.g., “second week”), pain level (e.g., “severe pain”), pain duration (e.g., “lasting for about 10 days”), physical health condition (e.g., “many physical discomforts”), mental health condition (e.g., “the patient has suffered a strong psychological shock, resulting in deterioration of the mental health condition”), tendency (e.g., “this patient has a tendency to be extremely immersed in something once engaged, but also has a tendency to lack confidence and thus cannot easily take on challenges”), and the like.

[162] That is, the control unit 140 may generate a prompt 500 to be input to a generative language model by combining at least some of answer data, user information, or information on the specific therapy program.

[163] Meanwhile, in the present invention, a process of generating feedback related to answer data by inputting a prompt to the generative language model (S240, refer to

FIG. 2) and a process of providing generated feedback to a user terminal (S250, refer to FIG. 2) may be performed.

[164] The control unit 140 may generate feedback related to questionnaire answer data by inputting a prompt 500 generated in the process of S230 to the generative language model. For example, as illustrated in FIG. 6, the control unit 140 may input a prompt 500, in which at least some of answer data, user information, or information on the specific therapy program are combined, to the generative language model, and may obtain, from the generative language model, feedback (e.g., “Although cognitive behavioral therapy has been performed for two weeks, it seems that today was a very difficult day, since you said it was the worst day. The pain level of the knee sprain that has been lasting for about 10 days is quite severe, and due to this, you may be experiencing emotional problems, depression, or anxiety as mental health problems caused by strong psychological shock. Today, because of the severe pain, you are not able to concentrate on daily activities, and thus your mood and condition seem to be very low. To prevent your condition from worsening further, it would be good to continue the ongoing cognitive behavioral therapy without interruption. The third-week cognitive behavioral therapy, which will begin today, is a behavioral strategy therapy to handle pain using breathing and progressive relaxation techniques, so please make sure to attend without missing it!”), 600) as a response to the prompt 500.

[165] The feedback 600 may include summary information regarding at least some of questionnaire answer data, user information, or information on the specific therapy program, and recommendation information regarding a specific therapy program that is scheduled to be conducted in a week following the specific therapy week corresponding to the specific therapy program.

- [166] That is, the generative language model may receive a prompt 500, in which at least some of answer data, user information, or information on the specific therapy program are combined, as an input, and may generate feedback 600 for a user's cognitive behavioral therapy.
- [167] Further, the control unit 140 may provide generated feedback 600 on the user terminal 10. For example, a user may receive feedback 600, check summary information summarizing the user's pain level, cognitive distortion degree, physical health condition, and mental health condition, etc., and receive information on a specific therapy program scheduled to be conducted in a week following the currently progressing specific therapy program.
- [168] In this regard, the control unit 140 may provide a user environment that allows a user performing cognitive behavioral therapy to continuously perform the cognitive behavioral therapy. For example, as illustrated in FIG. 6, the control unit 140 may provide a Graphical User Interface (GUI) 610 that allows the user to access the specific therapy program together with recommendation information on a specific therapy program scheduled to be conducted in a week following the specific therapy week. A user may select the GUI (e.g., "Start Now") to access a screen on which the specific therapy program related to the recommendation information may be performed, and may perform cognitive behavioral therapy through the specific therapy program.
- [169] The control unit 140 may provide a page on which the specific therapy program may be performed based on that the GUI 610 is selected from the user terminal 10. For example, as illustrated in FIGS. 7A to 7C, the control unit 140 may provide a page 700 including the specific therapy program on the user terminal 10. A user may perform cognitive behavioral therapy through the specific therapy program included in the page 700.

- [170] As described above, a method and system for providing feedback for cognitive behavioral therapy based on a language model according to the present invention may receive a user's response in real time through a questionnaire provided online, and by providing feedback based thereon, the user may receive continuous therapy support related to cognitive behavioral therapy, even in a case where regular face-to-face counseling is difficult.
- [171] In addition, the method and system for providing feedback for cognitive behavioral therapy based on a language model according to the present invention may identify a user's condition and needs from various perspectives through objective and subjective questionnaires. Through this, more sophisticated feedback may be provided to the user, and a therapy plan corresponding to actual user's needs may be provided.
- [172] Further, the method and system for providing feedback for cognitive behavioral therapy based on a language model according to the present invention may input to a generative language model a prompt generated by combining a user's answer data for a questionnaire, a user's gender, age, tendency, disease information, and information on a specific therapy program, and may generate user-customized feedback by using the generative language model. Through the customized feedback, the user may more deeply understand state information related to one's pain level and cognitive distortion degree, and may be provided with an effective therapy direction corresponding thereto.
- [173] Meanwhile, the present invention described above may be executed by one or more processes on a computer and implemented as a program that may be stored on a computer-readable medium (or recording medium).

- [174] Further, the present invention described above may be implemented as computer-readable code or instructions on a medium in which a program is recorded. That is, the present invention may be provided in the form of a program.
- [175] Meanwhile, the computer-readable medium includes all kinds of recording devices for storing data readable by a computer system. Examples of computer-readable media include hard disk drives (HDDs), solid state disks (SSDs), silicon disk drives (SDDs), ROMs, RAMs, CD-ROMs, magnetic tapes, floppy discs, optical data storage devices, and the like.
- [176] Further, the computer-readable medium may be a server or cloud storage that includes storage and that the electronic device is accessible through communication. In this case, the computer may download the program according to the present invention from the server or cloud storage, through wired or wireless communication.
- [177] Further, in the present invention, the computer described above is an electronic device equipped with a processor, that is, a central processing unit (CPU), and is not particularly limited to any type.
- [178] Meanwhile, it should be appreciated that the detailed description is interpreted as being illustrative in every sense, not restrictive. The scope of the present invention should be determined on the basis of the reasonable interpretation of the appended claims, and all of the alternations within the equivalent scope of the present invention belong to the scope of the present invention.

【CLAIMS】

【Claim 1】

A method for providing feedback for cognitive behavioral therapy based on a language model, the method comprising:

providing at least one questionnaire related to cognitive behavioral therapy on a user terminal;

receiving answer data to the questionnaire via the user terminal;

generating a prompt to be input to a generative language model by using the answer data;

generating feedback related to the answer data by inputting the prompt to the generative language model; and

providing the generated feedback to the user terminal.

【Claim 2】

The method of claim 1, wherein the questionnaire includes an objective questionnaire corresponding to an objective type,

wherein the objective questionnaire is configured such that a question related to the cognitive behavioral therapy and a plurality of selectable items respectively corresponding to a plurality of different responses to the question are paired, and

wherein in the generating of the prompt, the prompt is generated by using the question and a response to a specific selectable item selected from among the plurality of selectable items in the user terminal.

【Claim 3】

The method of claim 2, wherein different scores related to the cognitive behavioral therapy are respectively matched with and exist in the plurality of different responses, and

wherein the prompt includes a keyword for the question and a score matched to the specific selectable item.

【Claim 4】

The method of claim 3, wherein the questionnaire further includes a subjective questionnaire corresponding to a subjective type,

wherein the answer data includes memo information received from the user terminal for the questionnaire of the subjective type, and

wherein in the generating of the prompt, the prompt is generated by using the memo information.

【Claim 5】

The method of claim 4, further comprising:

analyzing a meaning of the memo information that is answer data for the subjective questionnaire and a meaning of the specific selectable item for the objective questionnaire,

and further comprising:

performing different processes according to a degree of similarity between the meaning of the memo information and the meaning of the specific selectable item as an analysis result.

【Claim 6】

The method of claim 5, wherein in the performing of the different processes, when the degree of similarity is equal to or greater than a preset criterion value, the prompt is generated by using the memo information and the response to the specific selectable item.

【Claim 7】

The method of claim 6, further comprising:

performing a re-questionnaire when the degree of similarity is less than the preset criterion value,

wherein in the performing of the re-questionnaire, guide information regarding a reason for performing the re-questionnaire is provided together on the user terminal when the re-questionnaire is performed.

【Claim 8】

The method of claim 1, wherein a server stores upon matching a plurality of therapy programs respectively matched to different topics, a plurality of therapy programs are sequentially provided on the user terminal according to therapy weeks respectively set for the plurality of therapy programs so that a user performs the cognitive behavioral therapy according to each of the plurality of therapy programs,

wherein the method further comprises:

extracting user information for the user registered in the server and information on a specific therapy program provided on the user terminal among the plurality of therapy programs, and

wherein in the generating of the prompt, the prompt is generated by combining at least some of the answer data, the user information, or information on the specific therapy program.

【Claim 9】

The method of claim 8, wherein the user information includes at least one of a gender, an age, a tendency, or a disease of the user, and

wherein the information on the specific therapy program includes information on a specific therapy week corresponding to the specific therapy program, a specific topic matched to the specific therapy program, and therapy history information of the user up to the specific therapy week.

【Claim 10】

The method of claim 9, wherein the feedback includes summary information regarding at least some of the answer data, the user information, or the information on the specific therapy

program included in the prompt, and recommendation information regarding a specific therapy program scheduled to be conducted in a week following the specific therapy week corresponding to the specific therapy program.

【Claim 11】

A system for providing feedback for cognitive behavioral therapy based on a language model, comprising a control unit configured to provide, on a user terminal, at least one questionnaire related to cognitive behavioral therapy,

wherein the control unit is configured to:

receive questionnaire answer data for the questionnaire through the user terminal;

generate a prompt to be input to a generative language model by using the answer data;

input the prompt to the generative language model to generate feedback related to the answer data; and

provide the generated feedback to the user terminal.

【Claim 12】

A program stored in a computer-readable recording medium, executed by one or more processes in an electronic device,

wherein the program comprises instructions to perform:

providing at least one questionnaire related to cognitive behavioral therapy on a user terminal;

receiving answer data to the questionnaire via the user terminal;

generating a prompt to be input to a generative language model by using the answer data;

generating feedback related to the answer data by inputting the prompt to the generative language model; and

providing the generated feedback to the user terminal.