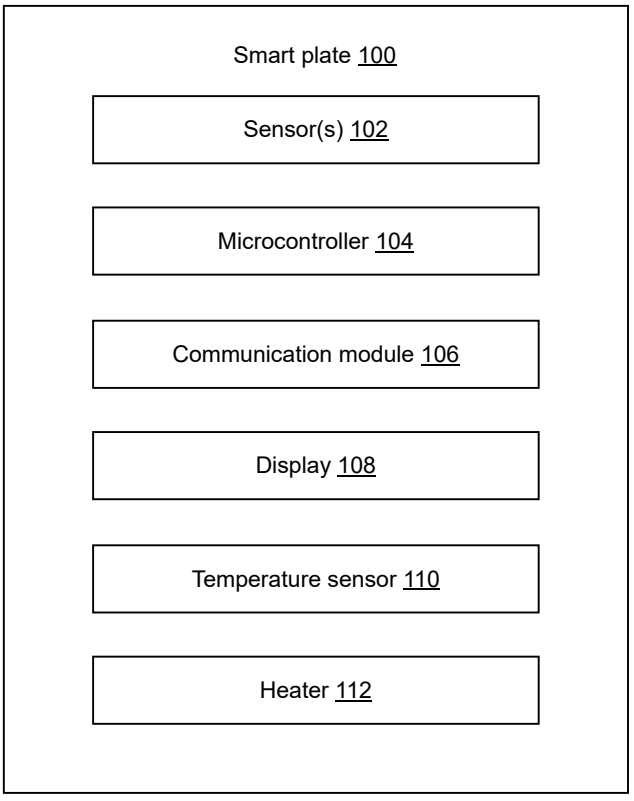

FIG. 1

Tarun Khurana
Regd. Patent Agent [IN/PA-1325]
Dated: 11th August, 2023

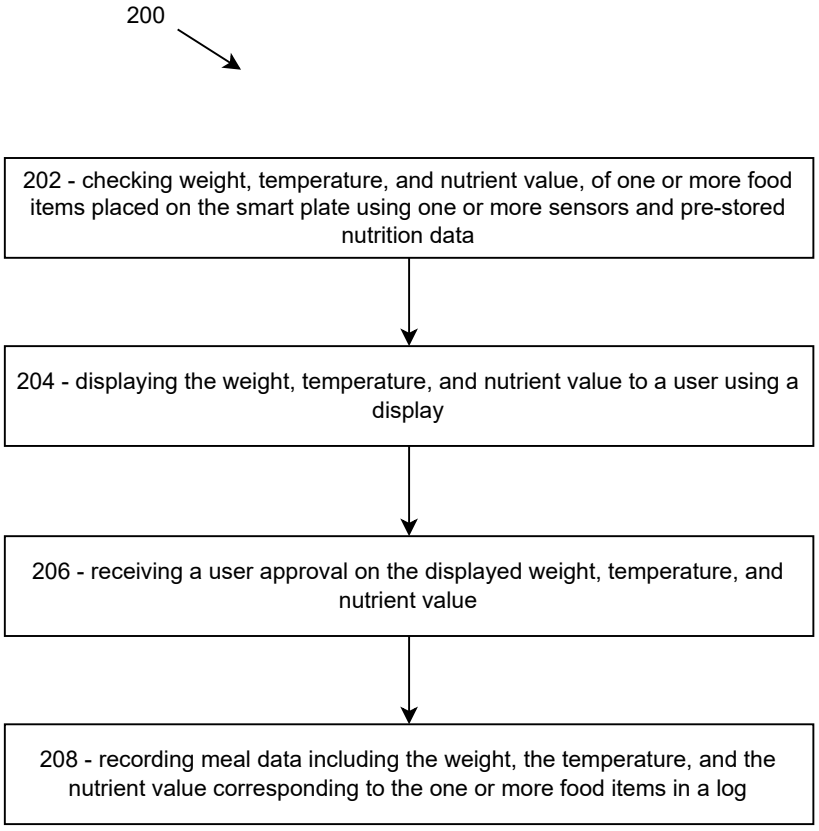

FIG. 2

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Dated: 11th August, 2023

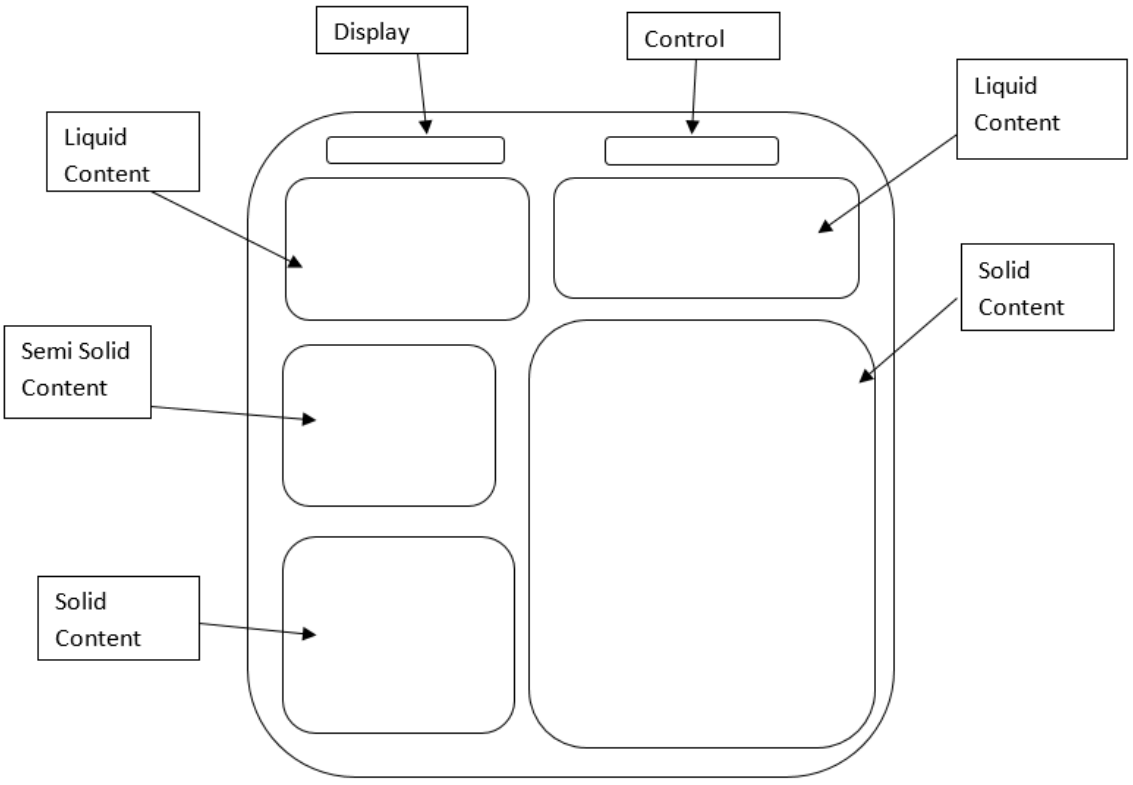

FIG. 3

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Dated: 11th August, 2023

FORM 2

THE PATENTS ACT, 1970

(39 of 1970)

&

The Patent Rules, 2003

COMPLETE SPECIFICATION

(See sections 10 & rule 13)

1. TITLE OF THE INVENTION

SMART PLATE FOR FOOD MONITORING

2. APPLICANT (S)

NAME	**NATIONALITY**	**ADDRESS**
Chitkara University	IN	Chitkara University, Atal Shiksha Kunj, Pinjore-Nalagarh National Highway (NH-21A), District: Solan - 174103, Himachal Pradesh, India.
Chitkara Innovation Incubator Foundation	IN	SCO: 160-161, Sector - 9c, Madhya Marg, Chandigarh- 160009, India.

3. PREAMBLE TO THE DESCRIPTION

COMPLETE SPECIFICATION

The following specification particularly describes the invention and the manner in which it is to be performed.

TECHNICAL FIELD

[001] The present invention relates to a smart plate for monitoring and managing food consumption. More specifically, it pertains to a plate incorporating sensors, a microcontroller, and a communication module to determine the weight of food items, calculate their nutrient value, and transmit meal data to a user device.

BACKGROUND

[002] The global increase in sedentary lifestyles and unhealthy dietary habits has led to a rise in diet-related health issues such as obesity, diabetes, and cardiovascular diseases. There is a growing recognition of the need for individuals to monitor and manage their food consumption effectively to make informed dietary choices and maintain a healthy lifestyle.

[003] Traditionally, individuals have relied on manual methods to track their food intake, such as maintaining handwritten journals or using mobile applications. However, these methods often require significant effort and can be prone to inaccuracies, leading to unreliable data.

SUMMARY

[004] The invention is a smart plate designed to monitor and manage food consumption effectively. The smart plate incorporates one or more sensors that accurately determine the weight of food items placed on it by the user. These sensors utilize advanced measurement techniques, such as load cells or image recognition, to provide precise weight readings. Connected to the sensors is a microcontroller that receives the weight measurements and uses them, along with associated data from a database or algorithm, to calculate the nutrient value of the food items. This includes determining the calories, macronutrients, vitamins, and minerals present in the food. The smart plate also features a communication module that enables the transmission of meal data, including the recorded weight of food items and their corresponding nutritional value, to a user device, such as a smartphone or wearable device.

[005] Additionally, the invention includes a method for logging meal data using the smart plate. The method involves checking the weight, temperature, and nutrient value of the food items placed on the smart plate using the sensors and pre-stored nutrition data. The measured values are displayed to the user on a display integrated into the smart plate, allowing them to review the information. The user then provides approval or confirmation regarding the displayed weight, temperature, and nutrient value. Finally, the meal data, including the weight, temperature, and nutrient value of the food items, is recorded in a log for further analysis and tracking of eating habits.

[006] Together, the smart plate and the method provide a comprehensive solution for monitoring food consumption. The smart plate accurately measures the weight and calculates the nutrient value of food items, while the method allows for efficient logging and recording of meal data. This empowers individuals to make informed dietary choices, track their nutrition intake, and work towards their health goals effectively.

BRIEF DESCRIPTION OF DRAWINGS

[007] These and other features, aspects, and advantages of the present invention will become better understood when the following detailed description is read with reference to the accompanying drawings in which like characters represent like parts throughout the drawings, wherein:

[008] FIG. 1 illustrates a smart plate for monitoring and managing food consumption, according to one or more embodiments of the present disclosure;

[009] FIG. 2 illustrates a flowchart of a method of logging meal data using a smart plate, according to one or more embodiments of the present disclosure; and

[0010] FIG. 3 illustrates an exemplary embodiment of the smart plate, according to one or more embodiments of the present disclosure.

[0011] Further, skilled artisans will appreciate that elements in the drawings are illustrated for simplicity and may not have been necessarily been drawn to scale. For example, the flow charts illustrate the method in terms of the

most prominent steps involved to help to improve understanding of aspects of the present invention. Furthermore, in terms of the construction of the device, one or more components of the device may have been represented in the drawings by conventional symbols, and the drawings may show only those specific details that are pertinent to understanding the embodiments of the present invention so as not to obscure the drawings with details that will be readily apparent to those of ordinary skill in the art having benefit of the description herein.

DESCRIPTION OF EMBODIMENTS

[0012] The word “exemplary” or “embodiment” is used herein to mean “serving as an example, instance, or illustration.” Any implementation or aspect described herein as “exemplary” or as an “embodiment” is not necessarily to be construed as preferred or advantageous over other aspects of the disclosure. Likewise, the term “aspects” does not require that all aspects of the disclosure include the discussed feature, advantage, or mode of operation.

[0013] Embodiments will now be described in detail with reference to the accompanying drawings. In the following description, numerous specific details are set forth in order to provide a thorough understanding of the aspects described herein. It will be apparent, however, to one skilled in the art, that these and other aspects may be practiced without some or all of these specific details. In addition, well known steps in a method of a process may be omitted from flow diagrams presented herein in order not to obscure the aspects of the disclosure. Similarly, well known components in a device may be omitted from figures and descriptions thereof presented herein in order not to obscure the aspects of the disclosure.

[0014] Before the present methods and systems are disclosed and described, it is to be understood that the methods and systems are not limited to specific methods, specific components, or to particular implementations. It is also to be understood that the terminology used herein is for the purpose of describing particular embodiments only and is not intended to be limiting.

[0015] As used in the specification and the appended claims, the singular forms “a,” “an,” and “the” include plural referents unless the context clearly

dictates otherwise. Ranges may be expressed herein as from "about" one particular value, and/or to "about" another particular value. When such a range is expressed, another embodiment includes from the one particular value and/or to the other particular value. Similarly, when values are expressed as approximations, by use of the antecedent "about," it will be understood that the particular value forms another embodiment. It will be further understood that the endpoints of each of the ranges are significant both in relation to the other endpoint, and independently of the other endpoint.

[0016] "Optional" or "optionally" means that the subsequently described event or circumstance may or may not occur, and that the description includes instances where said event or circumstance occurs and instances where it does not.

[0017] Throughout the description and claims of this specification, the word "comprise" and variations of the word, such as "comprising" and "comprises," means "including but not limited to," and is not intended to exclude, for example, other components, integers or steps. "Exemplary" means "an example of" and is not intended to convey an indication of a preferred or ideal embodiment. "Such as" is not used in a restrictive sense, but for explanatory purposes.

[0018] Disclosed are components that can be used to perform the disclosed methods and systems. These and other components are disclosed herein, and it is understood that when combinations, subsets, interactions, groups, etc. of these components are disclosed that while specific reference of each various individual and collective combinations and permutation of these may not be explicitly disclosed, each is specifically contemplated and described herein, for all methods and systems. This applies to all aspects of this application including, but not limited to, steps in disclosed methods. Thus, if there are a variety of additional steps that can be performed it is understood that each of these additional steps can be performed with any specific embodiment or combination of embodiments of the disclosed methods.

[0019] The present methods and systems may be understood more readily

by reference to the following detailed description of preferred embodiments and the examples included therein and to the Figures and their previous and following description.

[0020] As will be appreciated by one skilled in the art, the methods and systems may take the form of an entirely hardware embodiment, an entirely software embodiment, or an embodiment combining software and hardware aspects. Furthermore, the methods and systems may take the form of a computer program product on a computer-readable storage medium having computer-readable program instructions (e.g., computer software) embodied in the storage medium. More particularly, the present methods and systems may take the form of web-implemented computer software. Any suitable computer-readable storage medium may be utilized including hard disks, CD-ROMs, optical storage devices, or magnetic storage devices.

[0021] Embodiments of the methods and systems are described below with reference to block diagrams and flowchart illustrations of methods, systems, apparatuses and computer program products. It will be understood that each block of the block diagrams and flowchart illustrations, and combinations of blocks in the block diagrams and flowchart illustrations, respectively, can be implemented by computer program instructions. These computer program instructions may be loaded onto a general-purpose computer, special purpose computer, or other programmable data processing apparatus to produce a machine, such that the instructions which execute on the computer or other programmable data processing apparatus create a means for implementing the functions specified in the flowchart block or blocks.

[0022] These computer program instructions may also be stored in a computer-readable memory that can direct a computer or other programmable data processing apparatus to function in a particular manner, such that the instructions stored in the computer-readable memory produce an article of manufacture including computer-readable instructions for implementing the function specified in the flowchart block or blocks. The computer program instructions may also be loaded onto a computer or other programmable data

processing apparatus to cause a series of operational steps to be performed on the computer or other programmable apparatus to produce a computer-implemented process such that the instructions that execute on the computer or other programmable apparatus provide steps for implementing the functions specified in the flowchart block or blocks.

[0023] Accordingly, blocks of the block diagrams and flowchart illustrations support combinations of means for performing the specified functions, combinations of steps for performing the specified functions and program instruction means for performing the specified functions. It will also be understood that each block of the block diagrams and flowchart illustrations, and combinations of blocks in the block diagrams and flowchart illustrations, can be implemented by special purpose hardware-based computer systems that perform the specified functions or steps, or combinations of special purpose hardware and computer instructions.

[0024] The foregoing objects of the invention are accomplished and the problems and shortcomings associated with the prior art techniques and approaches are overcome by the present invention as described below in the preferred embodiment.

[0025] FIG. 1 and FIG. 3 illustrate a smart plate 100 for monitoring and managing food consumption. The smart plate 100 comprises one or more sensors 102 configured to determine the weight of food items placed on the plate. The sensors 102 utilize advanced weight measurement techniques, such as load cells or image recognition technology, to provide precise and accurate weight readings.

[0026] Connected to the sensors 102 is a microcontroller 104, which receives the weight measurements and associated data from a database or algorithm. The microcontroller 104 is programmed to calculate the nutrient value of the food items based on the determined weight and the corresponding nutritional information from the database. The microcontroller 104 provides detailed insights into the nutritional content of the food items, including calories, macronutrient compositions, vitamins, and minerals.

[0027] A communication module 106 is incorporated into the smart plate

100 to facilitate the transmission of meal data. The communication module 106 enables the smart plate 100 to wirelessly transmit meal data, including the recorded weight of food items and their corresponding nutritional value, to a user device, such as a smartphone or a wearable device.

[0028] The microcontroller 104 further offers additional functionalities to enhance the user experience. It automatically records the meal data in a log, which includes historic meal data. The historic meal data serves as a comprehensive record of the user's eating habits, enabling them to review past meals and track their progress over time.

[0029] Based on the historic meal data, the microcontroller 104 provides personalized dietary recommendations, for example, using a display 108. By analyzing the user's eating patterns, nutritional goals, and preferences, the microcontroller 104 generates tailored suggestions for healthier food choices, portion adjustments, and recipe recommendations.

[0030] The microcontroller 104 also provides immediate feedback on the eating habits of the user. This feedback can be conveyed through visual cues, lights, or smartphone notifications. For instance, if the user is eating too fast, the smart plate 100 may illuminate a warning light or send a notification to encourage slower eating.

[0031] To ensure comprehensive data access, the microcontroller 104 transmits the log comprising historic meal data, personalized dietary recommendations, and feedback to the user device. This enables users to conveniently access a wealth of information about their food consumption habits.

[0032] Furthermore, the microcontroller 104 provides educational content, tips, and suggestions to the user. The educational resources are designed to promote better food choices, educate users about balanced nutrition, and provide practical tips for maintaining a healthy diet.

[0033] In some embodiments, the smart plate 100 may include additional features. For example, a temperature sensor 110 may be integrated to monitor the temperature of the food items, ensuring optimal enjoyment and food safety. Additionally, a heater 112 can be incorporated into the smart plate 100 to warm

specific food items based on user preferences.

[0034] In conclusion, the smart plate 100 revolutionizes food monitoring and management by utilizing sensors 102, a microcontroller 104, and a communication module 106. With precise weight measurement, nutrient value calculation, meal data transmission, personalized recommendations, real-time feedback, and educational resources, the smart plate 100 empowers users to make informed dietary choices and work towards their health goals.

[0035] FIG. 2 illustrates a method 200 of logging meal data using a smart plate. The method 200 involves several steps performed by the smart plate to track and record information related to the food items placed on it.

[0036] At step 202, the method involves checking the weight, temperature, and nutrient value of one or more food items placed on the smart plate. For example, when a user places a salad consisting of lettuce, tomatoes, and dressing on the smart plate, the sensors integrated into the plate determine the weight of each ingredient, measure the temperature of the salad, and analyze the nutrient value based on the pre-stored nutrition data. The sensors can utilize load cells or image recognition technology to accurately determine the weight of the food items.

[0037] Once the measurements are obtained, the method proceeds to step 204, to display the weight, temperature, and nutrient value to the user. The smart plate includes a display that provides real-time information about the food items. For instance, the display may show that the salad weighs 200 grams, has a temperature of 10 degrees Celsius, and contains 100 calories, 5 grams of protein, and 10 grams of carbohydrates. The user can review this information to ensure its accuracy and make any necessary adjustments.

[0038] Next, at step 206, the method involves receiving user approval on the displayed weight, temperature, and nutrient value. The user can confirm the accuracy of the displayed data by providing explicit approval or taking appropriate actions on the smart plate interface. For example, the user may press a "Confirm" button on the display or use touch gestures to indicate their approval.

[0039] Finally, at step 208, the method includes recording the meal data in

a log. The recorded meal data comprises the weight, temperature, and nutrient value corresponding to the one or more food items placed on the smart plate. This log serves as a comprehensive record of the user's meal history. For instance, the smart plate can store the meal data in a digital log that includes details such as the date and time of the meal, the specific food items consumed, their respective weights, temperatures, and nutrient values. This log enables users to track their dietary habits, monitor their nutritional intake, and make informed decisions about their food choices.

[0040] In addition to the previous steps of checking the weight, temperature, and nutrient value of the initial food items placed on the smart plate, the method includes the ability to recalibrate the measurements when the user adds or modifies the food items on the plate.

[0041] For example, suppose a user initially places a bowl of soup on the smart plate, and the sensors detect the weight, temperature, and nutrient value of the soup. The display on the smart plate shows the initial values. Now, if the user decides to add a slice of bread to the meal, the sensors will detect the additional weight and adjust the measurements accordingly.

[0042] The method then proceeds to recalculate the weight and nutrient value of the added food item, taking into account the updated composition of the meal. In this case, the sensors will measure the weight of the slice of bread and the microcontroller will recalculate the nutrient value based on the new combination of soup and bread.

[0043] Once the recalculations are complete, the updated weight and nutrient value of the entire meal are displayed on the smart plate's display. The user can review the new measurements, which now include the combined weight and nutrient information of the soup and the added bread.

[0044] In addition to the previous steps of checking the weight, temperature, and nutrient value of the food items placed on the smart plate, this method further includes heating of food items using the smart plate.

[0045] Suppose a user places a plate of leftovers on the smart plate. The microcontroller receives the weight measurements and the associated data from

the database or algorithm, calculating the nutrient value of the food items based on the determined weight and the corresponding nutritional information.

[0046] Now, if the user wishes to heat a specific food item, such as a portion of the leftovers, they can provide a user input to activate the heating function. The smart plate incorporates a heater, which is capable of warming specific food items based on user preferences.

[0047] Once the user activates the heating function, the smart plate begins to warm the selected food item. During the heating process, the temperature of the food item is continuously monitored by the temperature sensor integrated into the smart plate.

[0048] To provide real-time information to the user, the smart plate's display shows the temperature of the food item being heated. For instance, if the user selected the portion of leftovers to be warmed, the display would show the current temperature of the food item as it increases during the heating process.

[0049] By displaying the temperature on the smart plate's display, the user can monitor the progress of the heating and ensure that the food item reaches the desired temperature for optimal enjoyment. This feature adds convenience and control to the heating process, allowing the user to customize their meal experience.

[0050] The smart plate for monitoring food consumption offers several distinct advantages. Firstly, it promotes portion control by accurately measuring the weight of food items placed on it, helping individuals maintain a balanced diet and manage their weight effectively. Secondly, it provides valuable insights into the nutritional content of food items, including calories, macronutrients, vitamins, and minerals, enabling users to make informed decisions about their diet and monitor their nutrient intake. Additionally, the smart plate automatically logs food consumption, eliminating the need for manual tracking and saving users time and effort. It also offers personalized dietary recommendations based on the user's eating habits and goals, suggesting healthier food choices, portion adjustments, and tailored recipes. Real-time feedback on eating habits, conveyed through visual cues, lights, or smartphone notifications, further assists users in developing

healthier eating behaviors. Integration with user devices, such as smartphones or wearables, allows for comprehensive health monitoring and a holistic approach to managing diet and overall well-being. The smart plate serves as an educational tool, providing users with valuable content, tips, and suggestions to promote better food choices and improve nutrition knowledge. Finally, the smart plate may include additional features like temperature monitoring and heating capabilities, enhancing food safety and customization options. In conclusion, the smart plate revolutionizes food monitoring and management, empowering users to make informed dietary choices, improve their eating habits, and work towards their health goals.

[0051] In an illustrative configuration, the smart plate 100, may be a computing device, such as a server or a workstation desktop, and may include one or more processors, one or more memory devices (generically referred to herein as memory), one or more input/output (I/O) interface(s), one or more network interface(s), one or more sensors or sensor interface(s), one or more transceivers, one or more optional speakers, one or more optional microphones, and data storage. The computing device may further include one or more buses that functionally couple various components of the remote server. The computing device may further include one or more antenna(e) that may include, without limitation, a cellular antenna for transmitting or receiving signals to/from a cellular network infrastructure, an antenna for transmitting or receiving Wi-Fi signals to/from an access point (AP), a Global Navigation Satellite System (GNSS) antenna for receiving GNSS signals from a GNSS satellite, a Bluetooth antenna for transmitting or receiving Bluetooth signals, a Near Field Communication (NFC) antenna for transmitting or receiving NFC signals, and so forth. These various components will be described in more detail hereinafter.

[0052] The bus(es) may include at least one of a system bus, a memory bus, an address bus, or a message bus, and may permit exchange of information (e.g., data (including computer-executable code), signaling, etc.) between various components of the remote server. The bus(es) may include, without limitation, a memory bus or a memory controller, a peripheral bus, an accelerated graphics

port, and so forth. The bus(es) may be associated with any suitable bus architecture including, without limitation, an Industry Standard Architecture (ISA), a Micro Channel Architecture (MCA), an Enhanced ISA (EISA), a Video Electronics Standards Association (VESA) architecture, an Accelerated Graphics Port (AGP) architecture, a Peripheral Component Interconnects (PCI) architecture, a PCI-Express architecture, a Personal Computer Memory Card International Association (PCMCIA) architecture, a Universal Serial Bus (USB) architecture, and so forth.

[0053] The memory of the computing device may include volatile memory (memory that maintains its state when supplied with power) such as random access memory (RAM) and/or non-volatile memory (memory that maintains its state even when not supplied with power) such as read-only memory (ROM), flash memory, ferroelectric RAM (FRAM), and so forth. Persistent data storage, as that term is used herein, may include non-volatile memory. In certain example embodiments, volatile memory may enable faster read/write access than non-volatile memory. However, in certain other example embodiments, certain types of non-volatile memory (e.g., FRAM) may enable faster read/write access than certain types of volatile memory.

[0054] In various implementations, the memory may include multiple different types of memory such as various types of static random access memory (SRAM), various types of dynamic random access memory (DRAM), various types of unalterable ROM, and/or writeable variants of ROM such as electrically erasable programmable read-only memory (EEPROM), flash memory, and so forth. The memory 1004 may include main memory as well as various forms of cache memory such as instruction cache(s), data cache(s), translation lookaside buffer(s) (TLBs), and so forth. Further, cache memory such as a data cache may be a multi-level cache organized as a hierarchy of one or more cache levels (L1, L2, etc.).

[0055] The data storage may include removable storage and/or non-removable storage including, but not limited to, magnetic storage, optical disk storage, and/or tape storage. The data storage may provide non-volatile storage of

computer-executable instructions and other data. The memory and the data storage, removable and/or non-removable, are examples of computer-readable storage media (CRSM) as that term is used herein.

[0056] The data storage may store computer-executable code, instructions, or the like that may be loadable into the memory and executable by the processor(s) to cause the processor(s) to perform or initiate various operations. The data storage may additionally store data that may be copied to memory for use by the processor(s) during the execution of the computer-executable instructions. Moreover, output data generated as a result of execution of the computer-executable instructions by the processor(s) may be stored initially in memory, and may ultimately be copied to data storage for non-volatile storage.

[0057] More specifically, the data storage may store one or more operating systems (O/S); one or more database management systems (DBMS); and one or more program module(s), applications, engines, computer-executable code, scripts, or the like such as, for example, one or more machine learning module(s), one or more communication module(s), one or more content scanning module(s), and/or one or more prediction module(s). Some or all of these module(s) may be sub-module(s). Any of the components depicted as being stored in data storage may include any combination of software, firmware, and/or hardware. The software and/or firmware may include computer-executable code, instructions, or the like that may be loaded into the memory for execution by one or more of the processor(s). Any of the components depicted as being stored in data storage may support functionality described in reference to correspondingly named components earlier in this disclosure.

[0058] The data storage may further store various types of data utilized by components of the computing device. Any data stored in the data storage may be loaded into the memory for use by the processor(s) in executing computer-executable code. In addition, any data depicted as being stored in the data storage may potentially be stored in one or more datastore(s) and may be accessed via the DBMS and loaded in the memory for use by the processor(s) in executing computer-executable code. The datastore(s) may include, but are not limited to,

databases (e.g., relational, object-oriented, etc.), file systems, flat files, distributed datastores in which data is stored on more than one node of a computer network, peer-to-peer network datastores, or the like. The datastore(s) may include, for example, purchase history information, user action information, user profile information, a database linking search queries and user actions, and other information.

[0059] The processor(s) 102 may be configured to access the memory and execute computer-executable instructions loaded therein. For example, the processor(s) may be configured to execute computer-executable instructions of the various program module(s), applications, engines, or the like of the computing device to cause or facilitate various operations to be performed in accordance with one or more embodiments of the disclosure. The processor(s) may include any suitable processing unit capable of accepting data as input, processing the input data in accordance with stored computer-executable instructions, and generating output data. The processor(s) may include any type of suitable processing unit including, but not limited to, a central processing unit, a microprocessor, a Reduced Instruction Set Computer (RISC) microprocessor, a Complex Instruction Set Computer (CISC) microprocessor, a microcontroller, an Application Specific Integrated Circuit (ASIC), a Field-Programmable Gate Array (FPGA), a System-on-a-Chip (SoC), a digital signal processor (DSP), and so forth. Further, the processor(s) may have any suitable microarchitecture design that includes any number of constituent components such as, for example, registers, multiplexers, arithmetic logic units, cache controllers for controlling read/write operations to cache memory, branch predictors, or the like. The microarchitecture design of the processor(s) may be capable of supporting any of a variety of instruction sets.

[0060] It should further be appreciated that the system may include alternate and/or additional hardware, software, or firmware components beyond those described or depicted without departing from the scope of the disclosure. More particularly, it should be appreciated that software, firmware, or hardware components depicted as forming part of the computing device are merely illustrative and that some components may not be present or additional

components may be provided in various embodiments. While various illustrative program module(s) have been depicted and described as software module(s) stored in data storage, it should be appreciated that functionality described as being supported by the program module(s) may be enabled by any combination of hardware, software, and/or firmware. It should further be appreciated that each of the above-mentioned module(s) may, in various embodiments, represent a logical partitioning of supported functionality. This logical partitioning is depicted for ease of explanation of the functionality and may not be representative of the structure of software, hardware, and/or firmware for implementing the functionality. Accordingly, it should be appreciated that functionality described as being provided by a particular module may, in various embodiments, be provided at least in part by one or more other module(s). Further, one or more depicted module(s) may not be present in certain embodiments, while in other embodiments, additional module(s) not depicted may be present and may support at least a portion of the described functionality and/or additional functionality. Moreover, while certain module(s) may be depicted and described as sub-module(s) of another module, in certain embodiments, such module(s) may be provided as independent module(s) or as sub-module(s) of other module(s).

[0061] Program module(s), applications, or the like disclosed herein may include one or more software components including, for example, software objects, methods, data structures, or the like. Each such software component may include computer-executable instructions that, responsive to execution, cause at least a portion of the functionality described herein (e.g., one or more operations of the illustrative methods described herein) to be performed.

[0062] A software component may be coded in any of a variety of programming languages. An illustrative programming language may be a lower-level programming language such as an assembly language associated with a particular hardware architecture and/or operating system platform. A software component comprising assembly language instructions may require conversion into executable machine code by an assembler prior to execution by the hardware architecture and/or platform.

[0063] Another example programming language may be a higher-level programming language that may be portable across multiple architectures. A software component comprising higher-level programming language instructions may require conversion to an intermediate representation by an interpreter or a compiler prior to execution.

[0064] Other examples of programming languages include, but are not limited to, a macro language, a shell or command language, a job control language, a script language, a database query or search language, or a report writing language. In one or more example embodiments, a software component comprising instructions in one of the foregoing examples of programming languages may be executed directly by an operating system or other software component without having to be first transformed into another form.

[0065] A software component may be stored as a file or other data storage construct. Software components of a similar type or functionally related may be stored together such as, for example, in a particular directory, folder, or library. Software components may be static (e.g., pre-established or fixed) or dynamic (e.g., created or modified at the time of execution).

[0066] Software components may invoke or be invoked by other software components through any of a wide variety of mechanisms. Invoked or invoking software components may comprise other custom-developed application software, operating system functionality (e.g., device drivers, data storage (e.g., file management) routines, other common routines and services, etc.), or third-party software components (e.g., middleware, encryption, or other security software, database management software, file transfer or other network communication software, mathematical or statistical software, image processing software, and format translation software).

[0067] Software components associated with a particular solution or system may reside and be executed on a single platform or may be distributed across multiple platforms. The multiple platforms may be associated with more than one hardware vendor, underlying chip technology, or operating system. Furthermore, software components associated with a particular solution or system

may be initially written in one or more programming languages, but may invoke software components written in another programming language.

[0068] Computer-executable program instructions may be loaded onto a special-purpose computer or other particular machine, a processor, or other programmable data processing apparatus to produce a particular machine, such that execution of the instructions on the computer, processor, or other programmable data processing apparatus causes one or more functions or operations specified in the flow diagrams to be performed. These computer program instructions may also be stored in a computer-readable storage medium (CRSM) that upon execution may direct a computer or other programmable data processing apparatus to function in a particular manner, such that the instructions stored in the computer-readable storage medium produce an article of manufacture including instruction means that implement one or more functions or operations specified in the flow diagrams. The computer program instructions may also be loaded onto a computer or other programmable data processing apparatus to cause a series of operational elements or steps to be performed on the computer or other programmable apparatus to produce a computer-implemented process.

[0069] Additional types of CRSM that may be present in any of the devices described herein may include, but are not limited to, programmable random access memory (PRAM), SRAM, DRAM, RAM, ROM, electrically erasable programmable read-only memory (EEPROM), flash memory or other memory technology, compact disc read-only memory (CD-ROM), digital versatile disc (DVD) or other optical storage, magnetic cassettes, magnetic tape, magnetic disk storage or other magnetic storage devices, or any other medium which can be used to store the information and which can be accessed. Combinations of any of the above are also included within the scope of CRSM. Alternatively, computer-readable communication media (CRCM) may include computer-readable instructions, program module(s), or other data transmitted within a data signal, such as a carrier wave, or other transmission. However, as used herein, CRSM does not include CRCM.

[0070] Although embodiments have been described in language specific to structural features and/or methodological acts, it is to be understood that the disclosure is not necessarily limited to the specific features or acts described. Rather, the specific features and acts are disclosed as illustrative forms of implementing the embodiments. Conditional language, such as, among others, "can," "could," "might," or "may," unless specifically stated otherwise, or otherwise understood within the context as used, is generally intended to convey that certain embodiments could include, while other embodiments do not include, certain features, elements, and/or steps. Thus, such conditional language is not generally intended to imply that features, elements, and/or steps are in any way required for one or more embodiments or that one or more embodiments necessarily include logic for deciding, with or without user input or prompting, whether these features, elements, and/or steps are included or are to be performed in any particular embodiment.

We Claim:

1. A smart plate, comprising:

one or more sensors configured to determine the weight of food items placed on said smart plate by an individual using the smart plate;

a microcontroller operatively connected to said one or more sensors, configured to calculate the nutrient value of said food items based on the determined weight and associated data from a database or algorithm; and

a communication module configured to transmit meal data, including the recorded weight of food items and their corresponding nutritional value, to a user device.

2. The smart plate of claim 1, wherein the microcontroller is further configured to automatically record the meal data in a log, wherein the log includes historic meal data.

3. The smart plate of claim 1, wherein the microcontroller is further configured to provide personalized dietary recommendations based on a log including historic meal data, the meal data including the recorded weight of food items and their corresponding nutritional value taken by an individual in a meal.

4. The smart plate of claim 1, wherein the microcontroller is further configured to provide immediate feedback on eating habits of an individual using one or more of visual cues, lights, or smartphone notifications to indicate whether the individual is eating too fast, taking appropriate portion sizes, or reaching daily nutritional goals.

5. The smart plate of claim 1, wherein the user device is a smartphone or a wearable user device, wherein the microcontroller is further configured to transmit a log comprising historic meal data, personalized dietary recommendations, feedback on eating habits of an individual, to the user device.

6. The smart plate of claim 1, wherein the microcontroller is further

configured to provide educational content, tips, and suggestions to the individual.

7. The smart plate of claim 1, a temperature sensor for sensing the temperature of the food items, and a heater for heating one or more of the food items based on a user input.

8. A method of logging meal data using a smart plate, comprising:

checking weight, temperature, and nutrient value, of one or more food items placed on the smart plate using one or more sensors and pre-stored nutrition data;

displaying the weight, temperature, and nutrient value to a user using a display;

receiving a user approval on the displayed weight, temperature, and nutrient value; and

recording meal data including the weight, the temperature, and the nutrient value corresponding to the one or more food items in a log.

9. The method as claimed in claim 1, further comprising:

recalculating the weight and the nutrient value at least one food item added by the user on the smart plate; and

displaying the updated weight and nutrient value on the display.

10. The method as claimed in claim 1, further comprising:

heating of at least one food item based on a user input; and

displaying the temperature of the at least food item on the display during the heating.

For Chitkara University and

Chitkara Innovation Incubator Foundation



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Dated: 11th August, 2023

ABSTRACT

SMART PLATE FOR FOOD MONITORING

This invention introduces a smart plate equipped with advanced technology for monitoring and managing food consumption. The smart plate incorporates one or more sensors that accurately measure the weight of food items placed on it by the user. These sensors are connected to a microcontroller, which uses the weight measurements and associated data from a database or algorithm to calculate the nutrient value of the food items. This includes determining the calories, macronutrients, vitamins, and minerals present in the food. The smart plate also includes a communication module that enables the transmission of meal data, including the recorded weight of the food items and their corresponding nutritional value, to a user device. This allows users to conveniently monitor their food intake and make informed dietary choices based on the provided data.

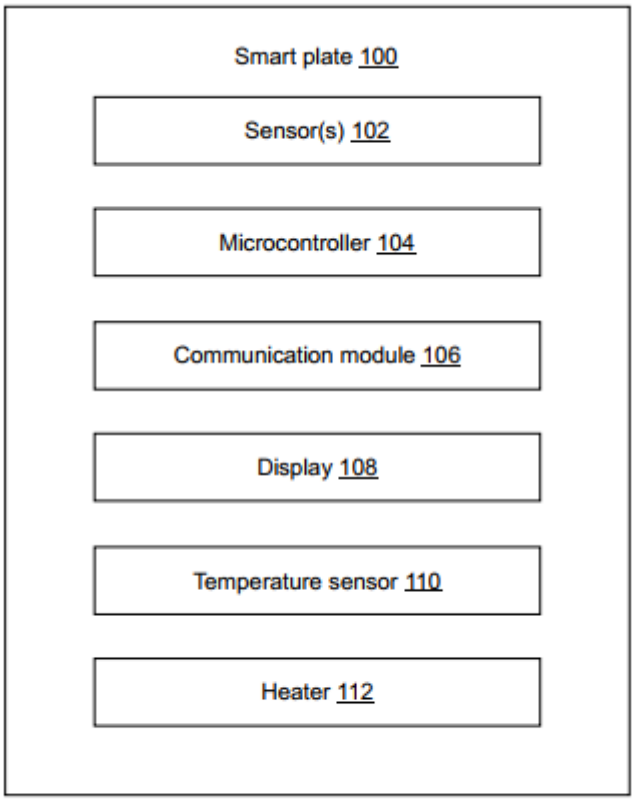

FIG. 1

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