

FOOD OR BEVERAGE PREPARATION SYSTEM, METHOD AND KIT

Technical Field

[001] The present invention relates broadly, but not exclusively, to systems, methods and kits for food or beverage preparation.

Background Art

[002] The preparation of food on an industrial scale can often be challenging especially for food and beverage (F&B) establishments that have a large number of outlets that are attempting to serve the same type of food or beverage consistently.

[003] Assuming that the ingredient supply can maintain consistency, there are frequently issues in the preparation of the food that result in inconsistencies. These include variability in preparation method (e.g. chopping of ingredients is variable) and variability in ingredient portioning.

[004] In an attempt to rectify these issues, F&B companies that seek such scale frequently use centralized kitchens or pre-prepared food to do as much of the food preparation and cooking, thus reducing the number of steps required at the outlet and often reducing it to just assembly.

[005] In cases where kitchen hands are required to prepare food, existing kitchen systems utilize display screens with information on the ingredients contained within the respective food items ordered to assist in the preparation. However, such systems still do not provide the necessary information to achieve consistency. In other cases, for training purposes, a stand-alone digital scale is used to train a new employee in the portioning of ingredients.

Summary of Invention

[006] According to a first aspect of the present invention, there is provided a food or beverage preparation system, comprising:

- a controller unit;
- a kitchen device communicatively coupled with the controller unit; and

a data storage unit communicatively coupled with the controller unit, the data storage unit storing a plurality of food or beverage recipes; and

a display device coupled with the kitchen device and the controller unit,

wherein the controller unit is configured to compare recipe information obtained from the data storage unit to sensed data received from the kitchen device;

wherein the kitchen device is configured to sense whether a quantity of an ingredient used by a user in a food or beverage order is within a predetermined range specific to the recipe received from the controller unit;

wherein the controller unit is further configured to calculate a performance index representative of the user's performance level over a plurality of food or beverage orders based on the comparison of recipe information obtained from the data storage unit to sensed data received from the kitchen device over the plurality of food or beverage orders; and

wherein the controller unit is further configured to generate a reward based on the performance index, and wherein the display device is configured to display the reward to the user in real time.

[007] The kitchen device may comprise at least one of a group consisting of a chopping block, a dispenser and a scale.

[008] The system may further comprise a rules database communicatively coupled with the controller unit, wherein the rules database is configured to provide the predetermined range to the kitchen device through the controller unit.

[009] The display device may be configured to dynamically display the sensed quantity of the ingredient.

[010] The controller unit may be further configured to generate at least one of a visual prompt, an audio prompt and a tactile prompt to prompt a user to stop when the sensed quantity of the ingredient is within the predetermined range specific to the recipe.

[011] The display device may be further configured to prompt the user to take a corrective action if the user stops dispensing the ingredient and the sensed quantity of the ingredient is outside the predetermined range specific to the recipe.

[012] The controller unit may be configured to communicate an instruction to block a next ingredient of the recipe if the corrective action is not taken.

[013] The system may further comprise a user interface device communicatively coupled with the controller unit, the user interface device capable of receiving an input from the user and communicating with the controller unit to unblock the next ingredient.

[014] The dispenser may comprise an electronically controlled container.

[015] The dispenser may comprise an electronically controlled scale.

[016] The controller unit may be further configured to calculate a performance index based on the comparison of recipe information obtained from the data storage unit to sensed data received from the kitchen device over a plurality of food or beverage orders.

[017] The controller unit may be further configured to generate a reward based on the comparison of recipe information obtained from the data storage unit to sensed data received from the kitchen device over a plurality of food or beverage orders.

[018] According to a second aspect of the present invention, there is provided a food or beverage preparation method comprising the steps of:

selecting a recipe from a plurality of recipes stored on a data storage unit in response to a food or beverage order;

communicating, through a controller unit communicatively coupled to the data storage unit, recipe information of the selected recipe to a kitchen device communicatively coupled to the controller unit;

preparing, by a user, an ingredient of the selected recipe;

determining, by the kitchen device, whether a quantity of the ingredient used by the user is within a predetermined range specific to the selected recipe;

calculating, by the controller unit, a performance index representative of the user's performance level over a plurality of food or beverage orders based on a comparison of the recipe information obtained from the data storage unit to sensed data received from the kitchen device over the plurality of food or beverage orders;

generating, by the controller unit, a reward based on the performance index; and

displaying, via a display device coupled with the kitchen device and the controller unit, the reward to the user in real time.

[019] The method may further comprise, before the determining step, a step of providing, from a rules database coupled with the controller unit, the predetermined range to the kitchen device.

[020] The method may further comprise dynamically displaying, via the display device, the sensed quantity of the ingredient.

[021] The method may further comprise generating, by the controller unit, at least one of a visual prompt, an audio prompt and a tactile prompt to prompt a user to stop when the sensed quantity of the ingredient is within the predetermined range specific to the recipe.

[022] The method may further comprise prompting the user, via the display device, to take a corrective action if the user stops dispensing the ingredient and the sensed quantity of the ingredient is outside the predetermined range specific to the recipe.

[023] There is also disclosed a kit of parts for food or beverage preparation, the kit comprising:
a controller unit;
a kitchen device communicatively couplable with the controller unit; and

a data storage unit communicatively couplable with the controller unit, and capable of storing a plurality of food or beverage recipes;

wherein the controller unit *capable of comparing recipe information obtained from the data storage unit to sensed data received from the kitchen device;*

wherein the kitchen device capable of sensing whether a quantity of an ingredient of a recipe is within a predetermined range specific to the recipe received from the controller unit; and

wherein the controller unit is further capable of calculating a performance index based on the comparison of recipe information obtained from the data storage unit to sensed data received from the kitchen device.

Brief Description of Drawings

[024] Embodiments of the invention will be better understood and readily apparent to one of ordinary skill in the art from the following written description, by way of example only, and in conjunction with the drawings, in which:

[025] Figure 1A is a schematic block diagram illustrating a food or beverage preparation system according to an example embodiment.

[026] Figure 1B is a schematic block diagram illustrating an example implementation of the food or beverage preparation system of Figure 1A.

[027] Figure 2 is a schematic block diagram illustrating a top plan view of a kitchen station incorporating the food or beverage preparation system of Figure 1A.

[028] Figure 3A is a schematic block diagram illustrating a dispenser suitable for use in the food or beverage preparation system of Figure 1A according to an example embodiment.

[029] Figure 3B is a schematic diagram illustrating an example implementation of the electronically controlled container 122 of Figure 3A.

[030] Figure 4 is a flow chart illustrating a food or beverage preparation method according to an example embodiment.

[031] Figure 5 is a schematic block diagram illustrating a computing device suitable for implementing the example embodiments.

Description of Embodiments

[032] Embodiments of the present invention provide systems, methods and devices which can be used in food or beverage preparation, including processing and monitoring of orders, for example, in an F&B outlet. In particular, these systems, methods and devices can be used in instances where there are a large number of different food or beverage items to prepare that may require different ingredients to be added in specific portions and weights, including liquids contained in bottles, such as dressings or sauces, that need to be dispensed accurately. For brevity, examples may be provided in connection with food preparation; however, it will be understood that the systems, methods and devices disclosed herein can be used for beverage preparation.

[033] Figure 1A is a schematic diagram illustrating a food or beverage preparation system 100 according to an example embodiment. The system 100 includes a controller unit 10, a kitchen device 20, such as a chopping block, a dispenser or a scale, etc., communicatively coupled with the controller unit 10, and a data storage unit 30 communicatively coupled with the controller unit 10. The data storage unit 30 stores a plurality of food or beverage recipes. At least one ingredient or one step of the recipes is prepared at the kitchen device 20. The controller unit 10 is configured to obtain recipe information from the data storage unit 30 and to communicate the recipe information to the kitchen device 20. The controller unit 10 is further configured to compare the recipe information obtained from the data storage unit 30 to sensed data received from the kitchen device 20. The kitchen device 20 is configured to sense whether a quantity of an ingredient of a recipe is within a predetermined range specific to the recipe received from the controller unit 10. Preferably, a rules database 40 is also communicatively coupled with the controller unit 10 to provide the rules for determining the acceptable range of the respective ingredient. In some implementations, the controller unit 10, kitchen device 20 and data storage unit 30 may be packaged as a kit.

[034] Some portions of the description which follows are explicitly or implicitly presented in terms of algorithms and functional or symbolic representations of operations on data within a computer memory. These algorithmic descriptions and functional or symbolic representations are the means used by those skilled in the data processing arts to convey most effectively the substance of their work to others skilled in the art. An algorithm is here, and generally, conceived to be a self-consistent sequence of steps leading to a desired result. The steps are those requiring physical manipulations of physical quantities, such as electrical, magnetic or optical signals capable of being stored, transferred, combined, compared, and otherwise manipulated.

[035] Unless specifically stated otherwise, and as apparent from the following, it will be appreciated that throughout the present specification, discussions utilizing terms such as “scanning”, “calculating”, “determining”, “replacing”, “generating”, “initializing”, “outputting”, or the like, refer to the action and processes of a computer system, or similar electronic device, that manipulates and transforms data represented as physical quantities within the computer system into other data similarly represented as physical quantities within the computer system or other information storage, transmission or display devices. The term “intelligent” may be used in the present specification (e.g. intelligent chopping block, intelligent scale, etc.). In this context, the term “intelligent” refers to a device having its own computing capability. Such devices may be electronically controllable, or incorporate artificial intelligence in their programming to provide some degree of autonomy.

[036] The present specification also discloses apparatus for performing the operations of the methods disclosed herein. Such apparatus may be specially constructed for the required purposes, or may comprise a general purpose computer or other device selectively activated or reconfigured by a computer program stored in the computer. The algorithms and displays presented herein are not inherently related to any particular computer or other apparatus. Various general purpose machines may be used with programs in accordance with the teachings herein. Alternatively, the construction of more specialized apparatus to perform the required method steps may be appropriate. The structure of a conventional general purpose computer will appear from the description below.

[037] In addition, the present specification also implicitly discloses a computer program, in that it would be apparent to the person skilled in the art that the individual steps of the method described herein may be put into effect by computer code. The computer program is not intended to be limited to any particular programming language and implementation thereof. It will be appreciated that a variety of programming languages and coding thereof may be used to implement the teachings of the disclosure contained herein. Moreover, the computer program is not intended to be limited to any particular control flow. There are many other variants of the computer program, which can use different control flows without departing from the spirit or scope of the invention.

[038] Furthermore, one or more of the steps of the computer program may be performed in parallel rather than sequentially. Such a computer program may be stored on any computer readable medium. The computer readable medium may include storage devices such as magnetic or optical disks, memory chips, or other storage devices suitable for interfacing with a

general purpose computer. The computer readable medium may also include a hard-wired medium such as exemplified in the Internet system, or wireless medium such as exemplified in the GSM, GPRS, 3G or 4G mobile telephone systems, as well as other wireless systems such as Bluetooth, ZigBee, Wi-Fi. The computer program when loaded and executed on such a general-purpose computer effectively results in an apparatus that implements the steps of the preferred method.

[039] The present invention may also be implemented as hardware modules. More particularly, in the hardware sense, a module is a functional hardware unit designed for use with other components or modules. For example, a module may be implemented using discrete electronic components, or it can form a portion of an entire electronic circuit such as an Application Specific Integrated Circuit (ASIC) or Field Programmable Gate Array (FPGA). Numerous other possibilities exist. Those skilled in the art will appreciate that the system can also be implemented as a combination of hardware and software modules.

[040] Figure 1B is a schematic block diagram illustrating an example implementation of the food or beverage preparation system 100 of Figure 1A. Figure 2 is a schematic block diagram illustrating a top plan view of a kitchen station incorporating the food or beverage preparation system 100 of Figure 1A. The various components can be physically implemented in a number of ways dependent upon e.g. the setup and requirements of the food preparation methods, space available and needs of each F&B outlet, etc.

[041] With reference to Figure 1B, the system 100 includes one or more kitchen devices (in the form of an electronic scale 101, a dispenser 102 and a chopping block 103), a rules database (in the form of an expert system 104 and/or rules/constraints/requirements 105), interface devices (in the form of a user interface 106 and a display device 107 which is also capable of auditory feedback), a data storage unit 108, and support modules (in the form of an inventory management module 109, an enterprise resource planning (ERP) module 110 and an order tracking module 111), each communicatively coupled with a controller unit in the form of a processing module 112. While three kitchen devices are shown in Figure 1B, it will be appreciated that fewer or more devices may be used in a particular kitchen setting.

[042] The expert system 104 may be configured as a rule-based decision system with artificial intelligence in order to emulate the decision-making ability of a human expert. The expert system 104 may be designed to solve complex problems by reasoning about knowledge, represented primarily as "if-else" rules rather than through conventional procedural code. A basic form may include a rule engine coupled with a knowledge base of scenarios. The expert system 104 may contain business and/or recipe logic and may also be capable of machine

learning. In an implementation, a model may be built based on suitable inputs (e.g. a recipe with an ingredient list and food preparation methods) so that the expert system 104 can be trained to make predictions and/or decisions, rather than following the “if-else” rules mentioned above. In this manner, the expert system 104 seeks to provide a uniform and consistent end product.

[043] Typically, an order is received via the order tracking module 111 which is linked to other systems and devices within the restaurant or F&B outlet that handle and dispatch orders, or via the user interface 106 whereby a user (shown as 202 in Figure 2) of the system 100 selects a recipe to be made. Information regarding the steps and ingredients specific to the recipe is then displayed via the display device 107 (shown as 205 in Figure 2) and audio prompts may also be provided. The user 202 then goes about following the recipe.

[044] In an embodiment where the electronic scale 101 is used, the user 202 may place a bowl (not shown) on the electronic scale 101 (shown as 204 in Figure 2). The electronic scale 101 may be stand-alone or located within the chopping block 103 (shown as 203 in Figure 2). The system 100 then instructs the user 202 to add a particular ingredient to the bowl. As the user 202 adds this individual ingredient to the bowl, the electronic scale 101 is able to sense the change of weight from the empty state, determine the quantity of the ingredient that has been deposited into the bowl, and report the data to the processing module 112. The processing module 112 can also query and obtain the data from the electronic scale 101. Using recipe information from the data storage unit 108, the processing module 112 is able to alert the user 202, e.g. via the display device 107, when to stop adding the ingredient and to provide live (i.e. dynamic) updates as the weight approaches or exceeds the correct quantity specific to the recipe. For example, a ‘healthy’ recipe of a dish may have a greater quantity of a vegetable and a smaller quantity of oil compared to a ‘regular’ recipe. The processing module 112 may also provide an audio signal or tactile feedback to be transmitted/outputted via the display device 107 or user interface 106, respectively. Alternatively, once the user 202 has added the individual ingredient, the processing module 112 can automatically determine whether the addition is complete by waiting for the scale reading to stabilize and checking whether the scale reading is within allowable tolerances of accuracy (i.e. within a predetermined range) specific to the recipe. Such allowable tolerances may be specified by the expert system 104 and/or any rules or constraints 105, collectively referred to as the rules database. For example, if an ingredient has a strong taste, the correct quantity of that ingredient has a relatively narrow range, so that the taste of the final food product does not vary significantly between different orders. In other words, both the absolute quantity of the ingredient and the allowable quantity range are specific to the recipe. The recipe may also specify substitutes for each ingredient as well as permissible combinations of substitutes in the event that multiple ingredients are not available.

[045] If the amount measured by the electronic scale 101 is in excess or shortfall beyond acceptable bounds, the processing module 112 may prompt the user 202 to take corrective action and deny (i.e. block) any further action until this has been done. For example, the processing module 112 may send an instruction to block a next step or next ingredient of the recipe. Alternately, the user 202 may use the user interface 106 to go to the next step or override the processing module 112 if needed. Such user interface 106 may be in the form of a touch screen, a foot switch, a hand gesture sensor, or other switches or touch interfaces communicatively coupled with the processing module 112 and located for access by the user 202.

[046] In another embodiment, for example, in some recipes where chopping with a knife may be required, the chopping block 103 is used as the kitchen device. The chopping block 103 (shown as 203 in Figure 2) contains an integrated scale and a plurality of accelerometers and/or strain gauges and/or load cells which can sense the force applied and the number of and location of the chops through, for example, triangulation of the magnitude of the acceleration. The processing module 112 is then able to determine if this step has been completed and if insufficient or excessive amount of processing has been done.

[047] In another embodiment, for example, in instances where smaller amounts of ingredients need to be added with greater accuracy than available through the electronic scale 101, the dispenser 102 (shown as 201 in Figure 2) is used as the kitchen device. Figure 3A shows a schematic block diagram illustrating the dispenser 102 according to an example embodiment. As shown in Figure 3A, the dispenser 102 includes an electronically controlled container 122 and an electronically controlled scale 132. However, it will be appreciated that, in alternate embodiments, the dispenser 102 may include only the container 122 or only the scale 132.

[048] Figure 3B shows a schematic block diagram illustrating an example implementation of the electronically controlled container 122 of Figure 3A. The container 122 may physically take the shape of a receptacle having an open ended top, or having a nozzle or attachment for constricting the flow of the contents. The container 122 includes plurality of measurement sensors (in the form of a flow sensor 301, a pressure sensor 302 and strain gauges 303), a plurality of inertial measurement units or activity sensors (in the form of an accelerometer 304, a gyroscope 305 and a compass 306), a user interface 307, a display unit 308, a data storage unit 309 and a communications unit 310, each communicatively coupled with a processing unit 311.

[049] The flow sensor 301 may be of the form of an optical occlusion sensor utilising a beam of light (which may be inside or outside the visible range of the spectrum) passing across the natural flow path of the contents as the contents are dispensed. The processing unit 311 can calculate the amount of time the contents are being dispensed through the occlusion signal from the flow sensor 301. This information may be combined with inertial measurement data that can be obtained through various algorithms and readings from the accelerometer 304, gyroscope 305 and compass 306 digitally to determine the quantity of the ingredient dispensed from the container 122. Typically, the inertial measurement unit allows for the position and orientation of the electronically controlled container 122 to be determined in 3-dimensional space. An alternate embodiment of the flow sensor 301 may be through the use of a mechanical flow sensor where an impeller or other mechanical device is made to move in a manner that is proportional to the flow of the contents such that through the movement, which can be sensed, the processing unit 311 can determine the flow rate and amount. Other alternate embodiments are also possible including using optical flow analysis wherein successive images are obtained of a flow channel and wherein key markers are tracked between frames to yield the magnitude of translation of the fluid tracked and thereby the flow rate. A further embodiment may utilize a chamber of a known quantity wherein the contents of the electronically controlled container 122 first fill this chamber. Sensors or a mechanical mechanism may be included in the chamber that may be able to detect or otherwise sense that the chamber has reached capacity before subsequently discharging the contents of only the chamber for use. As the chamber is of a known volume, fixed quantities can be metered out. A plurality of such chambers may be used for dispensing different volumes. Alternatively, adjustment means may be included in a relatively larger chamber to control a relatively smaller volume to be dispensed.

[050] The pressure sensor 302 can be used to measure the pressure within the electronically controlled container 122 when liquids are dispensed, as the pressure applied by the user may alter the properties of the flow sensor 301, and the pressure sensor 302 readings may provide means to improve the accuracy of the flow sensor 301 readings. The flow rate may be computed through lookup tables comprising pressure readings and the time duration the pressure is altered as well as the time the electronically controlled container 122 is inverted.

[051] Alternatively or additionally, a plurality of strain gauges 303 can be used to sense the deformation of the electronically controlled container 122 if it is made of flexible material. The strain gauges 303 can also be used to construct a load cell in the base of the electronically controlled container 122 such that the electronically controlled container 122 is able to weigh itself when it is set down on a surface. This allows the amount of contents dispensed per cycle to be calculated by the processing unit 311. The result can be combined with the information

obtained and calculated from the other sensors to provide a more accurate reading of the amount of contents used.

[052] In another embodiment of the electronically controlled container 122, the electronically controlled container 122 may be configured to dispense its contents without the user having to significantly alter its orientation in 3-dimensional space. One example involves suspending the container 122 overhead from which its contents may be dispensed by way of gravity. In another example, the container 122 may have a mechanical (or electromechanical) mechanism or actuator that can discharge the contents of the electronically controlled container 122 in response to an action, movement or gesture.

[053] The ingredient quantity information and information from the various sensors can be stored in the data storage unit 309 and communicated via the communications unit 310 to the processing module 112 (Figure 1B) such that the processing module 112 is able to obtain accurate information on the amount of ingredient used. The processing module 112 is also optionally able to determine information such as the time taken to dispense the ingredient, the manner or gesture of the user used to do so, which can be obtained through the inertial measurement unit readings. The electronically controlled container 122 may communicate through the communications unit 310 with the processing module 112 by various wired or wireless means, such as infrared coded pulses, Bluetooth (or Bluetooth Low Energy), wifi, zigbee, 1-Wire, serial or other suitable communication protocols.

[054] The processing unit 311 may optionally be able to communicate to the user through the user interface 307 and display unit 308 when the correct amount of contents has been deposited. The information may be conveyed to the user through an audio signal, a tactile signal or a visual signal.

[055] It will be appreciated that in alternate embodiments, some, all or none of the features shown in Figure 3B may be present in the electronically controlled container 122, depending on the requirements of the location and business. For example, in certain situations, an electronic scale or a plurality of scales may take the place or compliment the electronically controlled container 122.

[056] In certain embodiments, the second component of the dispenser 102 includes an electronically controlled scale 132 (Figure 3A) that is connected to the processing module 112 (Figure 1B). In one embodiment, a plurality of electronic scales are arranged in a grid-like manner and sized to the area of the bottom of the electronically controlled container 122 (Figure 3A) (or a normal container) such that the electronic scales, and the consequently containers, can

be densely arranged and yet allow each container to be weighed individually by its individual electronic scale. The electronic scale may optionally contain a container presence sensor that can determine if the container is placed upon it. Example presence sensing methods include using an optical luminosity sensor (e.g. using a light dependent resistor), using metal contacts that are bridged when the container is put in place, using a contact switch or other similar methods. In other words, the electronically controlled scale 132 is associated with the electronically controlled container 122 in embodiments where the container 122 is used. When the processing module 112 prompts the user to add an ingredient which may be available in the dispenser 102, the dispenser 102 is able to record the weight of the ingredient in question before the user retrieves the ingredient. After the user has completed using the container 122 and returns the container 122 to the initial position, the processing module 112 is able to calculate the difference and take action accordingly, as described above with reference to Figure 2. Typical actions that may be taken by the processing module 112 include storing the received data, calculating incentives and alerting the user if the dispensed ingredient quantity is in excess or shortfall, amongst others. The container presence sensor can be used to improve the accuracy of the processing module 112 and provide the capability to tare the electronic scale 132 to preserve accuracy in cases where other foreign bodies may have attached themselves to the electronic scale 132 thus altering the zero weight.

[057] In another embodiment of the electronic scale 132, instead of using a plurality of electronic scales, a single scale is used. For example, the single scale is disposed below an array or grid of multiple container-receiving pads, each provided with a container presence sensor. Jigs may be provided to ensure that the various containers are only placed at such specific container-receiving pads where such sensors are located. In this embodiment, there is only one single weight reading from the single scale; however, by using the container presence sensor, it is possible to determine which container is being accessed and still calculate the difference, e.g. before and after that container is accessed, to obtain the amount used.

[058] In addition to the actions described above with respect to the ingredient quantity, the processing module 112 is also able to update the inventory management module 109 (Figure 2) and ERP module 110 with the amount of ingredient used for analysis and supplier and inventory management purposes. Furthermore, as the user steps through various individual ingredients, the processing module 112 can keep track of key performance metrics such as time taken to complete the addition of each ingredient, the accuracy of the addition of each ingredient, and any other metrics that can be sensed or calculated by the processing module 112. Such information and readings are stored in the data storage module 108 (Figure 2) and are available to the processing module 112 to calculate any key performance indices (KPIs). Together with

the KPIs calculated at other steps, various incentives can be calculated and displayed in real time to the user via the user interface 106 (Figure 2) to motivate and incentivize the user to operate more optimally and produce a finish product that matches the recipe as closely as possible every time. For example, based on the stored readings by the same user over a number of different orders, the processing module 112 can generate a performance bonus or reward to be given to the user if the dispensed amounts match those in the recipes, or if the time taken to dispense an ingredient accurately is less than a target time, e.g. 99% or 100% of the time.

[059] Figure 4 shows a flow chart 400 illustrating a food or beverage preparation method according to an example embodiment. At step 402, a recipe is selected from a plurality of recipes stored on a data storage unit. At step 404, recipe information of the selected recipe is communicated, through a controller unit communicatively coupled to the data storage unit, to a kitchen device communicatively coupled to the controller unit. At step 406, an ingredient of the selected recipe is prepared. At step 408, a quantity of the ingredient is measured, by the kitchen device, to determine whether the quantity is within a predetermined range specific to the selected recipe.

[060] Figure 5 depicts an exemplary computing device 500, hereinafter interchangeably referred to as a computer system 500, where one or more such computing devices 500 may be used for the controller unit 10, the processing module 112, or the processing unit 311. The following description of the computing device 500 is provided by way of example only and is not intended to be limiting.

[061] As shown in Figure 5, the example computing device 500 includes a processor 504 for executing software routines. Although a single processor is shown for the sake of clarity, the computing device 500 may also include a multi-processor or multi-core system. The processor 504 is connected to a communication infrastructure 506 for communication with other components of the computing device 500. The communication infrastructure 506 may include, for example, a communications bus, cross-bar, or network.

[062] The computing device 500 further includes a main memory 508, such as a random access memory (RAM), and a secondary memory 510. The secondary memory 510 may include, for example, a hard disk drive 512 and/or a removable storage drive 514, which may include a floppy disk drive, a magnetic tape drive, an optical disk drive, or the like. The removable storage drive 514 reads from and/or writes to a removable storage unit 518 in a well-known manner. The removable storage unit 518 may include a floppy disk, magnetic tape, optical disk, or the like, which is read by and written to by removable storage drive 514. As will

be appreciated by persons skilled in the relevant art(s), the removable storage unit 518 includes a computer readable storage medium having stored therein computer executable program code instructions and/or data.

[063] In an alternative implementation, the secondary memory 510 may additionally or alternatively include other similar means for allowing computer programs or other instructions to be loaded into the computing device 500. Such means can include, for example, a removable storage unit 522 and an interface 520. Examples of a removable storage unit 522 and interface 520 include a program cartridge and cartridge interface (such as that found in video game console devices), a removable memory chip (such as an EPROM or PROM) and associated socket, and other removable storage units 522 and interfaces 520 which allow software and data to be transferred from the removable storage unit 522 to the computer system 500.

[064] The computing device 500 also includes at least one communication interface 524. The communication interface 524 allows software and data to be transferred between computing device 500 and external devices via a communication path 526. In various embodiments of the inventions, the communication interface 524 permits data to be transferred between the computing device 500 and a data communication network, such as a public data or private data communication network. The communication interface 524 may be used to exchange data between different computing devices 500 which such computing devices 500 form part an interconnected computer network. Examples of a communication interface 524 can include a modem, a network interface (such as an Ethernet card), a communication port, an antenna with associated circuitry and the like. The communication interface 524 may be wired or may be wireless. Software and data transferred via the communication interface 524 are in the form of signals which can be electronic, electromagnetic, optical or other signals capable of being received by communication interface 524. These signals are provided to the communication interface via the communication path 526.

[065] As shown in Figure 5, the computing device 500 further includes a display interface 502 which performs operations for rendering images to an associated display 530 and an audio interface 532 for performing operations for playing audio content via associated speaker(s) 534.

[066] As used herein, the term "computer program product" may refer, in part, to removable storage unit 518, removable storage unit 522, a hard disk installed in hard disk drive 512, or a carrier wave carrying software over communication path 526 (wireless link or cable) to communication interface 524. Computer readable storage media refers to any non-transitory tangible storage medium that provides recorded instructions and/or data to the computing device

500 for execution and/or processing. Examples of such storage media include floppy disks, magnetic tape, CD-ROM, DVD, Blu-ray™ Disc, a hard disk drive, a ROM or integrated circuit, USB memory, a magneto-optical disk, or a computer readable card such as a PCMCIA card and the like, whether or not such devices are internal or external of the computing device 500. Examples of transitory or non-tangible computer readable transmission media that may also participate in the provision of software, application programs, instructions and/or data to the computing device 500 include radio or infra-red transmission channels as well as a network connection to another computer or networked device, and the Internet or Intranets including e-mail transmissions and information recorded on Websites and the like.

[067] The computer programs (also called computer program code) are stored in main memory 508 and/or secondary memory 510. Computer programs can also be received via the communication interface 524. Such computer programs, when executed, enable the computing device 500 to perform one or more features of embodiments discussed herein. In various embodiments, the computer programs, when executed, enable the processor 504 to perform features of the above-described embodiments. Accordingly, such computer programs represent controllers of the computer system 500.

[068] Software may be stored in a computer program product and loaded into the computing device 500 using the removable storage drive 514, the hard disk drive 512, or the interface 520. Alternatively, the computer program product may be downloaded to the computer system 500 over the communications path 526. The software, when executed by the processor 504, causes the computing device 500 to perform functions of embodiments described herein.

[069] It is to be understood that the embodiment of Figure 5 is presented merely by way of example. Therefore, in some embodiments one or more features of the computing device 500 may be omitted. Also, in some embodiments, one or more features of the computing device 500 may be combined together. Additionally, in some embodiments, one or more features of the computing device 500 may be split into one or more component parts.

[070] It will be appreciated that the elements illustrated in Figure 5 function to provide means for performing the various functions and operations of the controller unit or processing unit as described in the above embodiments.

[071] In an implementation, a server may be generally described as a physical device comprising at least one processor and at least one memory including computer program code.

The at least one memory and the computer program code are configured to, with the at least one processor, cause the physical device to perform the requisite operations.

[072] It will be appreciated by a person skilled in the art that numerous variations and/or modifications may be made to the present invention as shown in the specific embodiments without departing from the spirit or scope of the invention as broadly described. The present embodiments are, therefore, to be considered in all respects to be illustrative and not restrictive.

Claims

1. A food or beverage preparation system, comprising:
 - a controller unit;
 - a kitchen device communicatively coupled with the controller unit;
 - a data storage unit communicatively coupled with the controller unit, the data storage unit storing a plurality of food or beverage recipes; and
 - a display device coupled with the kitchen device and the controller unit,wherein the controller unit is configured to compare recipe information obtained from the data storage unit to sensed data received from the kitchen device;
 - wherein the kitchen device is configured to sense whether a quantity of an ingredient used by a user in a food or beverage order is within a predetermined range specific to the recipe received from the controller unit;
 - wherein the controller unit is further configured to calculate a performance index representative of the user's performance level over a plurality of food or beverage orders based on the comparison of recipe information obtained from the data storage unit to sensed data received from the kitchen device over the plurality of food or beverage orders; and
 - wherein the controller unit is further configured to generate a reward based on the performance index, and wherein the display device is configured to display the reward to the user in real time.
2. The system as claimed in claim 1, wherein the kitchen device comprises at least one of a group consisting of a chopping block, a dispenser and a scale.
3. The system as claimed in claim 1 or 2, further comprising a rules database communicatively coupled with the controller unit, wherein the rules database is configured to provide the predetermined range to the kitchen device through the controller unit.
4. The system as claimed in any one of the preceding claims, wherein the display device is configured to dynamically display the sensed quantity of the ingredient.
5. The system as claimed in any one of the preceding claims, wherein the controller unit is further configured to generate at least one of a visual prompt, an audio prompt and a tactile prompt to prompt the user to stop when the sensed quantity of the ingredient is within the predetermined range specific to the recipe.

6. The system as claimed in claim 4 or 5, wherein the display device is further configured to prompt the user to take a corrective action if the user stops dispensing the ingredient and the sensed quantity of the ingredient is outside the predetermined range

specific to the recipe.

7. The system as claimed in claim 6, wherein the controller unit is configured to communicate an instruction to block a next ingredient of the recipe if the corrective action is not taken.

8. The system as claimed in claim 7, further comprising a user interface device communicatively coupled with the controller unit, the user interface device capable of receiving an input from the user and communicating with the controller unit to unblock the next ingredient.

9. The system as claimed in any one of claims 2 to 8, wherein the dispenser comprises an electronically controlled container.

10. The system as claimed in any one of claims 2 to 9, wherein the dispenser comprises an electronically controlled scale.

11. A food or beverage preparation method comprising the steps of:
selecting a recipe from a plurality of recipes stored on a data storage unit in response to a food or beverage order;
communicating, through a controller unit communicatively coupled to the data storage unit, recipe information of the selected recipe to a kitchen device communicatively coupled to the controller unit;
preparing, by a user, an ingredient of the selected recipe;

determining, by the kitchen device, whether a sensed quantity of the ingredient used by the user is within a predetermined range specific to the selected recipe;

calculating, by the controller unit, a performance index representative of the user's performance level over a plurality of food or beverage orders based on a comparison of the recipe information obtained from the data storage unit to sensed data received from the kitchen device over the plurality of food or beverage orders;

generating, by the controller unit, a reward based on the performance index; and

displaying, via a display device coupled with the kitchen device and the controller unit, the reward to the user in real time.

12. The method as claimed in claim 11, further comprising, before the determining step, a step of providing, from a rules database coupled with the controller unit, the predetermined range to the kitchen device.

13. The method as claimed in claim 11 or 12, further comprising dynamically displaying, via the display device, the sensed quantity of the ingredient.

14. The method as claimed in any one of claims 11 to 13, further comprising generating, by the controller unit, at least one of a visual prompt, an audio prompt and a tactile prompt to prompt a user to stop when the sensed quantity of the ingredient is within the predetermined range specific to the recipe.

15. The method as claimed in claim 14 or 15, further comprising prompting the user, via the display device, to take a corrective action if the user stops dispensing the ingredient and the sensed quantity of the ingredient is outside the predetermined range specific to the recipe.