

measure the location in three dimensional space of retro-reflective markers affixed to or embedded within the surface of the flexible display unit. In another embodiment, movement is tracked through wireless accelerometers embedded into the flexible display surface in lieu of said retro-reflective markers, or deformations are tracked through some fiber optics embedded in the display surface.

**[0022]** One embodiment of the invention is the application of said interaction techniques to flexible displays that resemble paper. In another embodiment, the interaction techniques are applied to any form of polymer or organic light emitting diode-based electronic flexible display technology.

**[0023]** Another embodiment of the invention is the application of said interaction techniques to flexible displays that mimic or otherwise behave as materials other than paper, including but not limited to textiles whether or not worn on the human body, three-dimensional objects, liquids and the likes.

**[0024]** In another embodiment, interaction techniques apply to projection on the skin of live or dead human bodies, the shape of which is sensed via computer vision or embedded accelerometer devices.

**[0025]** Another aspect of the invention is the apparatus for an interactive food or beverage container with a curved display and curved multitouch input device on its surface, and with sensors and computing apparatus inside that drives software functionality rendered on said display.

**[0026]** One aspect of the invention is a set of interaction techniques for manipulating graphical content and functionality displayed on curved displays based on methods for detecting manual or gestural interaction by a user with said display.

**[0027]** Another aspect of the invention is methods of using an interactive food or beverage container, including but not limited to ordering methods, promotions and advertising methods, children's game methods and others.

**[0028]** In one embodiment, the invention relates to electronic beverage container, a modular system of components consisting of, but not limited to, a customizable lid or top, a container/display component, a hardware computer component, and an optional base component that provides power and connectivity. In another embodiment, the invention relates to an apparatus and process for refilling said interactive food or beverage container.

**[0029]** Unless otherwise defined, all technical and scientific terms used herein have the same meaning as commonly understood by one of ordinary skill in the art to which this invention pertains. Although methods and materials similar or equivalent to those described herein can be used in the practice of the present invention, suitable methods and materials are described below. All publications, patent applications, patents, and other references mentioned herein are expressly incorporated by reference in their entirety. In cases of conflict, the present specification, including definitions, will control. In addition, materials, methods, and examples described herein are illustrative only and are not intended to be limiting.

**[0030]** Other features and advantages of the invention will be apparent from and are encompassed by the following detailed description and claims.

#### BRIEF DESCRIPTION OF THE DRAWINGS

**[0031]** The following Detailed Description, given by way of example, but not intended to limit the invention to specific

embodiments described, may be understood in conjunction with the accompanying Figures, incorporated herein by reference, in which:

**[0032]** FIG. 1 shows a Hold Gesture with flexible display surface (1). Note that flexible display surfaces and fingers in FIG. 1 through 10 may include some (hidden) marker(s) (3) according to FIG. 11 or FIG. 12 that have not been included in the drawings for reasons of clarity.

**[0033]** FIG. 2 shows a Collocate Gesture with flexible display surface (1).

**[0034]** FIG. 3 shows a Collate Gesture with flexible display surface (1).

**[0035]** FIG. 4 shows a Flip Gesture, Fold and Half-fold Gestures with flexible display surface (1).

**[0036]** FIG. 5 shows a Roll Gesture with flexible display surface (1) with markers (3).

**[0037]** FIG. 6 shows a Bend Gesture with flexible display surface (1) and foldline (2).

**[0038]** FIG. 7 shows a Rub Gesture with flexible display surface (1).

**[0039]** FIG. 8 shows a Staple Gesture with flexible display surface (1).

**[0040]** FIG. 9 shows a Pointing Gesture with flexible display surface (1).

**[0041]** FIG. 10 shows a Multi-handed Pointing Gesture with flexible display surface (1).

**[0042]** FIG. 11 shows a Flexible display surface (1) with markers (3).

**[0043]** FIG. 12 shows another embodiment of flexible display surface (1) made of fabric or similar materials with markers (3).

**[0044]** FIG. 13 shows a System apparatus for tracking flexible display surface (1) through computer vision cameras emitting infrared light (4) mounted above a workspace with user (7), where markers (3) affixed to flexible display surface (1) reflect infrared light emitted by computer vision cameras (4). Optionally, digital projection system (5) projects images of the modeled flexible display surfaces rendered with textures back onto said flexible display surfaces.

**[0045]** FIG. 14 shows interactive food or beverage container with multi-touch user interface on a curved display 103, with customizable lid 101. Also shown are the non-dominant hand 100 holding the container and the dominant hand 102 interacting with its touch screen.

**[0046]** FIG. 15 shows components of the interactive food or beverage container with customizable lid 201, interactive display/container component 202, computer, network and power component 203 and accessory base 204. Also shown an optional flattened area of the display surface 202 that provides the user with the orientation of said container.

**[0047]** FIG. 16 shows customizable lid design embodiments. The computer, network and power component recognizes the customizable lid placed on the interactive display/container component, and signals the user interface to alter its appearance accordingly. This allows a single interactive display/container component to serve multiple uses and re-uses, such as but not limited to: children's drink bottle 301; hiker's filtration bottle 302; exercise drink bottle 303; theme park bottle 304; or coffee mug 305.

**[0048]** FIG. 17 shows interactive customized form factor embodiments with associated software functionality and/or promotional displays: hiker's filtration bottle 401; exercise drink bottle 402; theme park bottle 403; coffee mug 404; sport info food/beverage container 405; fast food drink bottle 406;