

a feature of the subject. In another aspect, there is disclosed herein a lighting system including lighting means for lighting a subject with an LED lighting unit based on at least one of a desired lighting condition for the subject and a feature of the subject, and camera means for capturing an image of the subject.

[0017] In these various aspects, there may additionally be a non-LED lighting unit. The camera may include a communication facility for communicating with the LED lighting unit. There may be a sensor. The sensor may be integral to the camera, integral to the LED lighting unit, or external to the camera and the lighting unit. The LED lighting unit may be an unfiltered lighting unit, or the LED lighting unit may include a filter. There may be a timer. A feedback system may be associated with the camera to adjust the output of the LED lighting unit to obtain a desired illumination. A spatial control facility may be used.

[0018] The camera may include one or more of a film camera, a digital camera, a mini-camera, a television camera, a motion picture camera, a video camera, a video diskette camera, a still photography camera, a single lens reflex camera, a security camera, a telephoto camera, a point-and-shoot camera, a disposable camera, an underwater camera, a machine vision camera, a proximity detection camera, a large-format camera, a ultraviolet camera, and an infrared camera. The camera may include an optical element selected from the group consisting of a zoom lens, a telephoto lens, a wide-angle lens, a fifty millimeter lens, an array of optical elements, and a digital pixel array.

[0019] Color correction may be applied to balance at least one of a color of illumination of the subject and a color temperature of illumination of the subject. A user input may be included for controlling one or more of saturation of light and hue of light generated by the LED lighting unit. The LED lighting unit may be packaged in an LED package with at least one electronic component located in a submount of the LED package.

[0020] A gray card may be used to calibrate illumination of the subject in situ. A control facility may be used to control the LED lighting unit to simulate a time of day. The time of day may be, for example, morning, noon, or evening.

[0021] A plurality of lighting units may be used. Control signals may be sent to the plurality of lighting units using a serial addressing protocol. A pulsing facility may be used for pulsing the plurality of lighting units at a high current to provide high output for short periods of time. The plurality of lighting units may be arranged to substantially surround the subject.

[0022] A virtual model of the LED lighting unit and the subject may model effects of light from the LED lighting unit on an image of the subject captured by the camera.

[0023] A display may be included for viewing an image of the subject from the camera. There may also be a graphical user interface providing controls for one or more lighting effects in one or more regions of the image. One or more lighting effects may be generated by controlling the LED lighting unit in response to input received from the graphical user interface. Control signals may be generated to the LED lighting unit for color corrections to illumination of the subject in response to user may input of color values and/or intensity values. The manner in which the subject is illumi-

nated with the LED lighting unit may be stored as descriptive information, and may be included with a digital image of the subject captured by the camera.

[0024] The LED lighting unit may be a flash unit. A touch-screen user interface may be provided for controlling the LED lighting unit. A diffuser may diffuse light from the LED lighting unit. The camera may be a disposable camera. The LED lighting unit may include a phosphor for converting the wavelength of light emitted by the lighting units. The LED lighting unit may be a foldable, flexible, flat lighting unit. The LED lighting unit may include one or more high-intensity LEDs.

[0025] The LED lighting unit may include a plurality of LEDs controllable to produce a range of colors and/or a range of intensities. The range of colors may be a range of discrete values. The range of intensities may be a range of discrete values. The plurality of LEDs may include LEDs having at least three different colors.

[0026] It should be appreciated that all combinations of the foregoing concepts and additional concepts discussed in greater detail below are contemplated as being part of the inventive subject matter disclosed herein. In particular, all combinations of claimed subject matter appearing at the end of this disclosure are contemplated as being part of the inventive subject matter disclosed herein.

[0027] The following patents and patent applications are hereby incorporated herein by reference:

[0028] U.S. Pat. No. 6,016,038, issued Jan. 18, 2000, entitled "Multicolored LED Lighting Method and Apparatus;"

[0029] U.S. Pat. No. 6,211,626, issued Apr. 3, 2001 to Lys et al, entitled "Illumination Components;"

[0030] U.S. Pat. No. 6,608,453, issued Aug. 19, 2003, entitled "Methods and Apparatus for Controlling Devices in a Networked Lighting System;"

[0031] U.S. Pat. No. 6,548,967, issued Apr. 15, 2003, entitled "Universal Lighting Network Methods and Systems;"

[0032] U.S. patent application Ser. No. 09/886,958, filed Jun. 21, 2001, entitled Method and Apparatus for Controlling a Lighting System in Response to an Audio Input;"

[0033] U.S. patent application Ser. No. 10/078,221, filed Feb. 19, 2002, entitled "Systems and Methods for Programming Illumination Devices;"

[0034] U.S. patent application Ser. No. 09/344,699, filed Jun. 25, 1999, entitled "Method for Software Driven Generation of Multiple Simultaneous High Speed Pulse Width Modulated Signals;"

[0035] U.S. patent application Ser. No. 09/805,368, filed Mar. 13, 2001, entitled "Light-Emitting Diode Based Products;"

[0036] U.S. patent application Ser. No. 09/716,819, filed Nov. 20, 2000, entitled "Systems and Methods for Generating and Modulating Illumination Conditions;"

[0037] U.S. patent application Ser. No. 09/675,419, filed Sep. 29, 2000, entitled "Systems and Methods for Calibrating Light Output by Light-Emitting Diodes;"