

CLAIMS

1. A system comprising:

a wearable electronic device configured to be worn by a user comprising:

a housing;

at least one imaging sensor associated with the housing;

a data transmission interface for sending data to or receiving data from an external electronic device;

at least one microprocessor for managing the at least one imaging sensor and the data transmission interface; and

a program for acquiring and processing images acquired by the at least one imaging sensor;

a sampling device for collecting a fluid sample in a sample container; and

at least one identification tag attached to or integrally formed with the sampling device or sample container, the at least one identification tag including or being associated with a tracking code,

wherein the program processes an image captured by the at least one imaging sensor to identify the at least one identification tag and to determine the tracking code,

wherein the program confirms that the fluid sample has been collected by processing a series of images of the sample container captured by the at least one imaging sensor to determine when a minimum fluid volume is present in the sample container,

wherein the program transmits a confirmation that a sample was acquired, and the tracking code, to the external electronic device via the data transmission interface,

wherein image capture, image processing, and data transmission are performed automatically without an input or actuation activity by the user, and

wherein the program identifies the at least one identification tag in the image captured by processing the image to locate a positional marker on the sampling device and locating the at least one identification tag based on the position of the positional marker, wherein the positional marker points to the at least one identification tag and triggers the wearable electronic device to begin the image processing of the at least one identification tag,

wherein, after locating the positional marker by processing the image, the program delays the image processing of the at least one identification tag until the positional marker on the sampling device has been within a field of view of the at least one imaging sensor for a predetermined period of time.

2. The system of claim 1, further comprising a display for providing data to the user.

3. The system of claim 1, wherein the sampling device is a vascular access device, phlebotomy set, renal catheter, tissue sampling device, or any combination thereof.

4. The system of claim 3, wherein the vascular access device is a peripheral IV catheter, a PICC line, or a central line.

5. The system of claim 2, wherein the wearable electronic device is a head-worn computer, and wherein the display is a projection prism configured to project a virtual layer to a field of view of the user.

6. The system of claim 5, wherein the virtual layer includes a user interface, the user interface comprising a patient information portion, a sample collection confirmation portion, an identification tag confirmation portion, or any combination thereof.

7. The system of claim 1, wherein the at least one imaging sensor is a digital camera or digital video camera.

8. The system of claim 1, wherein the wearable electronic device further comprises a data storage medium for storing the program, a sample collection confirmation, the tracking code for the sample container, or images captured by the at least one imaging sensor.

9. The system of claim 1, wherein the wearable electronic device includes a peripheral data entry device that allows the user to manually enter data to the wearable electronic device.

10. The system of claim 9, wherein the peripheral data entry device is a motion sensor, gyroscope, pressure sensor, accelerometer, touchpad, touchscreen, or any combination thereof.

11. The system of claim 1, wherein the wearable electronic device further comprises a power supply within the housing of the wearable electronic device.

12. The system of claim 1, wherein the data transmission interface is configured to send data to and receive data from a patient data system.

13. The system of claim 12, wherein information received from the patient data system includes information about a procedure to be performed, information about a type of fluid sampling device to use, information about a volume of fluid sample required, information about a suggested vascular access site, or information about a patient.

14. The system of claim 1, wherein information transmitted to the external electronic device includes the confirmation that the sample was obtained, a time and date that the sample was obtained, information about a location of an injection site, the tracking code for the sampling device, or any combination thereof.

15. The system of claim 1, wherein the at least one identification tag comprises a two-dimensional bar code, a three-dimensional bar code, a near field communication device, or a label having text readable by an optical character recognition algorithm.

16. The system of claim 1, further comprising a patient identification device including or associated with identifying information about a patient, the patient identification device being readable by the at least one imaging sensor of the wearable electronic device.

17. The system of claim 1, further comprising a point-of-care testing device configured to receive a portion of the fluid sample for testing the fluid sample for one or more of the following: chemicals, electrolytes, hematology, blood gas concentrations, coagulation, or cardiac markers.

18. The system of claim 17, wherein the point-of-care testing device is one or more of the following: a test strip, dip stick, immunoassay, glass slide, or diagnostic cartridge.

19. The system of claim 17, wherein the program captures an image of the point-of-care testing device after the point-of-care testing device is exposed to a portion of the fluid sample, and wherein the program processes the image of the point-of-care testing device to determine a result of the point-of-care testing device.

20. The system of claim 17, wherein the point-of-care testing device includes an identification tag including or associated with identifying information for the point-of-care testing device, and wherein the program processes an image of the point-of-care testing device to determine the identifying information.

21. A method for confirming and tracking an acquired fluid sample, the method comprising:

- collecting a fluid sample in a sample collection container of a sampling device;
- acquiring a series of images of the sample collection container, as the fluid sample is being collected, with a wearable electronic device having at least one imaging sensor;
- processing the series of images in real time to determine when a predetermined fluid volume is present in the sample collection container;
- informing a user wearing the wearable electronic device that sample collection is complete when an image showing the sample collection container filled with the predetermined volume of fluid is acquired; and

processing at least one of the series of images to identify and extract information about the sampling device or sample collection container from at least one identification tag affixed to or integrally formed with the sampling device or sample collection container,

wherein processing is performed automatically without an actuation activity by the user,

wherein the processing identifies and extracts the information about the sampling device or sample collection container from the at least one identification tag in the at least one of the series of images by processing the at least one of the series of images to locate a positional marker on the sampling device or sample collection container and locating the at least one identification tag based on the position of the positional marker, wherein the positional marker points to the at least one identification tag and triggers the wearable electronic device to begin processing of the at least one identification tag to identify and extract the information about the sampling device or sample collection container,

wherein, after locating the positional marker by processing the at least one of the series of images, the processing to identify and extract the information about the sampling device or sample collection container from the at least one identification tag in the at least one of the series of images is delayed until the positional marker on the sampling device or sample collection container has been within a field of view captured by the series of images for a predetermined period of time.

22. The method of claim 21, wherein the information extracted from the identification tag includes a tracking code for the sampling device.

23. The method of claim 22, further comprising transmitting a confirmation that a sample was collected, and the tracking code for the sampling device, to an external source via a data transmission interface of the wearable electronic device.

24. The method of claim 21, wherein the wearable electronic device is a head-worn computer including a projection prism configured to project a virtual layer including information and instructions to a field of view of the user.