

[0007] As the visual inspection process continues, images in the image library are progressively replaced in a manner that satisfies (or substantially satisfies) two requirements throughout or substantially through the inspection process: (1) the image library contains a full complement of images (e.g., as soon as the first X images have been generated, if X is a full complement), and (2) the image library contains images distributed across the entire inspected lot (i.e., across the entire portion of the lot that has been inspected so far). In one such embodiment, when an n -th image set is received, every n -th image in the image library is replaced by the n -th image of the n -th image set, with the other images of the image library being left in place. For example, if a full complement is 250 images, all of the first 250 images may be saved. As images 251 through 500 become available, every second image of the saved images is replaced by every second image of images 251 through 500 (e.g., such that image number 252 replaces image number 2, image number 254 replaces image number 4, image number 256 replaces image number 256, and so on). As images 501 through 750 become available, every third image of the saved images is replaced by every third image of images 501 through 750 (e.g., such that image number 503 replaces image number 3, image number 506 replaces image number 256, and on on). This sampling process may repeat until the last set of 250 images (or some portion thereof) is generated, for example, or the process may be modified after the 250th image of the 250th set of images is generated, etc.

[0008] When such a technique is used, the image library provides a good distribution of images after each iteration/pass, and contains a full complement of images at least as soon as the first iteration/pass has finished. Moreover, these useful characteristics are maintained even after many iterations/passes.

[0009] Variations of this technique may also be used. For example, every n -th subset of two or more images in the image library may be replaced (e.g., with each subset corresponding to a different product sample, or a different imager perspective, etc.), rather than replacing every n -th image.

[0009a] According to a first aspect of the present invention, there is a computer-implemented method for sampling images generated by automated imaging equipment, the method comprising:

- receiving a first image set generated by the automated imaging equipment during a first inspection period;
- storing an image library in a memory, the image library initially consisting of the first image set;
- sequentially receiving a plurality of subsequent image sets generated by the automated imaging equipment during a plurality of subsequent inspection periods; and
- updating the image library stored in the memory, wherein
 - updating the image library stored in the memory includes, for each subsequent image set, adding to the image library j images distributed among the subsequent image set and removing from the image library j images distributed among a current instance of the image library, j being an integer greater than zero, and for each successive image set in the plurality of subsequent image sets, j decreases.

[0009b] According to a second aspect of the present invention, there is an automated visual inspection system comprising:
automated imaging equipment comprising one or more imagers and configured to capture images of samples;
a memory; and

one or more processors configured to

- receive a first image set generated by the automated imaging equipment during a first inspection period,
- store an image library in the memory, the image library initially consisting of the first image set,
- sequentially receive a plurality of subsequent image sets generated by the automated imaging equipment during a plurality of subsequent inspection periods, and

update the image library stored in the memory, wherein

- updating the image library stored in the memory includes, for each subsequent image set, adding to the image library j images distributed among the subsequent image set and removing from the library j images distributed among a current instance of the image library, j being an integer greater than zero, and

for each successive image set in the plurality of subsequent image sets, j decreases.

[0009c] According to a third aspect of the present invention, there is one or more non-transitory computer-readable media storing instructions that, when executed by one or more processors, cause the one or more processors to:

- receive a first image set generated by automated imaging equipment during a first inspection period;
- store an image library in a memory, the image library initially consisting of the first image set;
- sequentially receive a plurality of subsequent image sets generated by the automated imaging equipment during a plurality of respective inspection periods; and
- update the image library stored in the memory, wherein
 - updating the image library stored in the memory includes, for each subsequent image set, adding to the image library j images distributed among the subsequent image set and removing from the image library j images distributed among a current instance of the image library, j being an integer greater than zero, and
 - for each successive image set in the plurality of subsequent image sets, j decreases.

BRIEF DESCRIPTION OF THE DRAWINGS

[0010] The skilled artisan will understand that the figures, described herein, are included for purposes of illustration and are not limiting on the present disclosure. The drawings are not necessarily to scale, emphasis instead being placed upon illustrating the principles of the present disclosure. It is to be understood that, in some instances, various aspects of the described implementations may be shown exaggerated or enlarged to facilitate an understanding of the described implementations. In the drawings, like reference characters throughout the various drawings generally refer to functionally similar and/or structurally similar components.

[0011] FIG. 1 is a simplified block diagram of an example automated visual inspection system that may implement the image sampling techniques described herein.

[0012] FIG. 2A is a table showing an example series of successive image sets that may be generated in the automated visual inspection system of FIG. 1.

[0013] FIG. 2B is a table showing an example series of successive image replacement operations for an image library that may be performed when receiving the successive image sets of FIG. 2A.

[0014] FIG. 2C is a table showing an example series of successive contents of the image library when receiving the successive image sets of FIG. 2A and applying the successive image replacement operations of FIG. 2B.

[0015] FIG. 3 is a flow diagram of an example algorithm for sampling images generated by automated imaging equipment.

[0016] FIG. 4 is a flow diagram of an example method for sampling images generated by automated imaging equipment.

DETAILED DESCRIPTION

[0017] The various concepts introduced above and discussed in greater detail below may be implemented in any of numerous ways, and the described concepts are not limited to any particular manner of implementation. Examples of implementations are provided for illustrative purposes.

[0018] FIG. 1 is a simplified block diagram of an example automated visual inspection system 100 that may implement the image sampling techniques described herein. System 100 includes imaging equipment 102, a computer 104 communicatively