It is within this context that embodiments of the present invention arise.

SUMMARY OF INVENTION

According to an aspect of the present invention, there is provided an optical sensor apparatus, comprising: an optically transmissive light guiding structure having planar first, second, and third faces; two or more light sources located outside the light guiding structure adjacent the first face; a photodetector array located outside the light guiding structure adjacent the first face, wherein the light guiding structure, light sources, and photodetector array are configured such that light from the two or more light sources that is totally internally reflected at an optical interface between the light guiding and a sample outside the light guiding structure proximate the second face is reflected at the third face and incident on a portion of the photodetector array that depends on a refractive index of the sample, wherein the two or more light sources are positioned with respect to the light guiding structure and photodetector array such that light from each of the two or more light sources that is totally internally reflected at the interface and reflected at the third face corresponds to a different range of refractive index of the sample and maps to a corresponding portion of the photodetector array.

BRIEF DESCRIPTION OF THE DRAWINGS

The teachings of the present invention can be readily understood by considering the following detailed description in conjunction with the accompanying drawings, in which:

FIG. 1 A is a three-dimensional schematic diagram of an optical sensor apparatus according to an embodiment of the present invention.

FIG. IB is a side-view schematic diagram of an optical sensor apparatus according to an embodiment of the present invention.

FIG. 2 is a three-dimensional graph illustrating a photodetector array signal in an optical apparatus according to an embodiment of the present invention.

FIG. 3A is a side view schematic diagram illustrating an optical sensor apparatus according to an alternative embodiment of the present invention.

FIG. 3B is a side view schematic diagram illustrating an optical sensor apparatus according to another alternative embodiment of the present invention.

DESCRIPTION OF THE SPECIFIC EMBODIMENTS

Although the following detailed description contains many specific details for the purposes of illustration, anyone of ordinary skill in the art will appreciate that many variations and alterations to the following details are within the scope of the invention. Accordingly, the exemplary embodiments of the invention described below are set forth without any loss of generality to, and without imposing limitations upon, the claimed invention.

In the following Detailed Description, reference is made to the accompanying drawings, which form a part hereof, and in which is shown by way of illustration specific embodiments in which the invention may be practiced. In this regard, directional terminology, such as "top," "bottom," "front," "back," "leading," "trailing," etc., may sometimes be used with reference to the orientation of the figure(s) being described. Because components of embodiments of the present invention can be positioned in a number of different orientations, the directional terminology is used for purposes of illustration and is in no way limiting. It is to be understood that other embodiments may be utilized and structural or logical changes may be made without departing from the scope of the present invention. The following