600 depicts light 602 perpendicularly reflected off various positions of a three-dimensional object 604 such as a face and the view 650 depicts light 652 reflected perpendicularly off a flat surface 654. If the camera is looking at the 3D object 604, such as human face, its normal would rapidly change in synchronization with the actual image. In a spoofing attempt, the camera is usually confronted with a curved or flat surface 654 wherein changes in the normal has nothing to do with the image it purports to be. Thus, the difference between the vectors 602 and the vectors 652 demonstrate how normals vary between real 3D scenes and fake 2D scenes. This difference in normals cause dramatic differences in reflected light patterns per the relationship shown in the graph 500 (FIG. 5).

[0041] Referring to FIG. 7, a block diagram 700 depicts a device having a system for liveness detection in accordance with the present embodiments. The system includes a multi-color illumination device 702, a camera 704 and a processor 706. The multi-color illumination device 702 provides illumination in a first direction and the camera 704 acquires images in at least the first direction. The processor 706 is coupled to the multi-color illumination device 702 and the camera 704 and records a first image from the camera 704 when the multi-color illumination device 702 illuminates a face with a first color and records a second image from the camera 704 when the multi-color illumination device 702 illuminates the face with a second color. The liveness detection engine 124 in the processor 706 analyzes a combination of the first and second images to determine if the facial image is consistent with a 3D structure in response to the first and second images and authenticates the facial image if the facial image is consistent with a 3D structure and the facial image matches a user to be authenticated.