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(54) USING PHOTOMETRIC STEREO FOR 3D ENVIRONMENT MODELING

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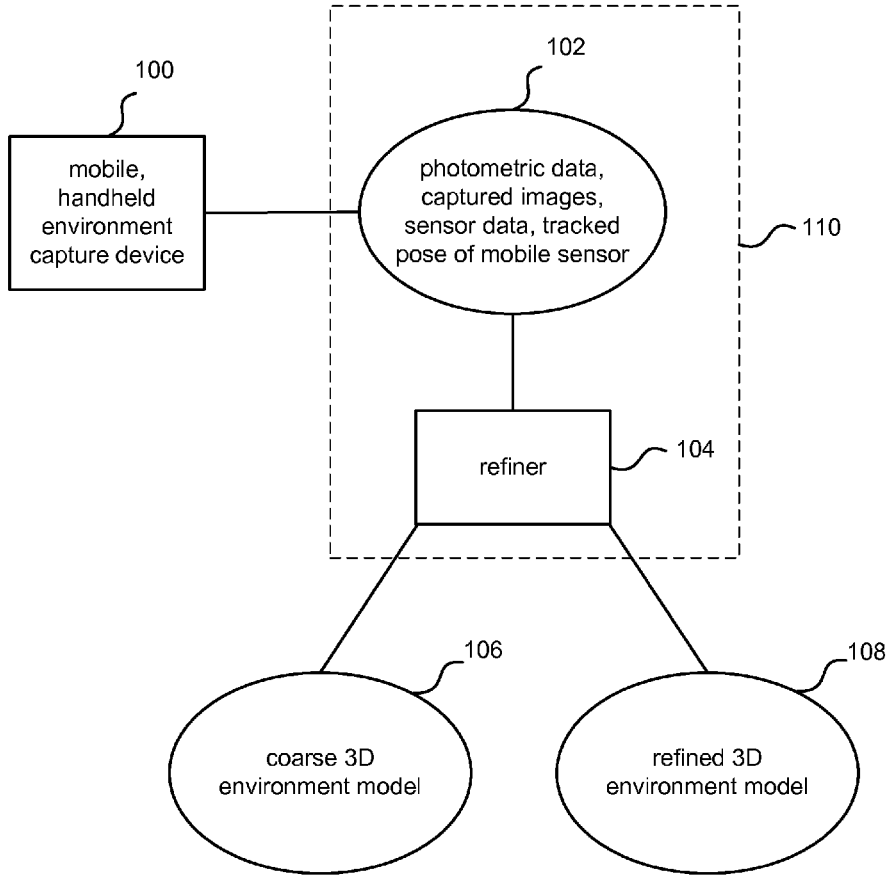
(57) **ABSTRACT**

Detecting material properties such reflectivity, true color and other properties of surfaces in a real world environment is described in various examples using a single hand-held device. For example, the detected material properties are calculated using a photometric stereo system which exploits known relationships between lighting conditions, surface normals, true color and image intensity. In examples, a user moves around in an environment capturing color images of surfaces in the scene from different orientations under known lighting conditions. In various examples, surfaces normals of patches of surfaces are calculated using the captured data to enable fine detail such as human hair, netting, textured surfaces to be modeled. In examples, the modeled data is used to render images depicting the scene with realism or to superimpose virtual graphics on the real world in a realistic manner.