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Kalscheur et al.

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(54) **HYBRID MODE ILLUMINATION FOR FACIAL RECOGNITION AUTHENTICATION**

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G06F 21/32	(2013.01)
G06K 9/20	(2006.01)

(52) **U.S. Cl.**

CPC ***G06K 9/00255*** (2013.01); ***G06F 21/32*** (2013.01); ***G06K 9/00288*** (2013.01); ***G06K 9/2036*** (2013.01)

(58) **Field of Classification Search**

CPC G06K 9/00255; G06K 9/2036; G06K 9/00288; G06K 9/2027; G06K 9/2018; G06K 9/6274; G06F 21/32

See application file for complete search history.

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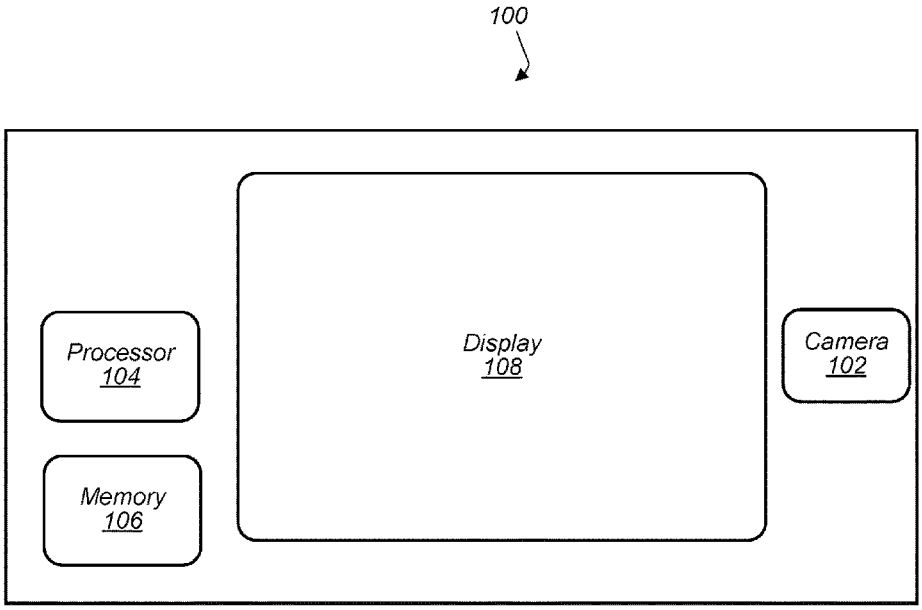
(57) **ABSTRACT**

A facial recognition authentication process may utilize images of a user's face that are captured while the user is being illuminated using both flood infrared illumination and patterned illumination (e.g., speckle pattern illumination). As the user's face is illuminated by both flood infrared illumination and patterned illumination, the captured images may include both flood infrared illumination data and depth map image data. Flood infrared illumination data may be generated from the images to assess two-dimensional features of the user in the captured images. Depth map image data may be generated from the pattern data in the images to assess three-dimensional (depth) features of the user in the captured images. The flood infrared illumination data and the depth map image data may be used separately by facial recognition authentication process to attempt to authenticate the user in the captured images as an authorized user of the device.

20 Claims, 8 Drawing Sheets