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# United States Patent [19]

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Ueno et al.

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[54] **EYE POSITION DETECTING SYSTEM AND METHOD THEREFOR**

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[73] Assignee: **Nissan Motor Company, Ltd., Yokohama, Japan**

[21] Appl. No.: **805,143**

[22] Filed: **Dec. 11, 1991**

[30] **Foreign Application Priority Data**

Dec. 14, 1990 [JP] Japan ..... 2-402512

[51] Int. Cl.<sup>5</sup> ..... **G06K 9/00**

[52] U.S. Cl. .... **382/1; 382/6; 382/48**

[58] Field of Search ..... 351/208, 209, 210; 382/1, 2, 48, 28, 6; 340/575, 576

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### [57] ABSTRACT

The invention detects the position of an eye in image of a driver's face quickly and with high reliability, even if the density of the driver's face image is not uniform on the right and left sides due to direct sunlight. Only one eye detection area is obtained on the dark side of the face image when the density of the face image is not uniform on the right and left sides. One eye window is detected in the one eye detection area, and an iris center is detected within the eye window to discriminate an inattentive driver who is dozing.

9 Claims, 15 Drawing Sheets

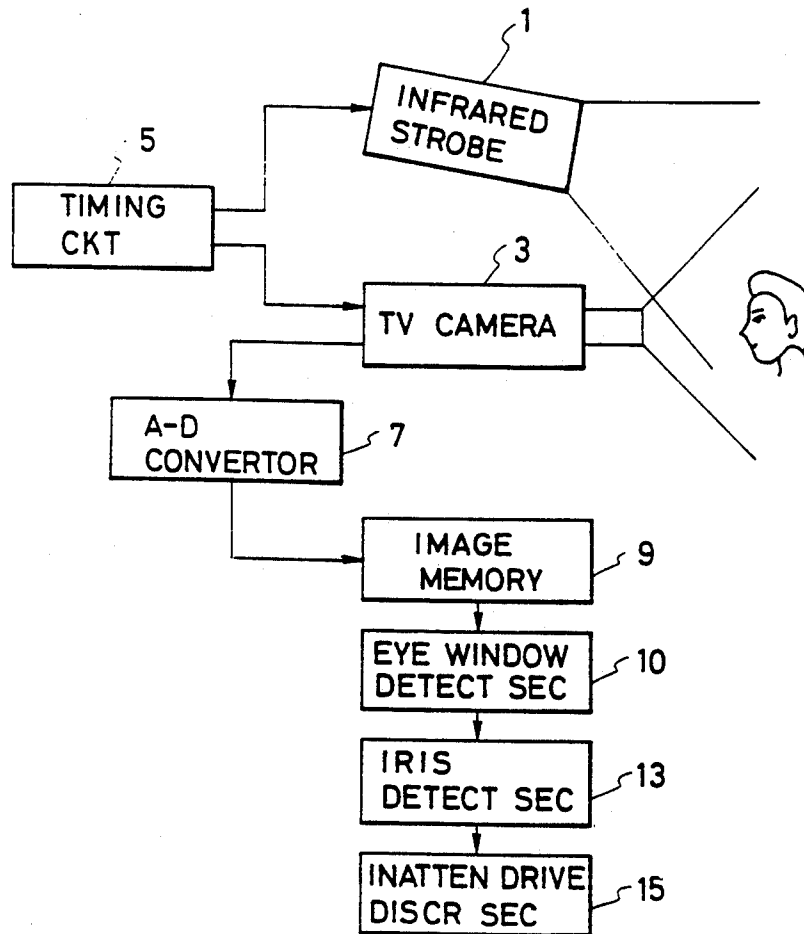


FIG. 1

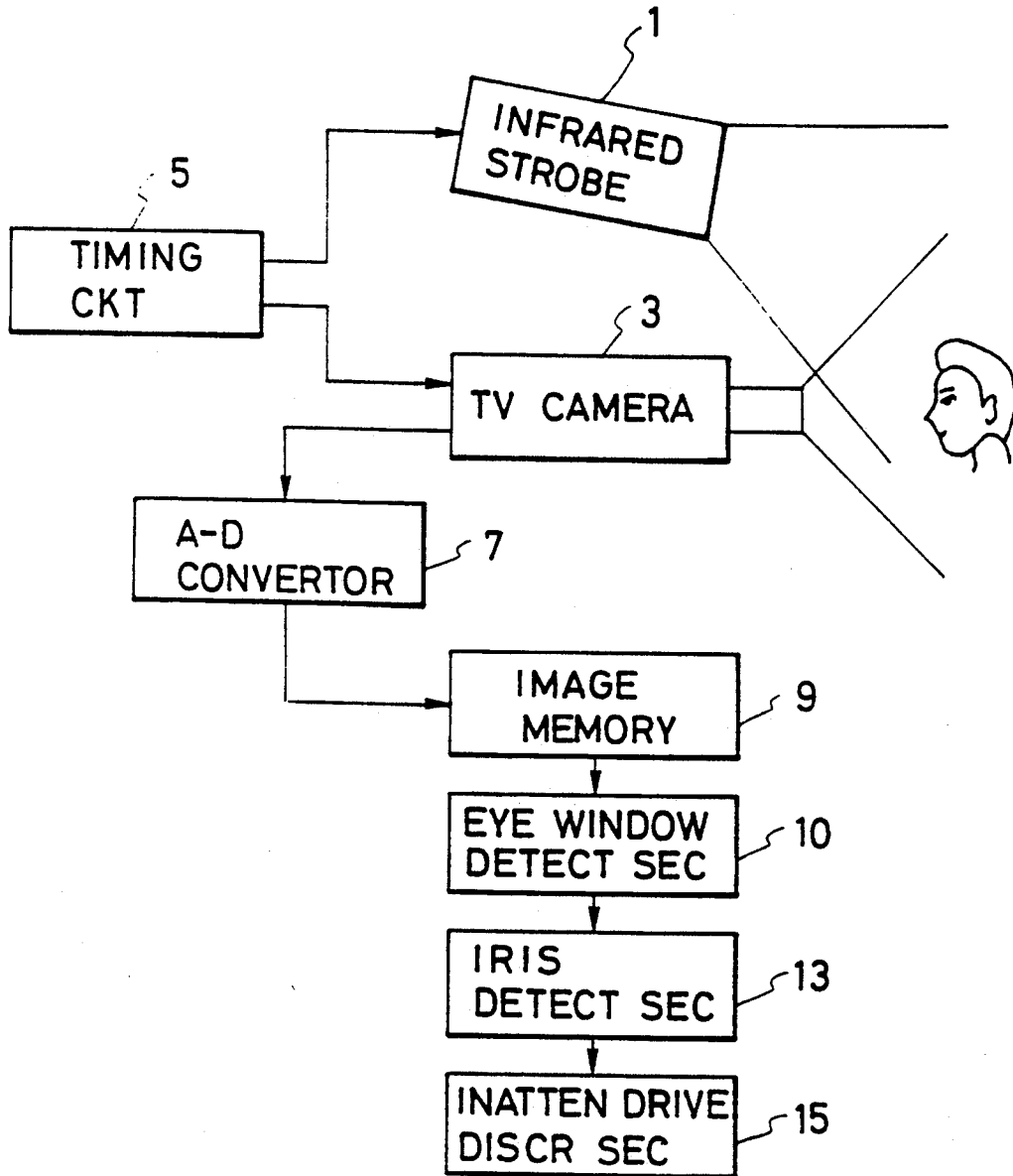


FIG. 2

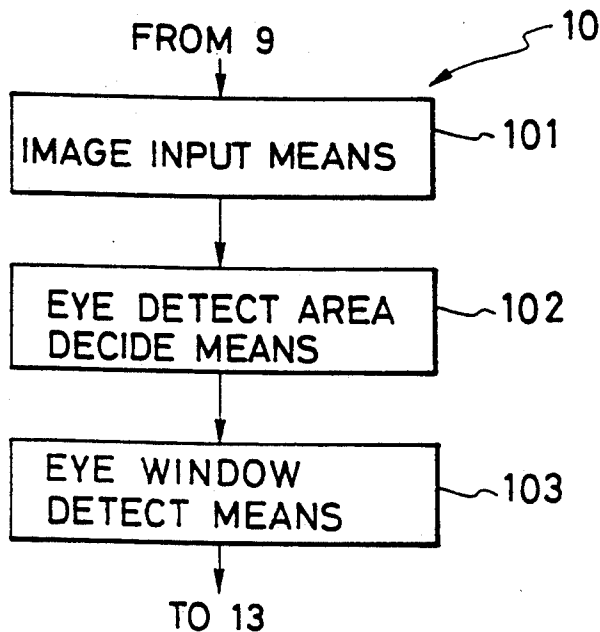


FIG. 2A

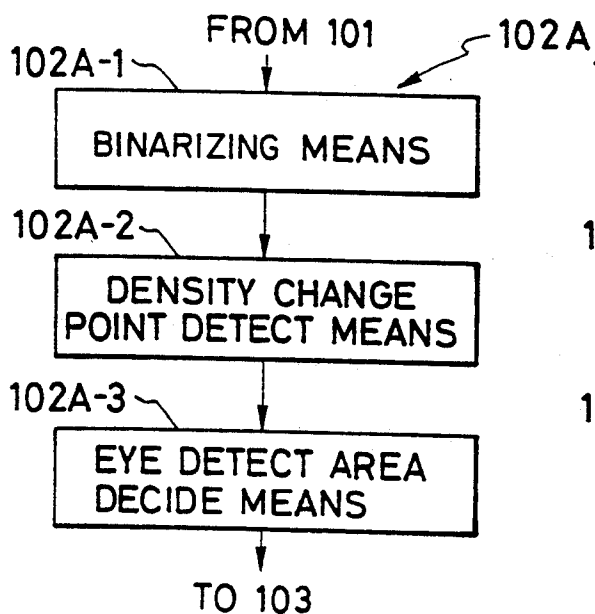


FIG. 2B

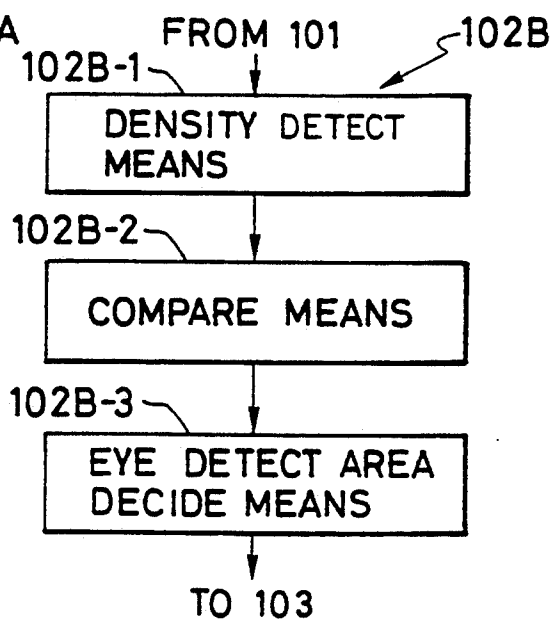


FIG. 3

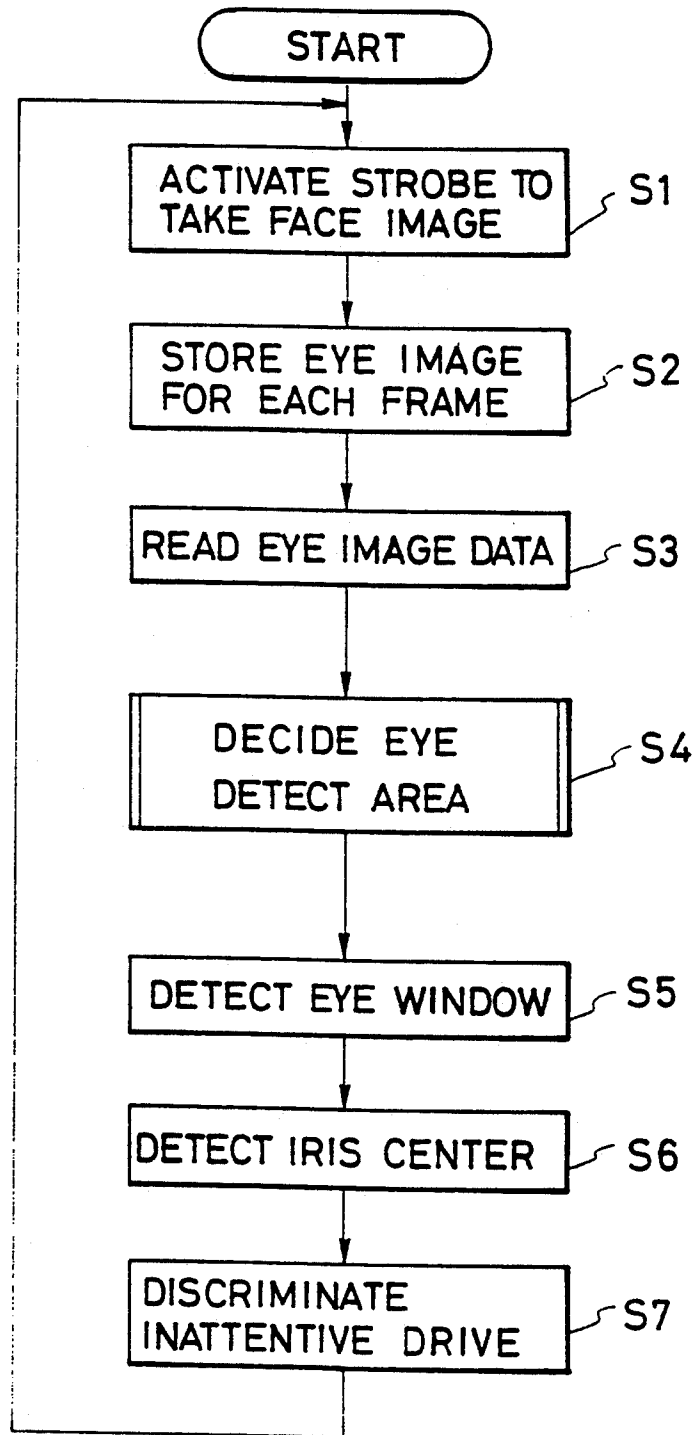


FIG. 3A

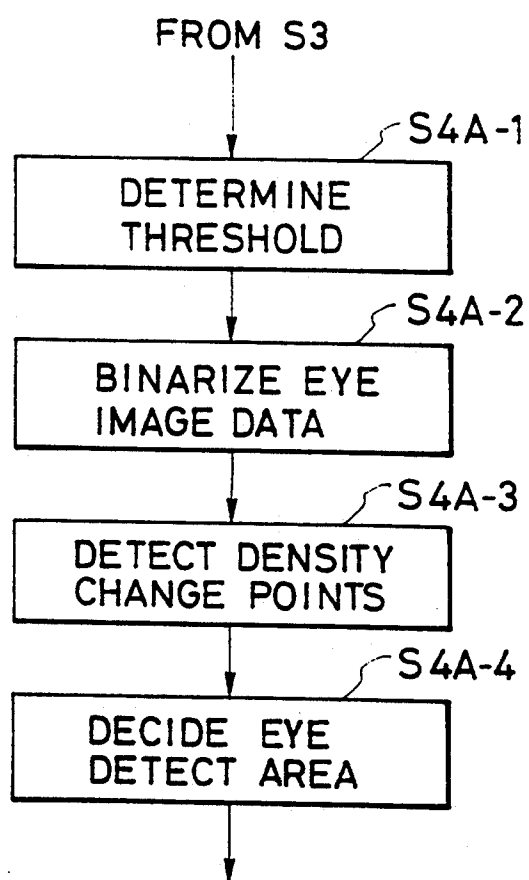
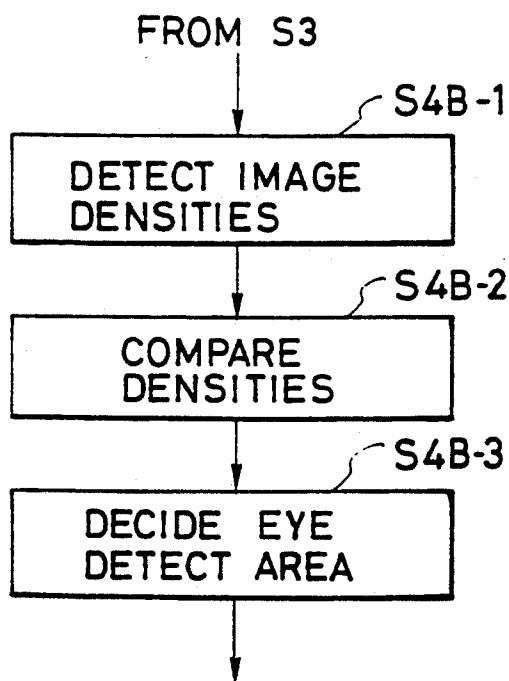


FIG. 3B



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