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[54] SENSORY INTEGRATED DATA INTERFACE

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- [51] Int. Cl.⁶ G09G 5/00; G06F 3/00
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- [58] Field of Search 340/705-707, 340/709, 825.19; 351/210; 381/43; 358/103, 104; 382/2; 434/112; 345/8, 156-158, 169

[56] References Cited

U.S. PATENT DOCUMENTS

4,028,725	6/1977	Lewis	385/104
4,034,401	7/1977	Mann	351/210
4,109,145	8/1978	Graf	340/825.19
4,641,349	2/1987	Flom et al.	382/2
4,659,197	4/1987	Weinblatt	351/210
4,702,575	10/1987	Breglia	351/210
4,768,088	8/1988	Ando	351/210
4,852,988	8/1989	Velez et al.	351/210
4,884,219	11/1989	Waldren	364/514
4,916,441	4/1990	Gombrich	345/169
4,934,773	6/1990	Becker	350/6.6
4,961,177	10/1990	Uchara	381/43
4,973,149	11/1990	Hutchinson	351/210
4,984,179	1/1991	Waldern	364/514
4,993,068	2/1991	Piosenka et al.	382/2
5,003,300	3/1991	Wells	340/705
5,133,011	7/1992	McKiel, Jr.	381/43

FOREIGN PATENT DOCUMENTS

353459A1 2/1990 European Pat. Off.

454363A2 10/1991 European Pat. Off.
WO 87/07497 12/1987 WIPO
WO 91/17522 11/1991 WIPO

OTHER PUBLICATIONS

- M.L. Wolbarsht et al., "Testing Visual Capabilities for Medical Surveillance or to Ensure Job Fitness", *Journal of Occupational Medicine*, vol. 27, No. 12, Dec. 1985, pp. 897-901.
- Park Engineering Associates, "CompCap—Wearable Computer Systems", date is prior to Jan. 10, 1992.
- R.J. Leigh et al., "The Diagnostic Value of Abnormal Eye Movements: A Pathophysiological Approach", *The John Hopkins Medical Journal*, vol. 151, pp. 122-135, (1982).
- J.D. Foley et al., "The Art of Natural Graphic Man-Machine Conversation", *Proceedings of the IEEE*, vol. 62, No. 4, Apr. 1974, pp. 462-471.

(List continued on next page.)

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[57] ABSTRACT

A system for interfacing between a user and a computer includes a microvideo display monitor, which may be mounted in a position which is substantially fixed relative to a given eye of the user, and a video input device which obtains an image of the given eye. The video input device is maintained in a fixed spatial relationship with the microvideo display monitor. From the image of the user's eye obtained by the video input device, the location on the display on which this eye is focused may be determined. A computer which controls the generation of selected displays on the microvideo display monitor responds to the eye focus location to perform predetermined functions. A voice or speech recognition unit may also be used to provide inputs to the computer. The computer may then perform predetermined functions in response to any combination of speech, and eye location data. The system may also be used for identification of the user and to determine whether the user is impaired.

14 Claims, 4 Drawing Sheets

