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Eskridge et al.

(54) USER DISPLAY PROVIDING OBSTACLE AVOIDANCE

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(58) Field of Classification Search None

See application file for complete search history.

(56) References Cited

U.S. PATENT DOCUMENTS

2003/0216834 A1	* 11/2003	Allard	B25J 9/1689
2005/0073433 A1	* 4/2005	Gunderson	700/245 B60Q 9/006 340/903

OTHER PUBLICATIONS

Borenstein et al., "Real-time Obstacle Avoidance for Fast Mobile Robots in Cluttered Environments," Reprint of Proceedings of the 1990 IEEE International Conference on Robotics and Automation, Cincinnati, Ohio, May 13-28, 1990, pp. 572-577.*

* cited by examiner

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(57) ABSTRACT

A visual display for use by a user for navigation and obstacle avoidance. A typical user employs the invention in operating a vehicle. The display may include a conventional video feed. A visual arch metaphor is also provided. If used in conjunction with a video feed, the arch metaphor preferably extends from the left side of the video, over the top of the video, and on to the right side of the video. The ranging data is then correlated to a predefined color scale. The ranging data is also correlated to a position on the arch metaphor.

7 Claims, 26 Drawing Sheets

