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(54) **DISPLAY FOR COMPUTER-AIDED DIAGNOSIS OF MAMMOGRAMS**

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See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

5,627,907	A	*	5/1997	Gur et al. 382/132
5,729,620	A		3/1998	Wang
5,815,591	A		9/1998	Roehrig et al.
5,828,774	A		10/1998	Wang
5,832,103	A	*	11/1998	Giger et al. 382/130
5,854,851	A		12/1998	Bamberger et al.
5,970,164	A		10/1999	Bamberger et al.
6,058,322	A	*	5/2000	Nishikawa et al. 600/408
6,075,878	A	*	6/2000	Yoshida et al. 382/132
6,075,879	A		6/2000	Roehrig et al.
6,198,838	B1	*	3/2001	Roehrig et al. 382/132
6,266,435	B1		7/2001	Wang
6,282,305	B1	*	8/2001	Huo et al. 382/128

(Continued)

OTHER PUBLICATIONS

Baoyu Zheng et al., Digital Mammography : Mixed Feature Neural Network with Spectral Entropy Decision for Detection of Microcalcifications, I.E.E.E. Transactions on Medical Imaging, vol. 15, pp. 589-597, Oct. 1996.*

(Continued)

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(57) **ABSTRACT**

A method for displaying a computer-generated determination of the likelihood of malignancy in a mammogram lesion. The method requires providing a digitized image of a mammogram, displaying the digitized image, and selecting a region of interest directly on the displayed digitized image. The digitized image is then processed so that classifier data of the lesion in the user-selected region of interest are generated and displayed. A system for displaying a determination of the likelihood of malignancy in a mammogram lesion. The system includes a display for presenting a digitized mammogram and an input device in communication with the display for selectably indicating a region of interest on the displayed mammogram. The system also includes a processor for generating classifier data related to a characterization feature within the region of interest. The classifier data is presented on the display.

31 Claims, 7 Drawing Sheets