US006033076A

United States Patent [19]

Braeuning et al.

[11] **Patent Number: 6,033,076**

[45] **Date of Patent: *Mar. 7, 2000**

[54] **VISUAL FIELD TESTING VIA TELEMEDICINE**

[75] Inventors: **Johannes Braeuning**, Ostfildern; **Stefan Schueller**, Petershagen, both of Germany; **Dariusz Wroblewski**; **Richard J. McClure**, both of San Diego, Calif.; **R. Kemp Massengill**, Leucadia, Calif.

[73] Assignees: **Virtual-Eye.com, Inc.**, Leucadia; **Orincon Corp.**, San Diego, both of Calif.

[*] Notice: This patent is subject to a terminal disclaimer.

[21] Appl. No.: **09/203,729**

[22] Filed: **Dec. 2, 1998**

Related U.S. Application Data

[63] Continuation-in-part of application No. 09/179,112, Oct. 26, 1998, which is a continuation-in-part of application No. 08/864,331, May 28, 1997, Pat. No. 5,898,474, which is a continuation of application No. 08/700,754, Jul. 31, 1996, Pat. No. 5,864,384

[60] Provisional application No. 60/067,521, Dec. 4, 1997, provisional application No. 60/089,817, Jun. 19, 1998, and provisional application No. 60/090,214, Jun. 22, 1998.

[51] **Int. Cl.**[7] **A61B 3/02**

[52] **U.S. Cl.** **351/224**; 351/246

[58] **Field of Search** 351/222, 224, 351/226, 246

[56] **References Cited**

U.S. PATENT DOCUMENTS

5,061,059	10/1991	Horn	351/223
5,325,136	6/1994	Salibello et al.	351/243
5,565,949	10/1996	Kasha, Jr.	351/224
5,758,651	6/1998	Nygard et al.	128/741
5,867,494	2/1999	Krishnaswamy et al.	370/352

FOREIGN PATENT DOCUMENTS

0 850 661	7/1998	European Pat. Off. .
0 856 333	8/1998	European Pat. Off. .
0 857 455	8/1998	European Pat. Off. .

OTHER PUBLICATIONS

Arnold, D. B., The Oculomotor Integrator: Testing of a Neural Network Model; Dec. 1995; Exp Brain Res (1997) 113; pp. 57–74.

Brigatti, Luca; Automatic Detection of Glaucomatous Visual Field Progression with Neural Networks; Jun. 1997; Arch Ophthalmol, vol. 115; pp. 725–728.

Brigatti, L.; Neural Networks to Identify Glaucoma with Structural and Functional Measurements; Nov. 1995; American Journal of Ophthalmology (1996) 121; pp. 511–521.

Gardner, G.; Automatic Detection of Diabetic Retinopathy Using an Artificial Neural Network; A Screening Tool; Jun. 1996; British Journal of Ophthalmology (1996) 80; pp. 940–944.

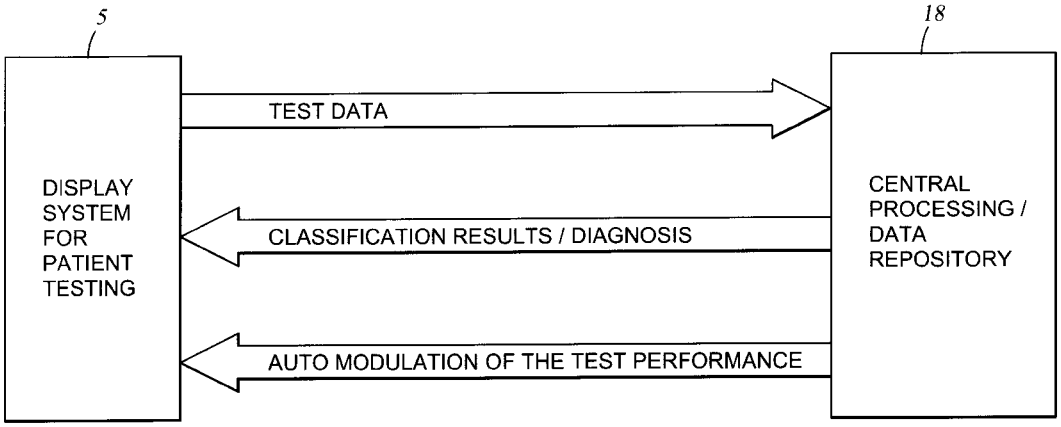
Goldbaum, Michael H.; Interpretation of Automated Perimetry for Glaucoma by Neural Network; Mar. 1994; Investigative Ophthalmology & Visual Science, Aug. 1994, vol. 35, No. 9; pp. 3362–3373.

Levin, Leonard A.; Neural Network Differentation of Optic Neuritis and Anterior Ischaemic Optic Neuropathy; May 1996; British Journal of Ophthalmology (1996)80; pp. 835–839.

(List continued on next page.)

Primary Examiner—Huy Mai
Attorney, Agent, or Firm—Gerald W. Spinks

[57] **ABSTRACT**

A method and an apparatus for the performance and autointerpretation via the Internet, or other telemetric vehicle, of the visual function test parameters obtained during interactive visual field screening utilizing a local display screen. Such interactive testing and instantaneous autointerpretation of visual field performance utilizing a local display screen, via telemedicine, are utilized to screen for glaucoma and other neurological disorders affecting the visual system. Telemedicine, such as via the Internet, allows the system to be employed on a world-wide basis, including areas where physicians are not present.

14 Claims, 2 Drawing Sheets