

emphasizing or de-emphasizing certain aspects of the visual field test to bring out the characteristic features of certain diseased states;

adding noise or measurement uncertainty component(s) which may be associated with a real visual field examination;

any other modification of the visual field test data and their associated classification; and,

simulated data, i.e., data that are constructed to simulate the real-world results of a visual field test for both normal and abnormal visual fields.

The data produced by the testing system are automatically reviewed and correlated with previously-determined patterns recognized to be "normal" or "abnormal," and clinical diagnoses for pathological conditions are thereby suggested. Telemedicine is utilized to receive test data from the patient and to transmit the test interpretation, including the suspected diagnosis, or diagnoses, and recommendations for further clinical correlation or for further ancillary tests. Telemedicine is also employed to monitor interactively and automatically, in real time, the patient's performance of the visual field test.

The content of the software is dictated by the need to provide technically acceptable protocols, such as for examining the field of view and deficiencies thereof, utilizing measurements of thresholds for pattern discrimination, sensitivity to light intensity, or, if desired and available on the patient's display monitor, color. The preferred embodiment includes frequency doubling and noise-field campimetry (both "full field" campimetry, and "focal" noise-field campimetry), as these are very amenable to testing on a display monitor screen. Active feedback sensing can alert the system to patient loss of attention, for notation and reiteration of test stimuli. Individual test points are reiterated when a result is found to be inconsistent with a predetermined norm. Audio feedback stimuli can present a voice, or a tone or series of tones, to monitor the test performance in real-time and to provide interactive feedback. Each eye is tested individually by occluding the non-tested eye.

Specific instructions are given to the patient to establish the proper geometric conditions for test performance, such as the recommended distance from the eyes to the patient's display screen, and head placement relationship thereto. It is important that the dimensions of the patient's display screen be known. These dimensions, as well as the display screen's manufacturer and model number, can be readily transmitted to the central station computer, so that the software can provide necessary viewing distance instructions and other pertinent recommendations. Widening the field of view is easily accomplished by simply decreasing the distance from the patient's eyes to the display monitor.

While the particular invention as herein shown and disclosed in detail is fully capable of obtaining the objects and providing the advantages hereinbefore stated, it is to be understood that this disclosure is merely illustrative of the presently preferred embodiments of the invention and that no limitations are intended other than as described in the appended claims.

We claim:

1. A visual field testing system comprising:

a video display screen for viewing by a patient at a local site;

a computing means located at a site remote from said local site, said remote computing means being programmed to generate visual stimuli for presentation on said local display screen, to monitor a patient's responses to said

visual stimuli, to provide real-time feedback to said responses, and to provide diagnostic information to a patient;

an automatically-trained expert system at said remote site connected to said remote computing means for receiving data on said responses from a patient, for instantaneously interpreting said responses, and for providing interpretation of said responses to said remote computing means; and

a data transmission system between said local and remote sites for transmitting data between said local display screen and said remote computing means.

2. A visual field testing system as recited in claim **1**, wherein said local video display screen comprises a television screen.

3. A visual field testing system as recited in claim **1**, further comprising a computing means at said local site, wherein:

said local video display screen comprises a video monitor connected to said local computing means;

said remote computing means displays said visual stimuli on said video monitor via said local computing means; said patient responses are transmitted to said remote computing means via said local computing means; and said feedback and said diagnostic information are transmitted to a patient via said local computing means.

4. A visual field testing system as recited in claim **1**, wherein said remote automatically-trained expert system comprises a neural network.

5. A visual field testing system as recited in claim **1**, wherein said data transmission system between local and remote sites comprises the internet.

6. A visual field testing system comprising:

a plurality of local computers including video monitors for viewing by patients at a plurality of testing sites;

a response means at each testing site for activation by a patient at said testing site;

a computer at a site remote from said testing sites, said remote computer being programmed to generate visual stimuli via said local computers for presentation on said video monitors, to monitor patients' responses to said visual stimuli, to provide real-time feedback to said responses, and to provide diagnostic information to patients;

a neural network at said remote site connected to said remote computer for receiving data on said responses from a patient, for instantaneously interpreting said responses, and for providing interpretation of said responses to said remote computer; and

a data transmission system between said local testing sites and said remote site for transmitting data between said local computers and said remote computer.

7. A visual field testing system as recited in claim **6**, wherein said local response means comprises a switch for activating an electrical signal.

8. A method for performing visual field testing, said method comprising:

providing a display screen for viewing by a patient at a local site, a response means for activation by a patient at said local site, a computer at a site remote from said local site, an autointerpretation system at said remote site, and a data transmission system between local and remote sites;

generating visual stimuli for presentation on said local display screen;