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SYSTEM AND METHOD FOR DETERMINING VISUAL ALERTNESS

CROSS-REFERENCE TO RELATED APPLICATION

This application claims the benefit of U.S. Provisional Patent Application No. 60/288,925 filed May 7, 2001, naming Michael B. Russo and Saul Santiago as inventors, said provisional application hereby incorporated by reference herein in its entirety.

STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT

The government has certain rights in this invention.

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present application relates, in general, to sleep deprivation.

2. Description of the Related Art

Human beings require a certain minimum amount and/or regularity of sleep to function effectively. Exactly how much sleep an individual needs, and how regularly such sleep should be taken, varies from person to person. However, each individual does tend to have certain minimal sleep requirements, and it is well known in the art that if an individual is deprived of his minimal sleep requirements, at some point the individual will suffer measurable degradation in either or both his mental and physical functioning.

An individual's mental and/or physical degradation that results from sleep deprivation can be severe. For example, recent studies have shown that significantly sleep deprived individuals exhibit the same amount of impairment as legally intoxicated individuals.

Many professions require that individuals go without sleep for extended periods of time and/or engage in highly erratic sleep patterns. For example, long-haul truck drivers and oilfield workers routinely perform their jobs for periods of 18, 24, 36, or 48 hours. As another example, factory workers are often routinely rotated between day shift and night shift, which interrupts such workers' ordinary and normal sleep patterns. As yet another example, military pilots are often called upon to both fly for extended periods without sleep and engage in sleep at very erratic intervals, especially during wartime operations. Those having ordinary skill in the art will recognize that many other examples are possible.

All of the foregoing examples result in sleep deprivation of some type (e.g., either by a deprivation of the amount or required rhythm of sleep). Furthermore, in all of the foregoing examples, the potential consequences associated with sleep deprivation impairment can prove disastrous in terms of truck or automobile accidents, on the job injuries, aircraft accidents, and/or "friendly fire" incidents. This is especially true in light of the relatively recent findings that physical and/or mental impairments resulting from sleep deprivation can prove as bad or worse than significant alcohol induced intoxication.

In light of the foregoing, it is apparent that a need exists for processes and systems which provide for the detection of physical and/or mental impairment arising from sleep deprivation.

BRIEF SUMMARY OF THE INVENTION

The inventors named herein (the "inventors") have devised a process and related system which provide for the

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detection of physical and/or mental impairment arising from sleep deprivation.

In one embodiment, a method is characterized by presenting a first pattern of light during a first interval of time; recording a first-pattern response set; presenting a second pattern of light during a second interval of time; recording a second-pattern response set; and assessing visual alertness in response to the first-pattern response set and the second-pattern response set.

In one embodiment, a related system includes but is not limited to circuitry and/or programming for effecting the foregoing-referenced method embodiment; the circuitry and/or programming can be virtually any combination of hardware, software, and/or firmware configured to effect the foregoing-referenced method embodiment depending upon the design choices of the system designer.

In one embodiment, an apparatus is characterized by a Lateral Visual Field Testing Device having at least one light spaced at least one degree relative to a midsagittal plane of a pre-defined test subject position.

The foregoing is a summary and thus contains, by necessity, simplifications, generalizations and omissions of detail; consequently, those skilled in the art will appreciate that the summary is illustrative only and is NOT intended to be in any way limiting. Other aspects, inventive features, and advantages of the devices and/or processes described herein, as defined solely by the claims, will become apparent in the non-limiting detailed description set forth herein.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING(S)

FIG. 1A shows a top-plan view of a lateral visual field tester (LVFT) device **100**.

FIG. 1B depicts an alternate view of the way the visual field frame of reference is defined.

FIG. 2 depicts a top-plan view which illustrates preferable design features of the LVFT device **100**.

FIG. 3 shows a perspective view of an implementation of the LVFT device **100** in the context of a data processing system **300**, audio-visual recording machinery **302**, and an interface device **304**.

FIG. 4 shows a high-level logic flowchart depicting a process.

FIG. 5 shows an alternate implementation of the process depicted in FIG. 4.

FIG. 6 depicts an alternate implementation of the process shown in FIG. 4.

FIG. 7 shows an alternate implementation of the process depicted in FIG. 4.

FIG. 8 depicts an alternate implementation of the process shown in FIG. 4.

FIG. 9 illustrates an alternate implementation of the process shown in FIG. 4.

FIG. 10 shows an alternate implementation of the process shown in FIG. 9.

The use of the same symbols in different drawings typically indicates similar or identical items.

DETAILED DESCRIPTION OF THE INVENTION

The inventors have discovered that physical and/or mental impairment arising from sleep deprivation may be correlated with visual neglect. That is, the inventors have discovered