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System and Method for Automated High-Resolution Audiometry with Quality Control

AzTE Case # M11-007

Inventors

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Background

The hearing threshold is defined as the lowest sound levels that a listener can detect. Finding accurate hearing threshold is one of the critical parameters in hearing loss diagnosis and hearing aid. However, current methods of testing suffer from various problems. One of the main problems is accuracy. Several contributing factors of inaccuracy have been identified including the long test duration, which exceeds subject's attention span. The amount of experience of the examiner can also affect accuracy. Current systems also need to be frequently calibrated which requires downtime that leads to loss in productivity.

Invention Description

Researchers at Arizona State University have developed an audiometric system that takes less time and automates most of the test activities thereby increasing accuracy and reducing operating cost.

The new system is a computer based system, which can quickly acquire a person's hearing threshold. The system allows for a relatively accurate determination of the hearing sensitivity with less effort from the subject. The responses are correlated with exact sound pressure level measured in the real ear with systematic calibration. Thresholds are determined with a signal detection theory analysis that can assess the validity and accuracy of the measurement. Due to the fast threshold estimate, hearing sensitivity can be measured in higher frequency resolution than currently available techniques. The system promises accurate diagnosis of lesions in the inner ear and auditory system and more appropriate prescribing of hearing aid instruments with high precision.

Intellectual Property Status:

Patent Pending

Potential Applications

- Upgrade current audiometric software systems
- Healthcare physicians
- Ear nose throat centers
- Audiology centers

Benefits and Advantages

- Minimum input from the subject improves efficiency and reduces test duration
- The new system calibrates automatically vs. frequent manual calibration
- Efficient and convenient input method scheme allows for tester's and subject's interaction through the main program using a multipoint input
- Quality control mechanism ensures the quality of the subject's response
- Allows for hearing threshold measurements in high frequency or small frequency spacing
- Significantly improves diagnostic precision and introduces new fitting techniques for hearing aids

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