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Sinusoidal Loudness Estimation

AzTE Case # *M09-118*

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Intellectual Property Status

Patent pending

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Background

In recent years, the proliferation of internet streaming applications has brought about the need for low-bit rate speech and audio coding methods. Several parametric designs such as the sinusoids+transients+noise model have been somewhat successful for speech and audio synthesis. Low-bit rate and streaming applications are restricted by only being able to transmit a limited number of parameters for loudness estimation, resulting in reduced audio quality. Current techniques for selecting relevant parameters are based on either Signal to Mask Ratio (SMR) or loudness patterns. Despite their popularity, an SMR focus has a tendency to neglect perceptually relevant sinusoids, and the loudness focused methods are computationally costly and aren't proficient in delay–critical applications.

Invention Description

Researchers at Arizona State University have created a novel and efficient technique for estimating relevant perceptual quantities like loudness patterns of individual sinusoids. This routine is helpful for accurate parameter selection in low-bit rate speech and audio applications.

Potential Applications

- Speech and Audio applications
  - MPEG-4 HVXC speech coder
  - MPEG-4 HILN audio coder
- Low-Bit Rate applications
  - Digital Audio Broadcasting
  - Internet Streaming
- Volume Control
- Hearing Aid Technologies

Benefits and Advantages

- **90% faster** CPU time for algorithm execution
- **Sufficient computational efficiency for real-time use**
- **Less than 1/2 the loudness error** of common method as number of sinusoidal components selected increases