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of a Fast Infrasonic Spectrum Sensing System Based on Fisher-Statistics Detection Method

Fisher statistics-based signal detection is a widely used powerful multi-sensor infrasound spectrum sensing strategy. However, this method requires the repeated computation of test statistics for each element of a grid of slowness vectors, which imposes a high computational complexity and leads directly to a raised processing time. Since conventional systems often have very stringent speed requirements for real-time surveillance applications, this disadvantage leads a limited application of Fisher detectors (FDs) for several infrasonic sensing purposes. In this presentation, we report a strategy for implementation of FD with reduced time-consumption. This strategy is based on the fact that the detection process for slowness-grid elements can be performed in a parallel manner using powerful graphics processing units (GPUs), in contrast with conventional FDs. The results of our simulations as well as empirical works show that our strategy promises very significant time-savings compared with conventional FDs, which enables it as a good candidate for real-time applications. Accordingly, we have implemented the algorithm in Visual Studio environment to produce a special fast infrasound detection software.

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