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The goal of this work is to develop neural-like cognitive sensory processing within non-neuronal systems. In many applications, stimuli from multiple sources are simultaneously incident upon sensor arrays, creating a composite effect that requires interpretation. The problem is to effectively separate and focus upon significant partials from within the composite sensory excitations. In an effort to formulate applicable computational models, Hopfield-type dynamical system analyses have been embraced to support adaptive optimization constructs. The adaptive constructs produce responses that are based upon comparison of temporal patterns arriving on spatially separate channels. These techniques have been applied to an example sound processing application. Graphical depiction of computational results have been produced. A comprehensive memory-driven structure for adaptive sound processing is being developed. Adaptive beamforming is used as a general paradigm supporting multiple roles in sensory processing. Key elements of the architecture are discussed.

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# NEURAL ATTENTIONAL SENSORY PROCESSING

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## Abstract

The goal of this work is to develop neural-like cognitive sensory processing within non-neuronal systems. In many applications, stimuli from multiple sources are simultaneously incident upon sensor arrays, creating a composite effect that requires interpretation. The problem is to effectively separate and focus upon significant partials from within the composite sensory excitations. In an effort to formulate applicable computational models, Hopfield-type dynamical system analyses have been embraced to support adaptive optimization constructs. The adaptive constructs produce responses that are based upon comparison of temporal patterns arriving on spatially separate channels. These techniques have been applied to an example sound processing application. Graphical depiction of computational results have been produced. A comprehensive memory-driven structure for adaptive sound processing is being developed. Adaptive beamforming is used as a general paradigm supporting multiple roles in sensory processing. Key elements of the architecture are discussed.

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