

A Role For Neural Networks In The Search For Extraterrestrial Intelligence

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The ability of artificial neural networks to perform extremely efficient computation and induction has seen them adopted for many real-time pattern recognition applications. The aim of this paper is to demonstrate how these capabilities could be applied to the real-time analysis of data collected during a SETI radio search. We present the results of an experiment in which a simple recurrent neural network was trained to identify a signal with a non-natural extraterrestrial signature in raw power spectra. The signature that we assumed for this experiment is that of a drifting continuous wave point source transiting an antenna beam, as would be expected in a SETI search similar to Project SERENDIP.

The results of our simulation illustrate the neural network's ability to extract features corresponding to those of the assumed extraterrestrial signal, whilst simultaneously rejecting features produced by noise and radio frequency interference. The network is able to perform this task at lower signal-to-noise ratios than the threshold currently used in Project SERENDIP and hence such a neural network based system would facilitate the analysis of SERENDIP data that would otherwise be discarded.

In light of discussions with the team at Southern SERENDIP, we envisage such a neural network based system being utilised as an additional tool for SETI researchers, rather than as a replacement for current methods.