

UC Merced

Proceedings of the Annual Meeting of the Cognitive Science Society

Title

A Dynamical Systems Reformulation of the Normalized Recurrence Algorithm

Permalink

<https://escholarship.org/uc/item/7dc608ps>

Journal

Proceedings of the Annual Meeting of the Cognitive Science Society, 33(33)

ISSN

1069-7977

Author

Pedersen, Bo

Publication Date

2011

Peer reviewed

A Dynamical Systems Reformulation of the Normalized Recurrence Algorithm

Bo Pedersen
Rosetta Stone Labs

Abstract: The Normalized Recurrence Algorithm is a kind of localist attractor network describing the temporal dynamics in continuous and recurrent information integration emerging in experimental psychology data (The Continuity of Mind, Michael Spivey, 2007). Despite the fact that this algorithm successfully models time series data, it is somewhat unsatisfactory to deal with an algorithm within a dynamical systems context and furthermore it is difficult to prove conjectures, so we suggest this description: $E(t+1)=E(t)+E(t)xC^*E(t)$, where t is time, E is all the different activity vectors pooled together and C is a connectivity matrix (x and $*$ is the matrix and hadamard product respectively). The normalization is performed post hoc only, and with this reformulation we can now prove the set size/convergence linearity hypothesis (p220), and reject the indirect crosstalk hypothesis (p103), and more importantly open up this model to comparisons within the field of dynamical systems where it truly belongs.