Group 3-6

Neural Models of Cognitive Function

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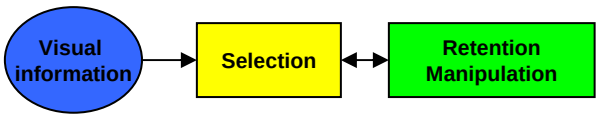
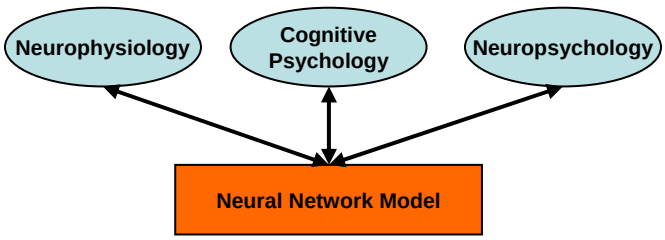
Object of Study



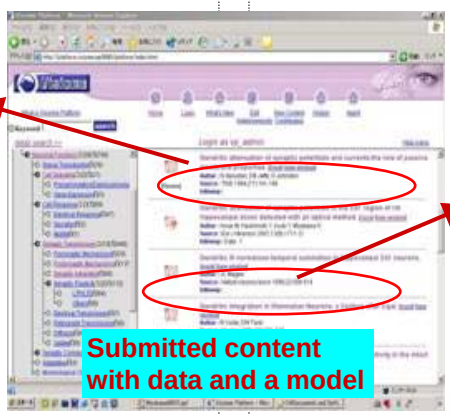
Method



Stochastic Saliency-Based Search Model for Attentional Shift.

T. Koike and J. Saiki. (2003). *Cognitive Studies*, **10**(3), 401-417

We proposed a pulsed neural network model for visual search tasks. We have shown that the introduction of stochastic WTA enables the saliency-based search model to exhibit changes in search efficiency as a result of the variation of the relative saliency, taking into account due to stochastic shifts of attention.



A Neural Network Model of a Rule-guided Delayed Matching-to-sample Task

T. Minami and T. Inui., (2003) *Cognitive Studies.,* 10(4), In Press

To investigate how the brain may implement a rule-guided behavior, we simulated physiological results in Wallis et al.(2001) and analyzed the temporal patterns of the model unit and connection weights, and compared the property of the unit with that of biological neurons.

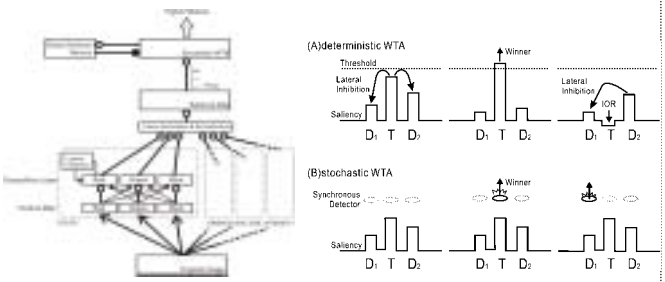


Fig.1 (Left) Schematic diagram of our model.

(Right) Schematic image of stochastic WTA network.

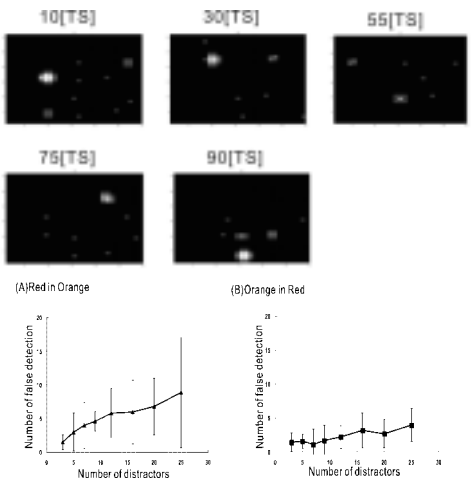


Fig.2 Results of our simulation. (Top) An example of the winner of WTA network. Higher luminance denotes higher firing rate. (Bottom) Model performance of visual search tasks.

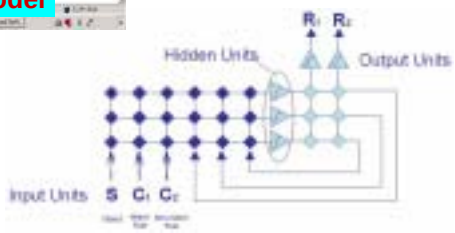
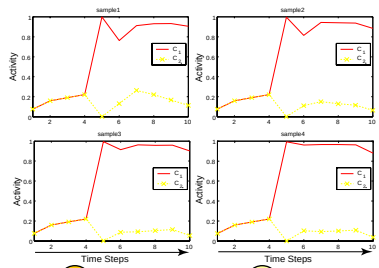


Fig.1 The neural network architecture includes input, hidden, and output layers. The input layer consists of an object input and two cue inputs. The hidden layer consists of recurrently connected logistic units.

Fig.2 Typical temporal behavior of a rule-selective unit. The graph shows the temporal pattern when each sample object and each cue (C1, C2) was input at step 5.



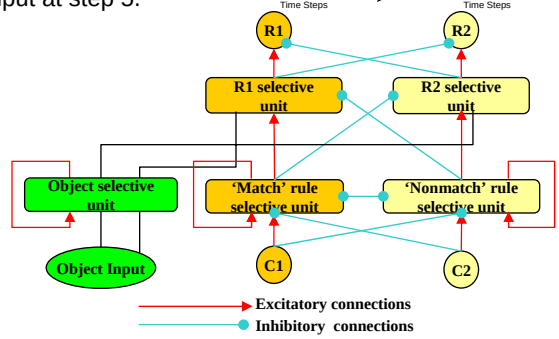


Fig.3 Schematic of the network mechanism: the relationships among the input layer, hidden units, and the output layer.