Similarity avoidance in Arabic with a connectionist network

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Abstract: This project accounts for the facts of similarity avoidance in Arabic consonant phonology in a connectionist network. The network is a feedforward network with two hidden layers. Input units encode the phonological feature representations of triliteral roots, and input activations spread through hidden layers to the output layer consisting of a single unit, whose activation represents the acceptability of a form. Portions of the network are trained using standard backpropagation learning, whereas others portions are trained separately on different tasks and then incorporated into the larger network. The result is a network that evaluates the acceptability of novel forms based largely on similarity avoidance. The proposed model differs from recent Harmonic Grammar accounts (Coetzee & Pater 2008) in that it does not require the prior existence of linguistic constraints. Finally, as a connectionist network, the model captures a cross-linguistically robust fact of phonological systems with neurologically plausible assumptions.