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Modeling Human Lexical Decision-Making with Artificial Neural Networks and Evidence Accumulation Models

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Abstract

Lexical Decision Task is one of the most widely used experimental paradigms for studying word recognition that allows researchers to make inferences about lexical processing and lexical representations of words and non-words. Evidence Accumulation Models (EAM) have been successfully used to model this task. Despite the accurate prediction of participants' reaction time and accuracy, these models lack a mechanism for representing the lexical features of words and non-words. Incorporating lexical features directly into an EAM can open up new and better ways to study lexical processing and lexical representations. For this purpose, we developed two models by combining FastText and BERT models, with the race-diffusion model. In this framework, representations of words and non-words are generated by FastText or BERT models and transformed into the race-diffusion model's drift rate. Results show that a combination of FastText and race diffusion model is a promising approach for modeling the lexical decision task.