Dynamics in the Evolution of Consumers' Brand Associations: A Temporal Neural Word Embedding for UGC

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Consumers' brand associations are essential to the development of effective marketing strategies. Understanding consumers' brand associations enables firms to determine their brand's positioning and informs new product development and marketing mix design. A rich and abundant source for consumers' brand associations is user-generated-content (UGC). To process these usually big and unstructured data, researchers turned to neural word embeddings such as the popular word2vec model. While word2vec was shown to create new insights for marketing, it suffers from a major shortcoming: Its inability to consider temporal information. Word2vec does not model dynamic changes in language over time. Yet, UGC commonly spans several years during which changing market conditions and evolving product lifecycles lead to changes in consumers' brand associations. These changes are captured in the UGC consumers generate. Ignoring the dynamics in brand associations can mislead decision makers about the effectiveness of their marketing mix design.

We overcome this shortcoming of word2vec with a new model named *Dory* that mimics human memory-systems. In contrast to extant neural word embeddings such as word2vec, *Dory* is not only able to learn brand associations, but can also forget them when they lose their prevalence, and remember them when they re-emerge. As we show by simulation and in an empirical application, *Dory's* additional qualities of human memory-systems (i.e., forget and remember) enable it to detect patterns in brand associations that remain undetected by extant models. *Dory* identifies different dynamics in the evolution of consumers' brand associations from over 52 million Amazon.com product reviews spanning across six years. For instance, while Pepsi's association "pepsistuff" rapidly emerged and disappeared, the association of "greediness" with the brand "Electronic Arts" flared-up and receded again multiple times. Such knowledge enables brand managers to evaluate the impact and effectiveness of their brand communication as well as alert them when brand associations shift unfavorably. *Dory* supports a broad spectrum of downstream applications.