WORD MEMORABILITY: A CROSS CULTURAL PERSPECTIVE

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INTRODUCTION

It has been seen that despite large individual differences in memory ability, most people tend to remember certain stimuli better than others. This phenomenon is referred to as the memorability of an individual item. We investigate whether such "intrinsic" memorability of words in English translate to memorability in Hindi. Specifically, we test the hypothesis that centrality of words in semantic networks influence memorability and test whether memorable words in English are also memorable to Hindi-speakers when translated to Hindi.

METHODS

Semantic Network Construction:

- We construct a semantic network (Figure 1) based on word embeddings for each language.
- Word embeddings are learned representations of text such that two words which are semantically similar have similar embeddings.
- These embeddings are in the form of vectors, wherein we use their cosine similarity as a threshold (> 0.55) to build semantic networks.
- An edge is made between a pair of words if their cosine similarity exceeds the threshold.

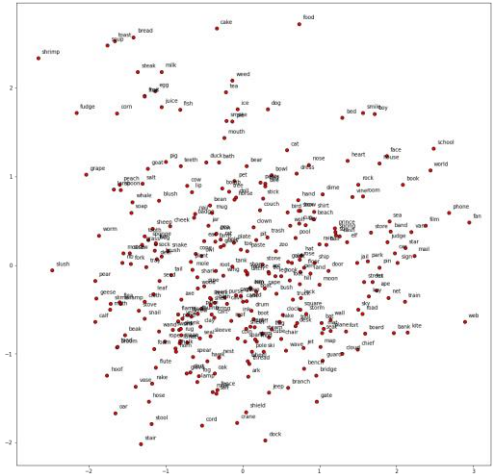
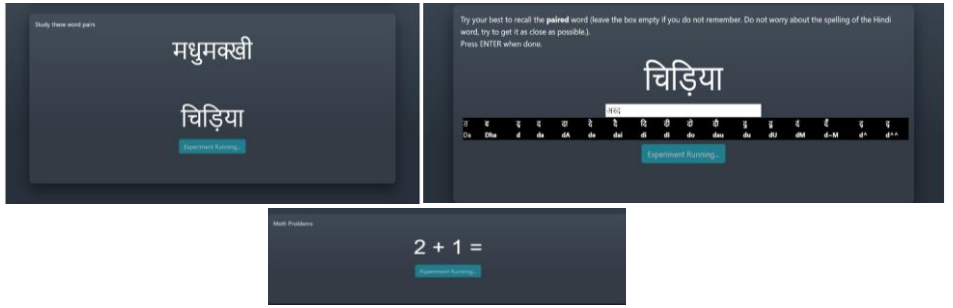


Figure 1: Semantic Network for English generated with Wikipedia Vectors

PAIRED ASSOCIATES TASK



We utilize a pool of English words that has been used in prior memorability studies (Xie et al., 2021) and the Hindi translation of those words to do a cross-cultural analysis of word memorability followed by free-association experiments with the high and low memorability/centrality words as a confirmatory test of the network centrality hypothesis for what drives memorability.

ANALYSIS: NEIGHBOURHOOD ACROSS DIFFERENT SEMANTIC NETWORKS

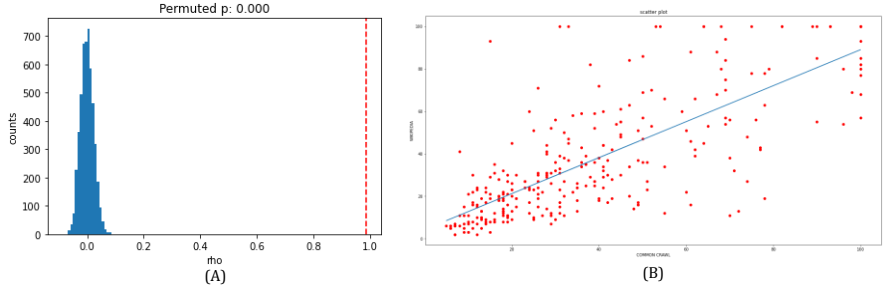


Figure 2A: Correlation Matrix comparison of Cosine Similarity of words across two different English Semantic Networks via a Permutation Test (permuted p-value: 0.00, true rho: 0.97)
Figure 2B: Correlation between number of neighbors across the semantic networks

REFERENCES AND FUNDING STATEMENT

Xie, W., Bainbridge, W.A., Inati, S.K. et al. Memorability of words in arbitrary verbal associations modulates memory retrieval in the anterior temporal lobe. Nat Hum Behav 4, 937–948 (2020). https://doi.org/10.1038/s41562-020-0901-2

Bainbridge, W. A., Isola, P., & Oliva, A. (2013). The intrinsic memorability of face photographs. Journal of Experimental Psychology: General, 142(4), 1323–1334. https://doi.org/10.1037/a0033872

*This work is funded by the IIITH Faculty Seed Grant granted to Vishnu Sreekumar[1]

HYPOTHESES

HYPOTHESIS 1: More centrally located words will have higher memorability as compared to words that are less connected (in both languages).

HYPOTHESIS 2: Word memorability of English words is related to word memorability of the synonymous Hindi words.

HYPOTHESIS 3: Memorability of words can be explained by properties such as centrality, word frequency, context variability, and animacy.

RESULTS: CENTRALITY VS MEMORABILITY

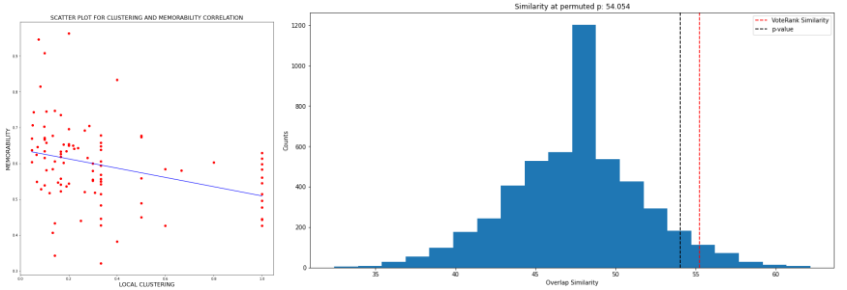


Figure 3A: Local Clustering vs Memorability shows a negative correlation Pearson's r = -0.33, p-value < 0.001
Figure 3B: A significant overlap = 55.26 %, p-value < 0.05 via the VoteRank Algorithm

DISCUSSION

- A negative correlation was observed between clustering coefficient and memorability of English words (Figure 3A).
- The VoteRank algorithm shows a significant overlap between higher-voted words and highly memorable words (Figure 3B).
- Preliminary results indicate that the neighborhoods of our target words in English Semantic networks trained over different corpora are similar (Figure 2).

WHAT WILL YOU REMEMBER MORE?



0.9634
MORE REMEMBERED



0.2
LESS REMEMBERED