NANYANG TECHNOLOGICAL UNIVERSITY
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Synthetic Word Embeddings

For downstream NLP applications

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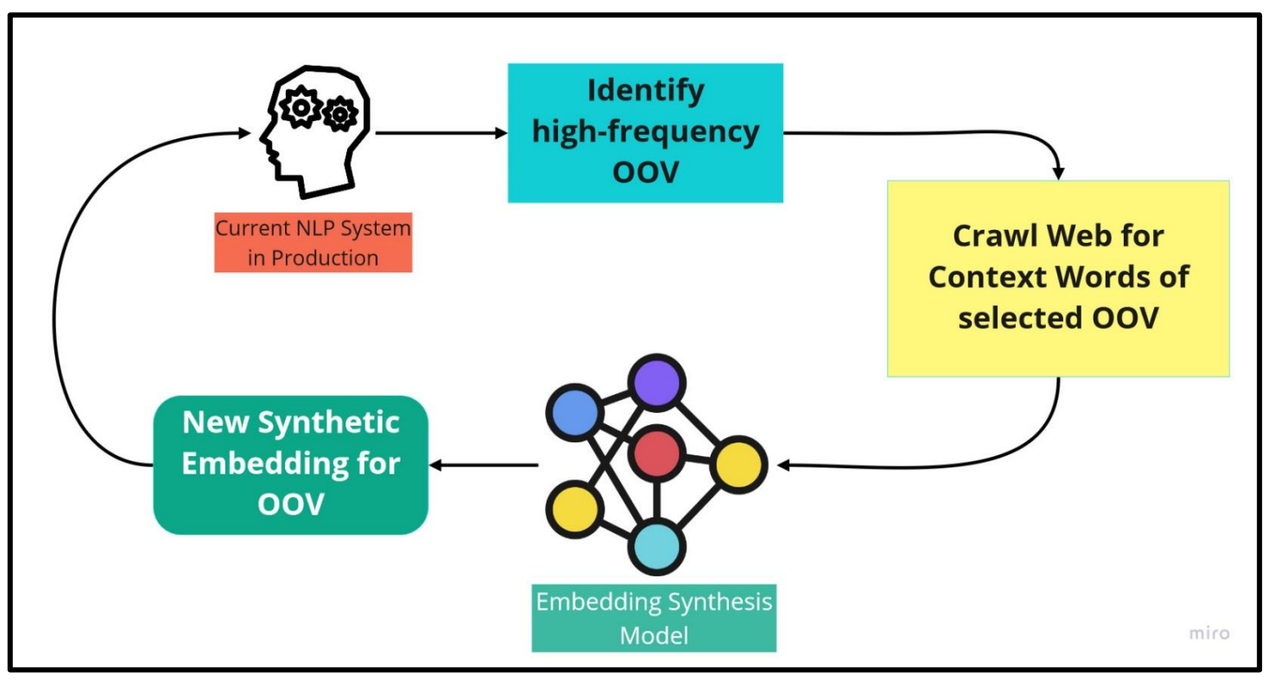
Project Objectives:

This Project aims to create synthetic embedding for unknown words using a novel approach, to enable machine learning applications to understand unprecedented phenomena and entities such as COVID-19 and PCR test. Our experiments show that the proposed network can generate new embedding containing relevant semantics using existing knowledge in latent space. Downstream tasks can then incorporate these synthetic embedding to understand new entities better

Workflow:



Best Architecture:

Multi- Layer Perceptrons

Embedding Tested:

GloVe Embeddings	RoBERTa Embeddings
100 dimensions	768 dimensions

Results:

The proposed workflow is able to synthesize embeddings for unknown words with great semantic relevance to the entities. These synthetic embeddings can then be easily inserted into the existing applications

Target word: covid

	Word	Unnormalized Cosine distance
0	disease	0.972045
1	diseases	0.861759
2	infection	0.804020
3	illness	0.774055
4	virus	0.764235

Target word: pfizer

	Word	Unnormalized Cosine distance
0	vaccine	0.801238
1	vaccines	0.711694
2	polio	0.583417
3	vaccination	0.565592
4	smallpox	0.554956

GitHub Demo