Method: Relation Extraction

In this work, we utilized an open-source package, OpenNRE [1], to carry out the relation extraction (RE) task and to identify whether an entity of interest has relationship(s) with the coronavirus. Briefly, OpenNRE is a software package that provides a unified framework to use and implement different RE methods. It consists of various modules based on both TensorFlow and PyTorch, and they can be extended easily.

To carried out the RE task, we applied the package’s supervised sentence-level RE model, which is a BERT model [2] trained using 56,000 sentences from WikiData [3]. The model output is the probability of a relationship between an entity and the coronavirus. Although there are 80 defined relationships in the pre-trained model, we filtered out the relationships that are not meaningful to our task (e.g., “X is the *father of* Y”) and presented only 2 relationships in the result.

[1] X. Han, T. Gao, Y. Yao, D. Ye, Z. Liu, and M. Sun, “OpenNRE: An open and extensible toolkit for neural relation extraction,” *arXiv Prepr. arXiv1909.13078*, 2019.

[2] J. Devlin, M.-W. Chang, K. Lee, and K. Toutanova, “Bert: Pre-training of deep bidirectional transformers for language understanding,” *arXiv Prepr. arXiv1810.04805*, 2018.

[3] D. Vrandečić and M. Krötzsch, “Wikidata: a free collaborative knowledgebase,” *Commun. ACM*, vol. 57, no. 10, pp. 78–85, 2014.