**Detecting Abrasive Online User Content in Question-and-Answer Forums**

Team 3 – Deepak Rajan, Indranil Pal, Yasser Parambathkandy

**Dr. Lindi Liao**

**George Mason University**

**AIT614 Big Data Analytics**

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**Abstract**

**Social media forums like Quora receive thousands of questions every day, and while most users genuinely seek answers, some questions are deliberately provocative in nature. Identifying insincere questions that make statements instead of seeking helpful answers is a significant challenge. To maintain a civil and respectful discourse, website administrators can employ automatic methods to flag such questions. The primary aim of this research is to use machine learning techniques to predict whether a question is sincere or insincere and perform real-time prediction for new incoming questions. Existing research employs word embeddings to generate NLP features and use supervised or deep learning methods to generate models. Recent work has demonstrated strong transfer task performance using pre-trained sentence level embeddings compared to word embeddings. In this paper, sentence embeddings are used to create a contextual vector for each question, rather than relying on traditional word embeddings. To achieve the goal, a dataset obtained from Kaggle that includes questions posted by Quora users is used for training, testing, evaluation, and real-time model serving. The approach focuses on the use of supervised learning methods like Logistic Regression to better identify insincere questions. The training pipeline employs Stanford’s Global Vectors for Word Representation (GloVe) for word embeddings and Google Universal Sentence Encoders for sentence embeddings. The paper thoroughly examines the models generated from sentence and word embeddings and the best model is selected based on various model performance measurements. When new questions are submitted through the user interface (UI), real-time prediction is performed, and the output is then stored to a big data store like MongoDB database. The moderator can then review the questions flagged as insincere and take appropriate actions. In conclusion, the research demonstrates the feasibility of using machine learning techniques to identify insincere questions and implement an automatic flagging system. The results of the research suggest that implementing the developed strategy can have a significant impact on maintaining a respectful and healthy online community, and it opens the door for expanding the research to address other forms of misinformation online.**

***Keywords—Questions Classification, Sentence embedding, Word embedding, Supervised Learning, Quora***

**References**

**Brownlee, Jason (2019, August 07). What are word embeddings for text? Retrieved March 11, 2023, from** <https://machinelearningmastery.com/what-are-word-embeddings/>

**Daniel Cer, Yinfei Yang, Sheng-yi Kong, Nan Hua, Nicole Limtiaco, Rhomni St. John, Noah Constant, Mario Guajardo-Cespedes, Steve Yuan, Chris Tar, Brian Strope, and Ray Kurzweil. 2018. Universal Sentence Encoder for English. In Proceedings of the 2018 Conference on Empirical Methods in Natural Language Processing: System Demonstrations, pages 169–174, Brussels, Belgium. Association for Computational Linguistics.**

**Nima, Prateek, Nikita Parab, Akshay Mungekar, Sanchit Pereira. (2019). Quora Insincere Questions Classification.**

**Y. Kim, ―Convolutional neural networks for sentence classification,‖ arXiv preprint arXiv:1408.5882, 2014**

**S. T. Indra, L. Wikarsa, and R. Turang, “Using logistic regression method to classify tweets into the selected topics,” in 2016 International Conference on Advanced Computer Science and Information Systems (ICACSIS), Oct 2016, pp. 385–390.**

**Aggarwal, C.C., Zhai, C. (2012). A Survey of Text Classification Algorithms. In: Aggarwal, C., Zhai, C. (eds) Mining Text Data. Springer, Boston, MA. https://doi.org/10.1007/978-1-4614-3223-4\_6**

**F. CHIROMA, H. LIU and M. COCEA, "Text Classification For Suicide Related Tweets," 2018 International Conference on Machine Learning and Cybernetics (ICMLC), 2018, pp. 587-592, doi: 10.1109/ICMLC.2018.8527039.**

**A. Hassan and A. Mahmood, ―Deep learning for sentence classification, 2017 IEEE Long Island Systems, Applications and Technology Conference (LISAT). 2017**

**Dachapally Prudhvi Raj, ―In-depth Question classification using Convolutional Neural Networks, arXiv preprint arXiv:1804.00968, 2018.**

**Quora insincere questions classification. (n.d.). Retrieved March 16, 2023, from** <https://www.kaggle.com/competitions/quora-insincere-questions-classification/overview>

**Pennington, J. (n.d.). Retrieved March 16, 2023, from** <https://nlp.stanford.edu/projects/glove/>