

Automatic Generation of MCQs Using Transformer Mode

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Abstract: Multiple Choice questions is the go to assessment technique used for competitive entrance exams, company's aptitude screening process and for the assessment exams of various institutions and universities. The rise of the online paradigm due to the pandemic has also changed the way universities and institutions conduct their assessment exams* Hence, MCQs play an important role in assessment of skill and knowledge in different domains and situations* However, it becomes very difficult for a human to generate large amount of MCQs along with good quality distractors in limited time. This problem can be solved using state of the art natural language processing and deep learning techniques. Our work is an attempt to generate multiple choice based questions which can be used for assessment in an exam setting. This paper proposes a system which uses T5 transformer for question generation and other state of the art deep learning technique for distractor generation generate multiple choice questions which resembles the human way of questioning.

Keywords: Natural Language Processing, MCQs, T5 transformer, Deep learning, Distractors, Question generation

REFERENCES

- [1]. Henry L. Roediger III, Adam L. Putnam, and Megan A. Smith. Chapter one – ten benefits of testing and their applications to educational practice. In Psychology of Learning and Motivation, volume 55, pages 1–36. Academic Press, 2011.
- [2]. Rao, Dhawaleswar & Saha, Sujana Kumar. (2018). Automatic Multiple Choice Question Generation From Text: A Survey. IEEE Transactions on Learning Technologies. PP. 1-1. 10.1109/TLT.2018.2889100.
- [3]. Yuni Susanti, Takenobu Tokunaga, Hitoshi Nishikawa, and Hiroyuki Obari. Evaluation of automatically generated english vocabulary questions. Research and practice in technology enhanced learning, 12(1):1–21, 2017.
- [4]. Sandeep Subramanian, Tong Wang, Xingdi Yuan, Saizheng Zhang, Yoshua Bengio, Adam Trischler - "Neural Models for Key Phrase Extraction and Question Generation", 2018 Proceedings of the Workshop on Machine Reading for Question Answering
- [5]. Yuan, Xingdi, et al. "Machine comprehension by text-to-text neural question generation." arXiv preprint arXiv:1705.02012 (2017).
- [6]. Wang, Liuyin & Xu, Zihan & Lin, Zibo & Zheng, Haitao & Shen, Ying. (2020). Answer-driven Deep Question Generation based on Reinforcement Learning. 5159-5170. 10.18653/v1/2020.coling-main.452.
- [7]. Chan, Ying-Hong & Fan, Yao-Chung. (2019). A Recurrent BERT-based Model for Question Generation. 154-162. 10.18653/v1/D19-5821.
- [8]. Rajpurkar, Pranav, et al. "Squad: 100,000+ questions for machine comprehension of text." arXiv preprint arXiv:1606.05250 (2016).
- [9]. Yang, Zhilin, et al. "HotpotQA: A dataset for diverse, explainable multi-hop question answering." arXiv preprint arXiv:1809.09600 (2018).
- [10]. Kishore Papineni, Salim Roukos, Todd Ward, and Wei-Jing Zhu. Bleu: a method for automatic evaluation of machine translation. In Proceedings of the 40th Annual Meeting of the Association for Computational Linguistics, ACL '02, pages 311–318, Philadelphia, Pennsylvania, USA, 2002. Association for Computational Linguistics.

- [11]. Chin-Yew Lin. ROUGE: A package for automatic evaluation of summaries. In Proceedings of the Workshop on Text Summarization Branches Out, pages 74–81, Barcelona, Spain, 2004. Association for Computational Linguistics.
- [12]. Alon Lavie and Abhaya Agarwal. METEOR: An automatic metric for MT evaluation with high levels of correlation with human judgments. In Proceedings of the Second Workshop on Statistical Machine Translation, WMT '07, pages 228–231, Prague, Czech Republic, 2007. Association for Computational Linguistics
- [13]. Guokun Lai, Qizhe Xie, Hanxiao Liu, Yiming Yang, and Eduard Hovy. RACE: Large-scale ReAding comprehension dataset from examinations. In Proceedings of the 2017 Conference on Empirical Methods in Natural Language Processing, EMNLP '17, pages 785–794, Copenhagen, Denmark, 2017. Association for Computational Linguistics.
- [14]. Questgen. Questgen: AI powered question generator. <http://questgen.ai/>. Accessed: 2022-03-25.
- [15]. Quillionz. Quillionz - world's first AI-powered question generator. <https://www.quillionz.com/>. Accessed: 2022-03-25.
- [16]. Vaswani, Ashish, et al. "Attention is all you need." Advances in neural information processing systems 30 (2017).
- [17]. Raffel, Colin, et al. "Exploring the limits of transfer learning with a unified text-to-text transformer." arXiv preprint arXiv:1910.10683 (2019).
- [18]. Vachev, Kristiyan, et al. "Leaf: Multiple-Choice Question Generation." arXiv preprint arXiv:2201.09012 (2022).
- [19]. Sherstinsky, Alex. "Fundamentals of recurrent neural network (RNN) and long short-term memory (LSTM) network." Physica D: Nonlinear Phenomena 404 (2020): 132306.
- [20]. Devlin, Jacob, et al. "Bert: Pre-training of deep bidirectional transformers for language understanding." arXiv preprint arXiv:1810.04805 (2018).
- [21]. Brown, Tom, et al. "Language models are few-shot learners." Advances in neural information processing systems 33 (2020): 1877-1901.
- [22]. Andrew Trask, Phil Michalak, and John Liu. sense2vec - a fast and accurate method for word sense disambiguation in neural word embeddings. ArXiv:1511.06388, 2015.
- [23]. LW, Anderson & DR, Krathwohl & PW, Airasian & KA, Cruikshank & Mayer, Richard & PR, Pintrich & Raths, J.& MC, Wittrock. (2001). A Taxonomy for Learning, Teaching, and Assessing: A Revision of Bloom's Taxonomy of Educational Objectives