

Automatic Multiple Choice Question Generation from Text: A Survey

¹Musale Ashish Rambhau, ²Bhujbal Omkar Vaibhav, ³Meghana Phadatare, ⁴Ishwari Jadhav

Abstract: Automatic Multiple alternative Question (MCQ) generation from a text may be a standard analysis space. MCQs are wide accepted for large-scale assessment in varied domains and applications. However, manual generation of MCQs is pricey and time-consuming. Therefore, researchers were involved towards routine MCQ generation since the delayed 90's. Since then, many systems are developed for MCQ generation. We have a tendency to perform a scientific review of these systems. This paper presents our findings on the review. We have a tendency to define a generic advancement for Associate in Nursing automatic MCQ generation system. The advancement consists of six phases. For each of those phases, we discover and discuss the list of techniques adopted within the literature. We have a tendency to additionally study the analysis techniques for assessing the standard of the system generated MCQs. Finally, we have a tendency to establish the areas wherever the present analysis focus ought to be directed toward enriching the literature.

Keywords: Automatic Question Generation, Multiple Choice Questions, Natural Language Processing, Text Analysis.

Introduction:

A question is an essential tool to assess the knowledge or understanding of a learner. Assessment is crucial in learning and question is essential for assessment. Multiple choice questions (MCQ) is the most widespread form of a question for various levels of assessment. MCQs have many advantages including quick evaluation, less testing time, consistent scoring, and the possibility of an electronic evaluation. Many examinations use MCQ based question papers through a computerized environment. However, manual preparation of MCQs is time-consuming and costly. Therefore, the research community devoted substantial effort to find the techniques for the automatic generation of MCQs. The investigate on regular MCQ generation started at least 20 years ago. As an early challenge, we discover the system developed by Coniam David in 1997 [1]. Since then, lots of MCQ generation system have been developed in a variety of languages and domains, and for different applications.

Related work

Normalization refers to a conversion of the input text into the required format and removal of unnecessary content from the text. This step identifies the chapters, sections, subsections, paragraphs, and other relevant tags in the text. a number of author get help of such structural information in MCQ generation. It involves splitting up the document text into a stream of words, symbols, and numbers.

It is observed that a particular part-of-speech or parse category becomes dominating as a potential keyword in some specific domains or applications. If the transformation is not done, then the sentence remains in its original form, and a blank replaces the key. As a result, it becomes a fill in-the-blank type question with distracters. However, we found several works containing the transformation from the declarative to an interrogative sentence. Post-processing is the final phase that aims to improve the quality of the system generated MCQs. These are, post-editing of ill-formed questions, question ranking, and filtering of unacceptable questions.

Motivation:

We found that the researchers were primarily motivated by the methodology expected to follow for manual preparation of MCQs from a text. For the manual preparation of MCQs, the person first needs to acquire the information embedded in the input text. As one MCQ primarily demands one informative sentence, he also identifies the sentences that contain any questionable fact or information

System Architecture:

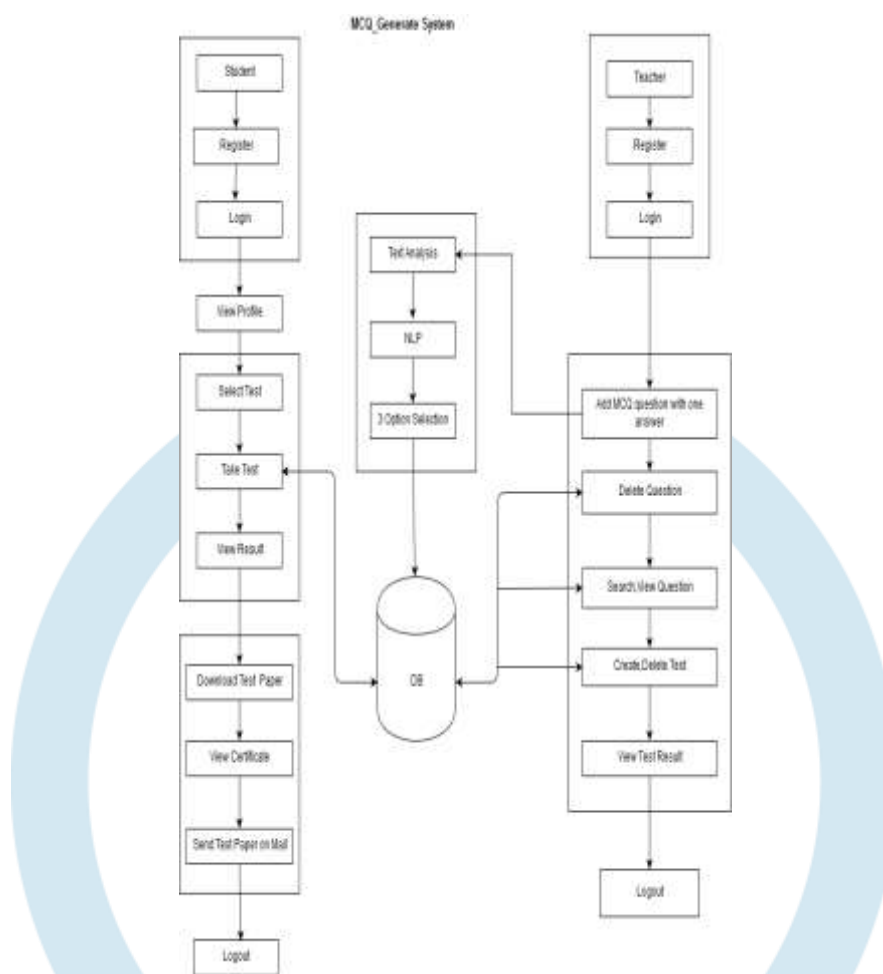


Fig 1 system overview

Conclusion:

In this paper, we reviewed the works presented in the literature of automatic MCQ generation from a text. We discussed the existing approaches for MCQ generation. We established a generic workflow consisting of six broadly classified dependent phases, namely, pre-processing, sentence selection, key selection, question formation, distract or generation, and Post-processing.

References:

- [1] G. Kumar, R. E. Banchs, and L. F. D'Haro, "Automatic fill-the blank question generator for student self-assessment," in *Frontiers in Education Conference (FIE)*, 2015 IEEE. IEEE, 2015, pp. 1–3.
- [2] A. E. Awad and M. Y. Dahab, "Automatic generation of question bank based on pre-defined templates," *International Journal of Innovations Advancement in Computer Science*, vol. 3, no. 1, pp. 80–87, 2014.
- [3] N. Afzal and R. Mitkov, "Automatic generation of multiple choice questions using dependency-based semantic relations," *Soft Comput.*, vol. 18, no. 7, pp. 1269–1281, Jul. 2014.
- [4] M. Agarwal and P. Mannem, "Automatic gap-fill question generation from text books," in *Proceedings of the 6th Workshop on Innovative Use of NLP for Building Educational Applications*, ser. IUNLPBEA '11. Stroudsburg, PA, USA: Association for Computational Linguistics, 2011, pp. 56–64.
- [5] L. Zavala and B. Mendoza, "On the use of semantic-based aig to automatically generate programming exercises," in *Proceedings of the 49th ACM Technical Symposium on Computer Science Education*. ACM, 2018, pp. 14–19.
- [6] N. Stancheva, A. Stoyanova-Doycheva, S. Stoyanov, I. Popchev, and V. Ivanova, "A model for generation of test questions," *Compt. Rend. Acad. bulg. Sci.*, vol. 70, no. 5, pp. 619–630, 2017.
- [7] T. Alsubait, B. Parsia, and U. Sattler, "Ontology-based multiple choice question generation," *KI-Künstliche Intelligenz*, vol. 30, no. 2, pp. 183–188, 2016.
- [8] F. de Assis Zampiroli, V. R. Batista, and J. A. Quilici-Gonzalez, "An automatic generator and corrector of multiple choice tests with random answer keys," in *Frontiers in Education Conference (FIE)*, 2016 IEEE. IEEE, 2016, pp. 1–8.
- [9] N. L. Bhale, S. G. Patil, M. R. Pawar, T. G. Katkade, and N. D. Jadhav, "Automatic question generation using wikipedia," *Imperial Journal of Interdisciplinary Research*, vol. 2, no. 4, 2016.
- [10] B. Das and M. Majumder, "Factual open cloze question generation for assessment of learner's knowledge," *International Journal of Educational Technology in Higher Education*, vol. 14, no. 1, p. 24, 2017.