Form 2: Literature Documents

1. Team No: 10

2. Project Title: SmartQuiz: Empowering Education with Dynamic and Ethical MCQ Generation

3. Problem Statement

The manual creation of Multiple-Choice Questions (MCQs) in education poses challenges in terms of time, adaptability, and potential biases. Current methods rely on manual or algorithmic approaches, leading to time constraints, limited adaptability, and potential biases in question creation.This project aims to overcome these challenges by introducing an automated MCQ generation system, enhancing efficiency, adaptability, and reducing biases in educational assessments.

4. Problem Illustration:

Creating a diverse set of Multiple-Choice Questions (MCQs) manually is time-consuming and limits scalability. Existing methods, whether manual or algorithmic, often struggle to adapt swiftly to various subjects and question types. The potential introduction of biases in manually authored questions raises concerns about fairness. This scenario emphasizes the urgency for an efficient and adaptable solution to streamline question creation, ensuring a fair and comprehensive assessment process in education.

5 .Concept Tree
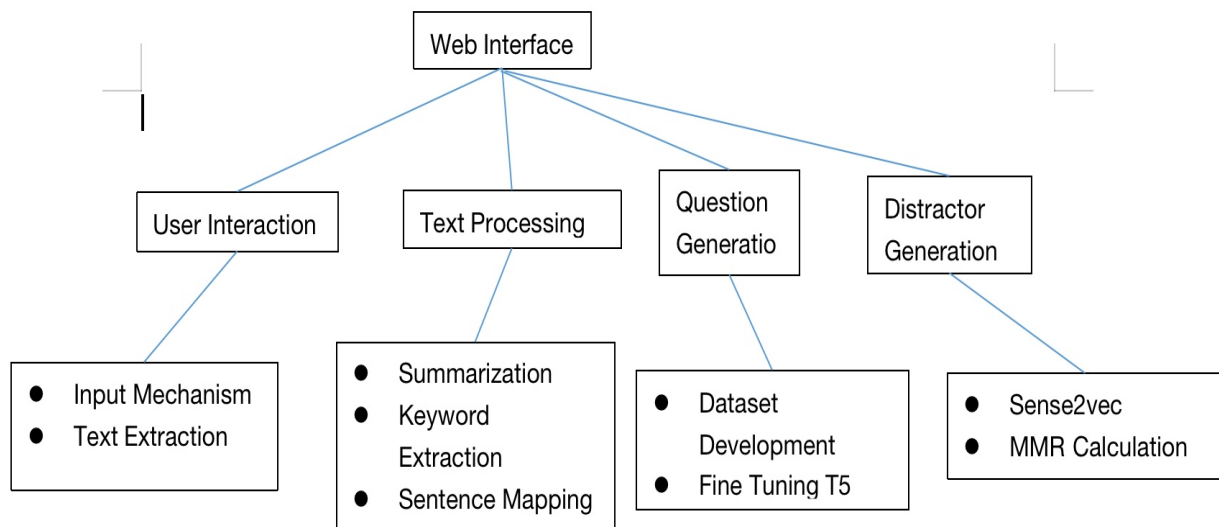
6. Comparison of Existing Strategies for Problem solve

Sl.No	Strategies	Advantages	Disadvantages
1	Rule-based with Named Entity Recognition	Automatic question generation, NER for answer identification	Limited flexibility, rule complexity.
2	Focus generator module, Neural Entity Selection Algorithm, Recurrent Neural Networks	Diverse question types, SQuAD dataset utilization	Computational complexity, training data dependency.
3	Wikipedia-based dataset, Paradigmatic Relation discovery	Wide knowledge base utilization, Intelligent Tutoring Systems	Limited subject matter scope, dependence on pre-existing data.
6	Semantics and Service Technologies	Heuristics for distractor suitability, Semantic Trees	Dependency on semantic tree quality, complexity.
7	Semantic Similarity, Syntactic Similarity, Context-fit	Incorporates semantic and syntactic information, Word2Vec	Sensitivity to context, Word2Vec training dependency.

7. Comparison of Existing Method from selected Strategies

Sl.No	Author	Strategies	Advantages	Disadvantages
1	Min-Kyoung Kim et al. [1]	Rule-based with Named Entity Recognition	Automatic QA generation, Named Entity Recognition	Limited flexibility, rule complexity
2	Sushmita Gangopadhyay et al. [2]	Focus generator, Neural Entity Selection, RNN	Diverse question types, SQuAD dataset utilization	Computational complexity, training data dependency
3	Riken Shah et al. [3]	Wikipedia-based dataset, Paradigmatic Relation discovery	Knowledge base utilization, Intelligent Tutoring Systems	Limited subject matter scope, dependence on pre-existing data
4	Pedro Álvarez et al. [4]	Semantics and Service Technologies	Diverse distractors, Semantic Trees utilization	Dependency on semantic tree quality, complexity.
5	Bowei Zou et al. [7]	Unsupervised domain-independent true/false question generation	Domain-independent, Masking-and-infilling strategy	Limited to true/false questions, masking strategy sensitivity

8. References

[1] Min-Kyoung Kim, Han-Joon Kim, "Design of Question Answering System with Automated Question Generation", 2008 IEEE 28th International Symposium on Computer-Based Medical Systems.

[2] Susmita Gangopadhyay, Ravikiran S.M, "Focused Questions and Answer Generation by Key Content Selection", 2020 IEEE Sixth International Conference on Multimedia Big Data (BigMM)

[3] Riken Shah, Deesha Shah, Prof. Lakshmi Kurup, "Automatic Question Generation for Intelligent Tutoring Systems", 2017 2nd International Conference on Communication Systems, Computing and IT Applications (CSCITA)

[4] Pedro Álvarez, Sandra Baldassarri, "Semantics and service technologies for the automatic generation of online MCQ tests", 2018 IEEE Global Engineering Education Conference (EDUCON)

[5] Girish Kumar, Rafael E. Banchs, Luis Fernando D'Haro, "Automatic Fill-the-blank Question Generator for Student Self-assessment", 2015 IEEE Frontiers in Education Conference (FIE)

[6] A. Hadifar, S. K. Bitew, J. Deleu, C. Develder and T. Demeester, "EduQG: A Multi-Format Multiple-Choice Dataset for the Educational Domain," in IEEE Access

[7] Bowei Zou, Pengfei Li, Liangming Pan, Ai Ti Aw, "Automatic True/False Question Generation for Educational Purpose", 17th Workshop on Innovative Use of NLP for Building Educational Applications (BEA 2022)

Signature Team Members   **Signature Supervisor**

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