

# AUTOMATED MCQ GENERATOR

AI-Powered Multiple Choice Question Generation from Educational Text using NLP and Transformer Models

## PROBLEM STATEMENT

Creating high-quality multiple-choice questions from educational content is time-consuming and requires significant effort from educators

## WORKFLOW

Input Text → Extract Entities

Entities → Generate Questions

Questions → Create Distractors

Distractors → Final MCQs

## KEY FEATURES

- Automatic extraction of key concepts and entities from text
- Context-aware question generation using T5 transformer
- Intelligent distractor creation for plausible wrong answers
- User-friendly web interface for easy access
- Supports various educational domains and subjects

## MY SOLUTION

An automated system that generates relevant, well-structured MCQs from any textbook passage using advanced NLP techniques.

- **Question Generation:** T5-based model with highlight mechanism
- **Answer Extraction:** SpaCy NER and noun phrase chunking
- **Distractor Generation:** Semantic similarity using sentence embeddings
- **User Interface:** Gradio web application

## IMPLEMENTATION

### Model Selection:

Valhalla T5-base-qg-hl for highlight-based question generation provides superior contextual understanding.

### NLP Pipeline:

SpaCy processes text for named entity recognition and syntactic analysis.

### Embedding Model:

Sentence-transformers enable semantic similarity matching for distractor generation.

## BENEFITS & IMPACT

- Consistency: Ensures uniform question quality
- Scalability: Handles large volumes of content
- Accessibility: Empowers educators with limited resources

The screenshot shows a Gradio-based user interface for generating MCQs. On the left, there is a text input area containing a passage about the circulatory system. To the right, several multiple-choice questions are displayed, each with a list of options and a 'Correct' indicator. The questions are:

- Q1: The circulatory system transports blood, nutrients, oxygen, and what else throughout the body?
  - A. Hypertension
  - B. hormones
  - C. wound
  - D. oxygenAnswer: hormones
- Q2: What is the role of the heart?
  - A. hemoglobin
  - B. that
  - C. Plasma
  - D. arteriesAnswer: that
- Q3: Along with arteries, capillaries and veins, what other type of blood vessel serves a different function?
  - A. capillaries
  - B. life
  - C. veinsAnswer: veins
- Q4: Arteries carry oxygen-rich blood away from the heart to various tissues and what else?
  - A. organs
  - B. nutrients
  - C. mercury
  - D. ExerciseAnswer: organs
- Q5: What veins carry oxygenated blood back to the heart?
  - A. Exercise
  - B. mercury
  - C. which
  - D. VeinsAnswer: veins
- Q6: What are tiny blood vessels called?
  - A. organs
  - B. life
  - C. hemoglobin
  - D. CapillariesAnswer: Capillaries
- Q7: What is hemoglobin?
  - A. Veins
  - B. blood
  - C. that
  - D. DiolateAnswer: blood

At the bottom of the interface, there are 'Clear' and 'Submit' buttons.

## FUTURE ENHANCEMENTS

### Difficulty Levels

Implement adaptive difficulty scaling based on Bloom's taxonomy

### Multi-language Support

Extend to generate questions in multiple languages

### Feedback Loop

Incorporate teacher feedback to improve question quality

### Integration

API development for LMS integration (Moodle, Canvas)