



# Kruxx: A Web Application for Educational Summarization and Personalized Quizzes

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Kruxx is a web application designed to revolutionize learning by addressing challenges like information overload and time constraints in education. It integrates advanced technologies such as Natural Language Processing (NLP) (BART, BERT), Optical Character Recognition (OCR), and Generative AI to automate summarization of educational content (PDFs, DOCs, images, YouTube videos) and generate context-aware quizzes and to deliver tailored, accessible, and interactive learning experiences.. Key features include clickbait detection for YouTube links, multilingual translation, and personalized video recommendations.

## Introduction

Students today struggle with overwhelming study material & lack of personalized tests. Kruxx solves these challenges by combining summarization, quiz generation, and video content analysis into a single platform. It supports all forms of input enhancing both flexibility & engagement.

## Problem Statement

The core challenge in education today is not the lack of resources but the inefficient use of time & generic assessments. Students struggle to: Prioritize key content from large volumes; Find quizzes that address personal learning gaps; Get meaningful insights from multi-format inputs.

## Conclusion

Kruxx significantly boosts study efficiency by reducing time spent on reading and manual quiz creation. Key strengths: accurate and concise summaries; context-aware quiz questions; multimedia support; detects clickbaits; gives relevant video recommendations

## Significance Of Problem

- Unified Platform: Combines summarization, quizzes, clickbait checks, etc.
- Multi-Format Support: Handles text, PDFs, PPTs, videos, links.
- Complete Learning Support: Generates quizzes, recommends study videos, provides text-to-speech & translation support.

## Solution Approach

Kruxx integrates: NLP models (BERT/BART) for summarization; Generative AI APIs for quiz creation; OCR tools for extracting text from images; Clickbait detection via sentiment analysis and similarity scoring; Smart video recommendations via YouTube APIs; Frontend: ReactJs, CSS; Backend: Flask

## Future Work

- Adaptive Quizzes: Adjust difficulty based on user performance.
- Mobile App: Cross-platform accessibility for on-the-go use.
- Advanced Analytics: Track learning patterns for personalized insights.
- Gamification: Add badges and leaderboards to boost engagement.

## References

- M. Lewis et al., “BART: for natural language generation, Translation, and Comprehension” Available: <https://arxiv.org/abs/1910.13461>
- J. Devlin et al., “BERT: Pre-training of Deep Bidirectional Transformers for Language Understanding” Available: <https://arxiv.org/abs/1810.04805>
- Varshney, D., Vishwakarma, D.K., “A unified approach for detection of Clickbait videos on YouTube using cognitive evidences”, Appl Intell 51 (2021) Available: <https://doi.org/10.1007/s10489-020-02057-9>
- V. Raina & M. Gales, “Multiple-Choice question generation: towards automated assessment framework” Available: <https://arxiv.org/abs/2209.11830>