# AI-Based Automatic Text Summarization Using Transformer Models

## Abstract:

Text summarization plays a critical role in processing large volumes of information efficiently. This project explores **AI-based automatic text summarization** using **transformer models** such as **BERT (Bidirectional Encoder Representations from Transformers), T5 (Text-To-Text Transfer Transformer), and GPT-4**. The system aims to generate **both extractive and abstractive summaries**, maintaining contextual accuracy and coherence.

## Methodology:

- **Data Preprocessing:** Tokenization, stopword removal, and sentence segmentation.
- **Feature Extraction:** Word embeddings using transformer-based models.
- **Model Selection:** Comparison of extractive (LexRank, TextRank) and abstractive approaches (BART, T5).
- **Training & Evaluation:** Fine-tuning transformer models on benchmark datasets (CNN/DailyMail, Gigaword) and evaluating performance using **ROUGE, BLEU, and METEOR scores**.

## Outcome:

The project demonstrates that **transformer-based approaches outperform traditional NLP techniques**, producing **highly coherent and contextually rich summaries**. The system finds applications in **news aggregation, research paper summarization, and document analysis**.