

Smart Summar AI: Project Report Summary

Project Title: Smart Summar AI: An Automated Summarization Tool

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Project Overview

Smart Summar AI is a **modular, web-based application** that uses **NLP, OCR, ASR, and QA models** to summarize text, images, and video content. The system includes a chatbot that answers user questions about the summarized content.

Objectives

- Automatically summarize text, scanned documents, and video/audio content.
 - Provide interactive Q&A over summaries using transformer-based models.
 - Deliver a clean, responsive web interface using Flask and front-end tools.
 - Support multi-language summarization and translation.
 - Provide output in paragraph or bullet formats.
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Key Features

- **Text Summarization:** Supports PDFs, DOCX, TXT formats using BART-large-CNN.
- **OCR from Images:** Extracts text using Tesseract and OpenCV.
- **YouTube Video Summarization:** Transcribes speech via Whisper ASR model and summarizes it.

- **Interactive Chatbot:** Answers questions using XLM-RoBERTa-SQuAD2 model.
- **Multilingual Support:** Detects input language and translates summaries if needed.
- **Dockerized Deployment:** Ensures reproducibility and easy deployment.

Tools and Technologies	
Category	Tools & Frameworks
Backend	Python, Flask, Docker
Frontend	HTML5, CSS3, JavaScript (Jinja2 Templates)
NLP Models	BART, XLM-RoBERTa, Whisper (OpenAI)
OCR / Image	PyTesseract, OpenCV
Video Processing	yt-dlp, ffmpeg
Deployment	Docker, GitHub, VS Code
Language Detection	Langdetect, Googletrans
Evaluation Metrics	ROUGE, Human Review

Performance & Findings

Module	Accuracy	Avg Time
Text Summarization	88–93%	3–5 mins
OCR Summarization	85–92%	4–6 mins
YouTube Video Summary	89–91%	15–20 mins
Q&A Chatbot	87–91%	1–3 secs

Other insights:

- Paragraph summaries preferred by 65% of users.
- Bullet summaries preferred by 35%.
- Coherence and readability judged high by human evaluators.

Limitations

- OCR quality depends on image clarity.
- Summarization accuracy drops on technical content.
- Whisper struggles with noisy audio or strong accents.
- File size limit: 10MB.
- Web interface lacks advanced features like user accounts or history.

How to Use

1. Upload a document, image, or YouTube link.
 2. Choose summary format (paragraph or bullet).
 3. View/download summary and ask follow-up questions.
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