

Multilingual Video Translation Pipeline

Aim

Design & implement a system converting video speech → translated audio

Objectives

- Automate transcription (speech → text)
- Translate text into multiple languages
- Generate natural speech in target language
- Sync translated audio with original video



Scope: Academic research + prototype development

Applications: Education, Accessibility, Media, Cross-Cultural Communication

H/W, S/W Requirements, Tools, and Human Efforts

Hardware

- CPU: Intel i7/AMD Ryzen
- GPU: NVIDIA RTX 30xx/40xx
- RAM: ≥ 16 GB
- Storage: ≥ 1 TB SSD

Software

- Python 3.10+, Flask, PyTorch
- Whisper AI (STT)
- Hugging Face Transformers (MT)
- IndexTTS2 (TTS)

Tools

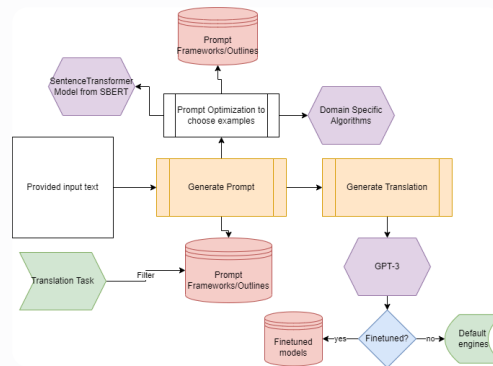
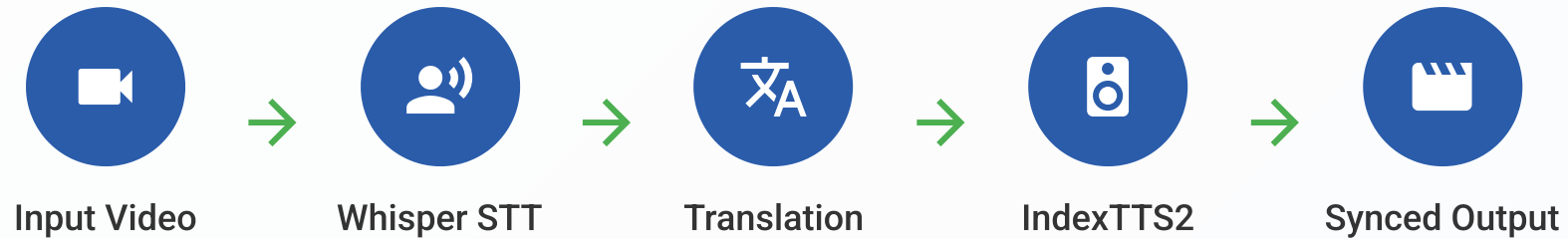
- GitHub, VS Code, Docker
- Linux/Windows environment

Human Efforts

- Development: ~ 150 hrs
- Research: ~ 80 hrs
- Testing: ~ 50 hrs

System Overview & Architecture

Translation Pipeline



Project Phases

✓ Phase 1: Video Input & Transcription

⋮ Phase 2: Translation

⋮ Phase 3: Audio Synthesis

⋮ Phase 4: Sync & Output

🚩 End-to-end pipeline for seamless video translation

🔄 Current Status: Phase 1 completed

Research Paper Components

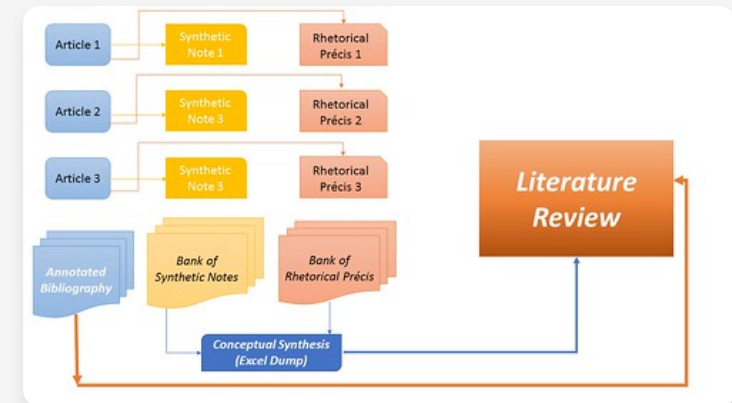
AI-Driven Multilingual Video Translation Pipeline for Accessibility and Cross-Cultural Communication

Literature Review

- STT: Whisper AI
- MT: MarianMT, M2M-100
- TTS: Tacotron, VITS, IndexTTS2
- Applications: Education, Media

Research Gap

- Lack of integrated open-source solutions
- Challenges: Real-time sync, emotional TTS, scaling



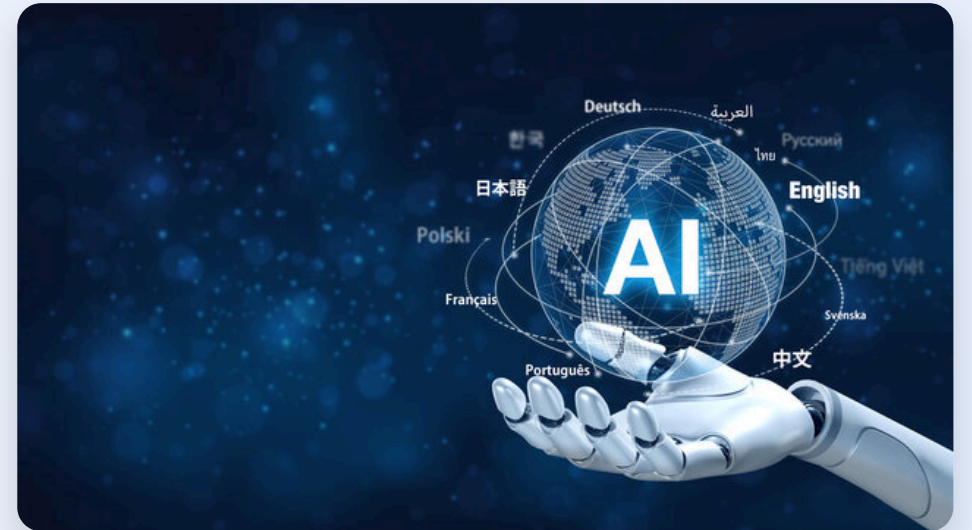
Literature Review Process

Research Paper Focus

 Develop cost-free, scalable STT+MT+TTS pipeline

Abstract

Unified system converting **video speech** → **translated audio** with synchronization. Leverages **Whisper AI**, **Hugging Face Transformers**, and **IndexTTS2**. Bridges language barriers in education, accessibility, and global collaboration.



Education



Accessibility



Global Communication



Media

Progress Report

Project Phases



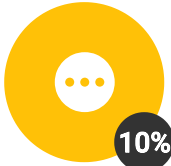
Phase 1
Completed



Phase 2
Planned

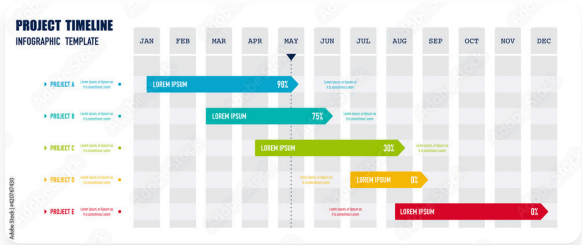


Phase 3
Planned

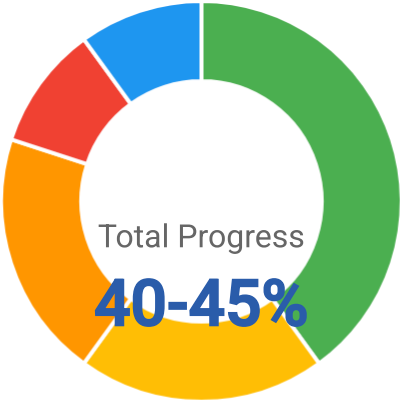


Phase 4
Planned

● ✓ Completed ● □ Planned ● □ In Progress



Progress Distribution



Phase 1 Phase 2 Phase 3
Phase 4 Literature