MedTranslate – Healthcare Translation Web App

Overview

MedTranslate is a web-based healthcare translation application for real-time multilingual translation of patient-provider conversations. Users can speak in one language, see a live transcript, and receive enhanced and translated text with audio playback. The app uses Generative AI for transcription, translation, and optional grammar and medical text enhancement.

File Structure

```
MedTranslate/
├── app.py           # Flask backend with translation and enhancement API
├── home.html        # Landing page
├── static/
│   └── index.html   # Main translation interface
├── requirements.txt # Python dependencies
└── Procfile         # For Render deployment
```

Key Scripts

- **app.py**: Handles routes (`/`, `/languages`, `/process_text`), loads Hugging Face models, caches models for faster requests
- **home.html**: Landing page with Start Translating button
- **static/index.html**: Core interface with language selection, voice-to-text recording, transcription, enhancement, translation display, and audio playback; uses Web Speech API

AI Tools Used

- Hugging Face Transformers: AutoTokenizer and AutoModelForSeq2SeqLM
- MarianMT models for translation
- T5-based model for English grammar and medical enhancement
- PyTorch backend
- Web Speech API for speech recognition and audio playback

Security Considerations

- CORS configured via Flask-Cors
- No user data is stored; processing occurs in memory
- Input validation prevents empty text or unsupported languages
- Models cached in memory with fallback if unavailable

Python Dependencies

Flask==2.3.4
Flask-Cors==3.0.11
torch==2.2.0
transformers==4.34.0
sentencepiece==0.1.99
protobuf>=4.23.0
tokenizers==0.13.3
numpy==1.25.2
tqdm==4.65.0

Note: Python built-in logging used

Deployment on Render

1. Procfile content: `web: gunicorn app:app`
2. Push repository to GitHub, connect Render
3. Use Python 3.11 or compatible version
4. Build command: `pip install -r requirements.txt`
5. Start service and test via live URL

Usage Instructions

1. Open landing page, click Start Translating
2. Select input and output languages
3. Click 🎤 Start Speaking and speak naturally
4. Click ⏹️ Stop to finish recording
5. View: Original transcript, Enhanced text, Translated text
6. Click 🔊 Speak Translation for audio playback
7. Repeat as needed

MedTranslate is designed for secure, real-time healthcare translation with AI-powered enhancements.”