Healthcare Translation Web Application

Prototype Feature Guide / User Reference Manual

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1. Overview

The Healthcare Translation Web App is a voice-to-voice multilingual translator built to assist healthcare providers in communicating effectively with patients who speak different languages. The application captures the speaker's voice, transcribes the speech to text, translates it into the desired language, and plays the translated audio.

This tool enhances accessibility and reduces language barriers in medical environments where accurate and timely communication is critical.

2. Key Features

- Speech Recognition: Captures spoken language from the user in English using the Web Speech API.
- Text Translation: Converts the transcribed English text into the target language using Google Translate API.
- Audio Playback: Converts the translated text into speech using Google Text-to-Speech (gTTS) and plays the audio to the user.
- Responsive Interface: Built with React.js and Tailwind CSS, offering a clean and intuitive user interface across devices.

3. Technology Stack

- Frontend: React.js, Tailwind CSS, Web Speech API
- Backend: FastAPI (Python)
- AI Tools:
  - Googletrans for translation
  - gTTS for speech synthesis
  - (Optional) Whisper for enhanced speech recognition accuracy

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4. How It Works

1. User Clicks Start Recording
   - Triggers browser speech recognition
2. Speech Is Transcribed to Text
   - The spoken input is transcribed and displayed
3. Translation Is Requested
   - Transcribed text is sent to the backend for translation into the selected language
4. Audio Is Generated
   - Translated text is converted into speech using gTTS
5. Audio Is Played
   - The translated audio is played back to the patient

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5. Intended Use Cases

- Doctor-patient communication in multilingual clinical environments
- Emergency response teams needing instant translation
- Healthcare facilities in linguistically diverse regions

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6. Security and Privacy

- Speech input is processed in-memory without storage
- Translations are handled over secure backend routes
- Audio blobs are revoked after playback to prevent unauthorized reuse
- Recommended deploying the application over HTTPS for production environments

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7. Limitations

- Browser-based speech recognition may have limitations in noisy environments
- gTTS uses an internet connection and may be affected by latency
- Only one language (English) is supported as input in the current prototype (extendable)

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8. Future Enhancements

- User-selectable input and output languages
- Support for offline speech recognition models
- Logging and analytics for usage patterns (with privacy compliance)

- Enhanced UI/UX with accessibility features for impaired users

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9. Deployment Notes

To deploy this application:

- Host the frontend using services like Vercel, Netlify, or GitHub Pages
- Host the backend on platforms like Render, Railway, or AWS
- Ensure proper CORS configuration between frontend and backend