

Summary of Learned Skills - Offline Clinical Support Project

Embedded Systems Design

- Architected a low-resource AI system optimized for Raspberry Pi 2 (ARMv7, 1GB RAM).
- Managed fully offline operation with no cloud or GUI dependencies.
- Used systemd to create boot-time services on Linux.

Speech-Based Interaction

- Integrated Vosk for offline, lightweight speech-to-text recognition.
- Integrated eSpeak NG for compact, fast text-to-speech output.
- Designed a voice-driven interaction loop suitable for hands-free, screenless environments.

Software Architecture & Decision Logic

- Designed a robust, object-oriented decision tree system in Python.
- Implemented a simple state machine pattern to manage medical flowcharts.
- Separated domain logic (airway_tree.py) from orchestration (main.py), supporting maintainability.

Project Packaging

- Created a structured, reproducible file layout for open-source collaboration.
- Wrote a detailed README.md with installation, usage, and hardware guidance.
- Packaged project with requirements.txt and LICENSE for GitHub deployment.

Clinical Informatics Awareness

- Translated Joint Trauma System protocol logic into computable decision trees.
- Made design tradeoffs to prioritize robustness, simplicity, and speed over deep ML/NLP.

Licensing & Open Source Practice

- Applied a Creative Commons Attribution 4.0 (CC BY 4.0) license to enable global reuse.
- Prepared the codebase for public release on GitHub, with reproducible setup instructions.