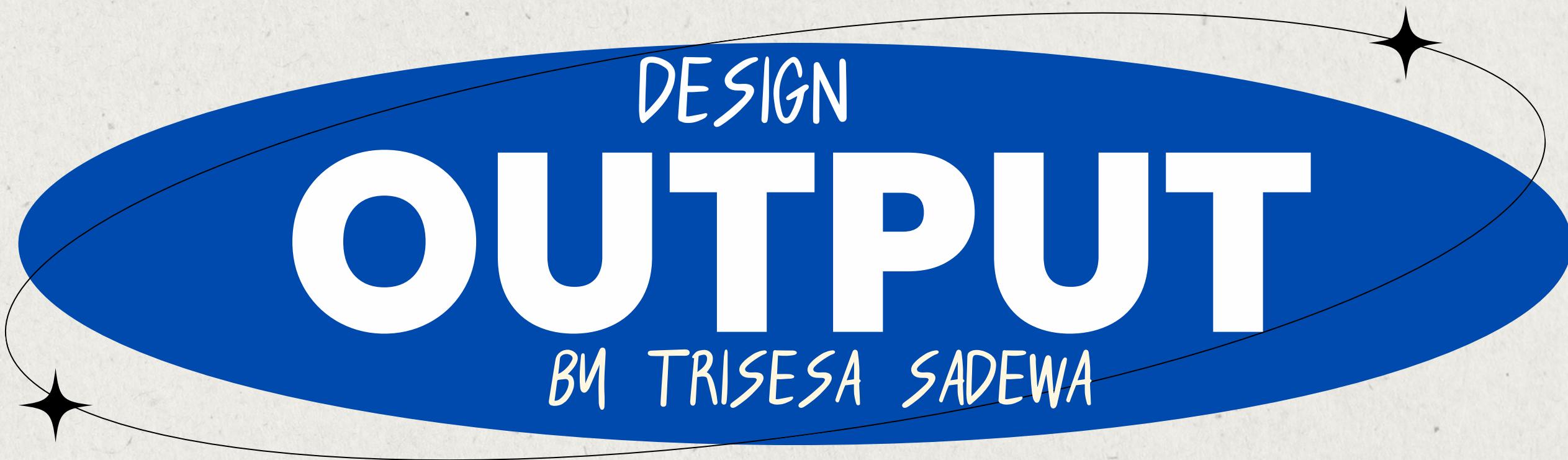




DESAIN TEKNOLOGI KESEHATAN (DTK)



5049221001



2025





ABOUT ME

DESIGN OUTPUT



CREATOR

HI I'M TRISESA SADEWA

I am a dedicated and forward-thinking undergraduate student specializing in Medical Technology at Institut Teknologi Sepuluh Nopember (ITS), a leading Indonesian institution renowned for its commitment to advancing humanity through science and technology. My academic journey is driven by a passion for integrating innovative technologies into healthcare solutions, aiming to enhance patient outcomes and contribute to the development of Indonesia's medical technology sector.

I am enthusiastic about collaborating on projects that bridge the gap between technology and medicine, and I continually seek opportunities to apply my skills in real-world settings. Let's connect to explore synergies in medical innovation and student development.



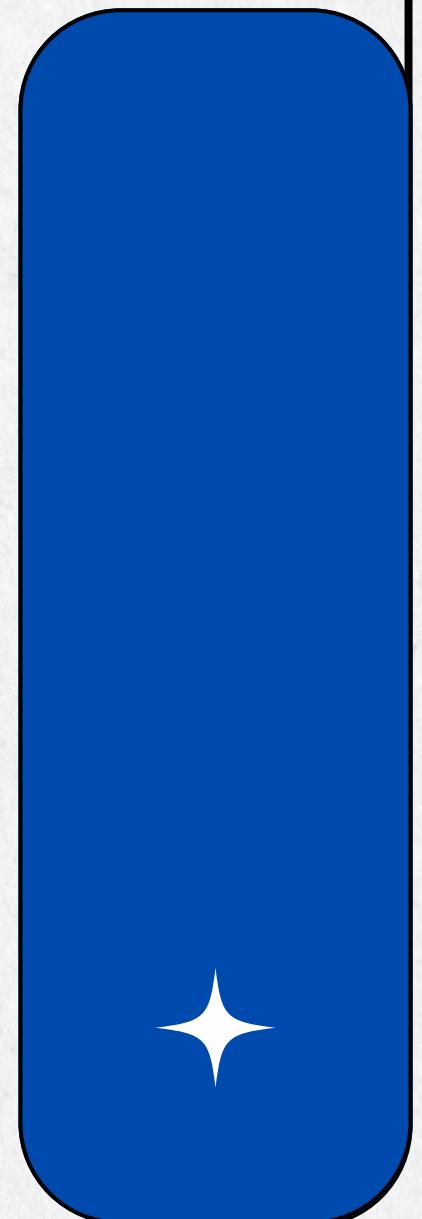


INTRODUCTION

DESIGN OUTPUT



Microtia is a congenital deformity of the external ear (pinna) characterized by a small, underdeveloped, or absent auricle. It ranges from mild structural abnormalities to anotia (complete absence of the ear). In the global context, microtia is a rare condition; however, in Indonesia and parts of East Asia, the prevalence is notably higher. Recent epidemiological data from Universitas Airlangga (2024) and RSCM Jakarta suggests a prevalence of approximately 1 in 7,000 to 8,000 births.





INTRODUCTION

DESIGN OUTPUT



The current "Gold Standard" for reconstruction in Indonesia is the Autologous Rib Cartilage Reconstruction technique, popularized by Dr. Satoru Nagata. This complex two-stage procedure involves harvesting the patient's costal cartilage (typically ribs 6, 7, 8, and 9) and carving it into a three-dimensional framework that is inserted under the mastoid skin.



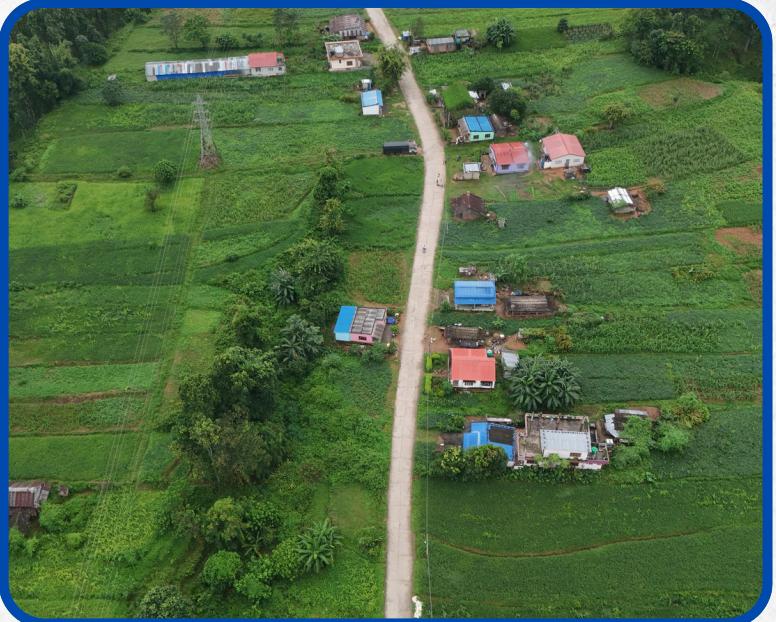


DESIGN OBJECTIVE

DESIGN OUTPUT

ACCESSABLE

Low Cloud-based AI Processing that can be accessed anywhere by only uploading 2D picture that require 0 expertise or training.



FRUGAL

Using only phone based camera to capture a 2D picture that is processed into 3D model (.STL) which can be 3D printed anywhere.



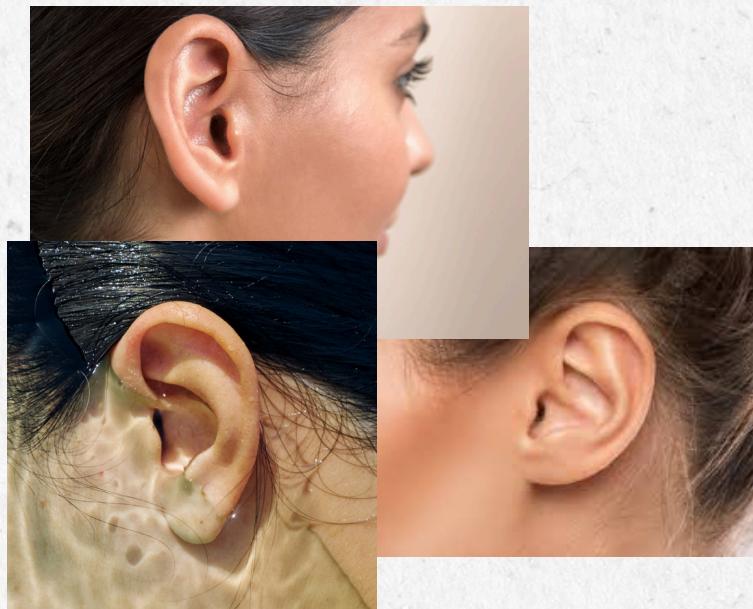
EASY AS PIE

Intuitive web-based UI design that produce results in 3 steps. Requiring 0 expertise or training.



SYSTEM FLOW

DESIGN OUTPUT



Align and crop to produce standardize images



Adjust brightness and contrast and saturation



Export outline result





TECHSTACK

DESIGN OUTPUT

SEGMENTATION

- Rapidly detects the bounding box of the ear in a 2D photo.
- Generates a precise, pixel-perfect mask of the ear base (Base Plate).



PROCESSING

- Difference of Gaussians (DoG): To extract internal cartilage ridges (Skeleton).
- Morphological Operations: To smooth masks using elliptical kernels (organic shapes).



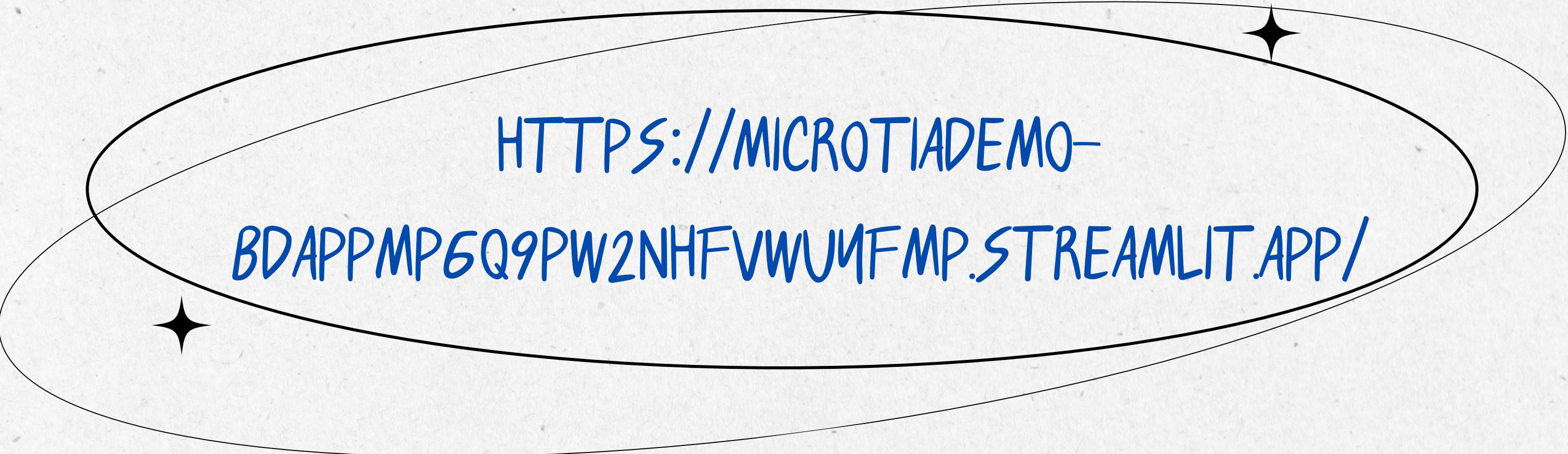
DEEP LEARNING

The backend engine running YOLO and META SAM:

- Using CUDA (Hardware-Acceleration).
- Simplify AI Training & Implementation.



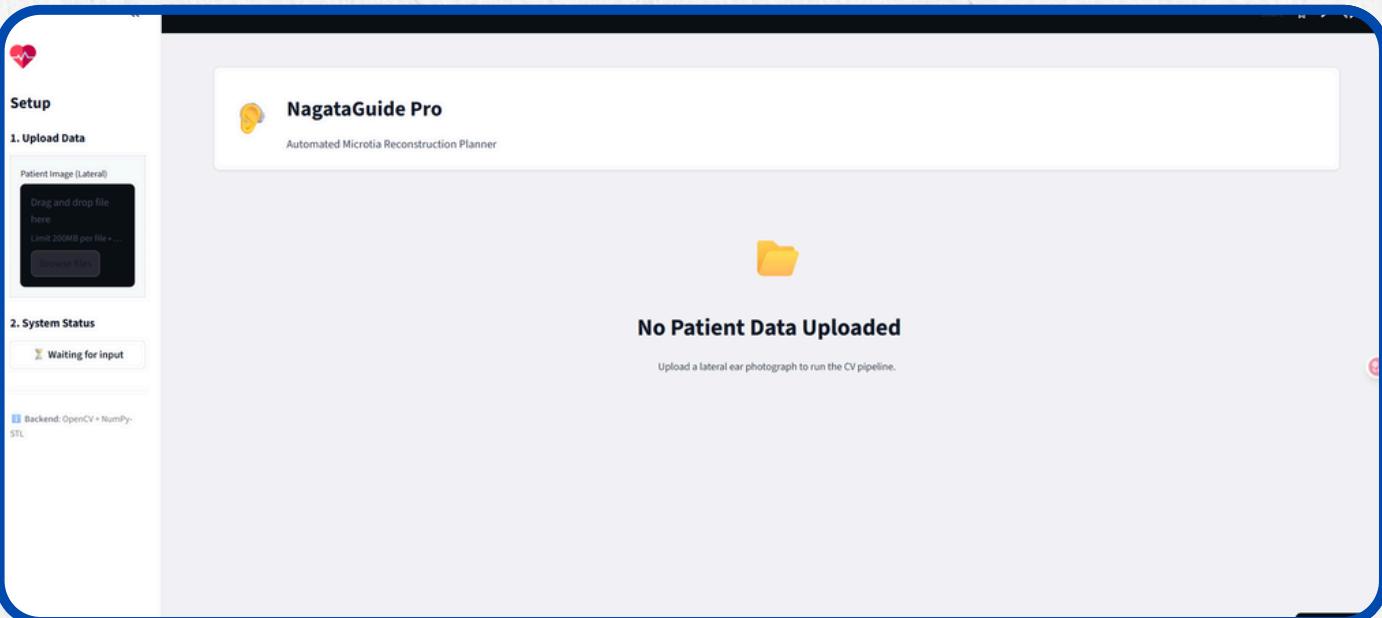
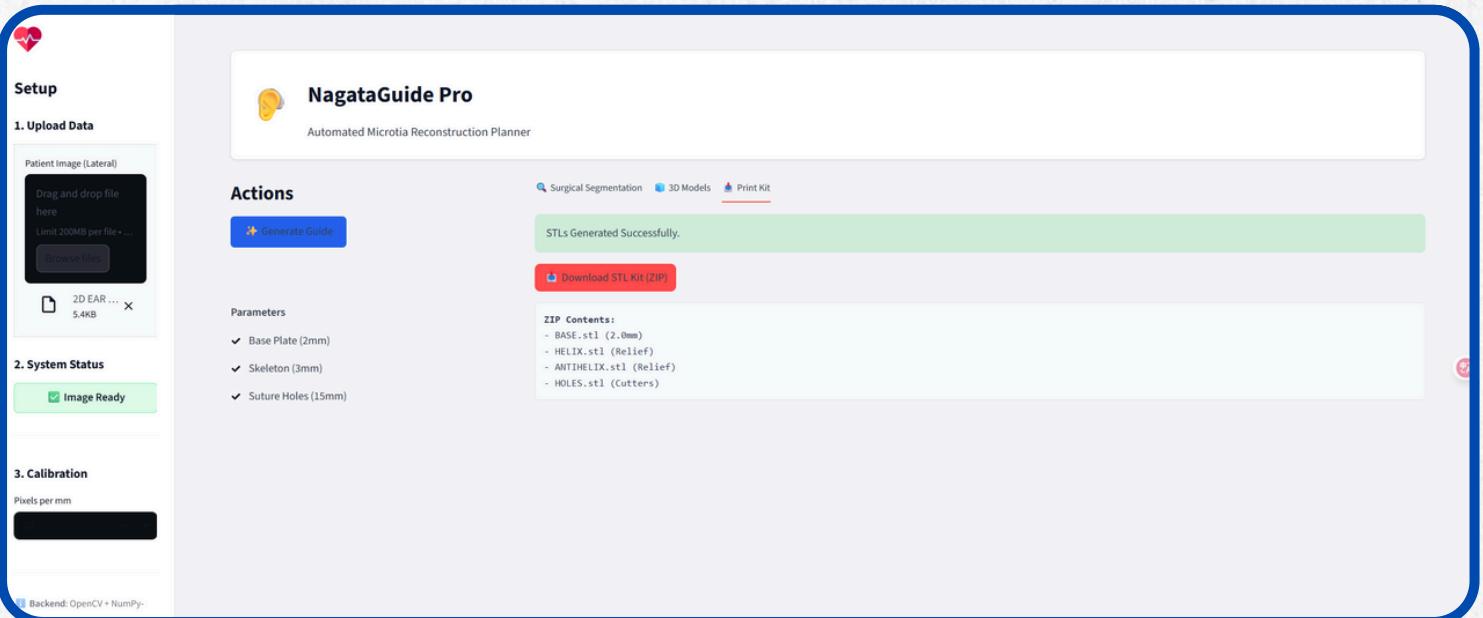
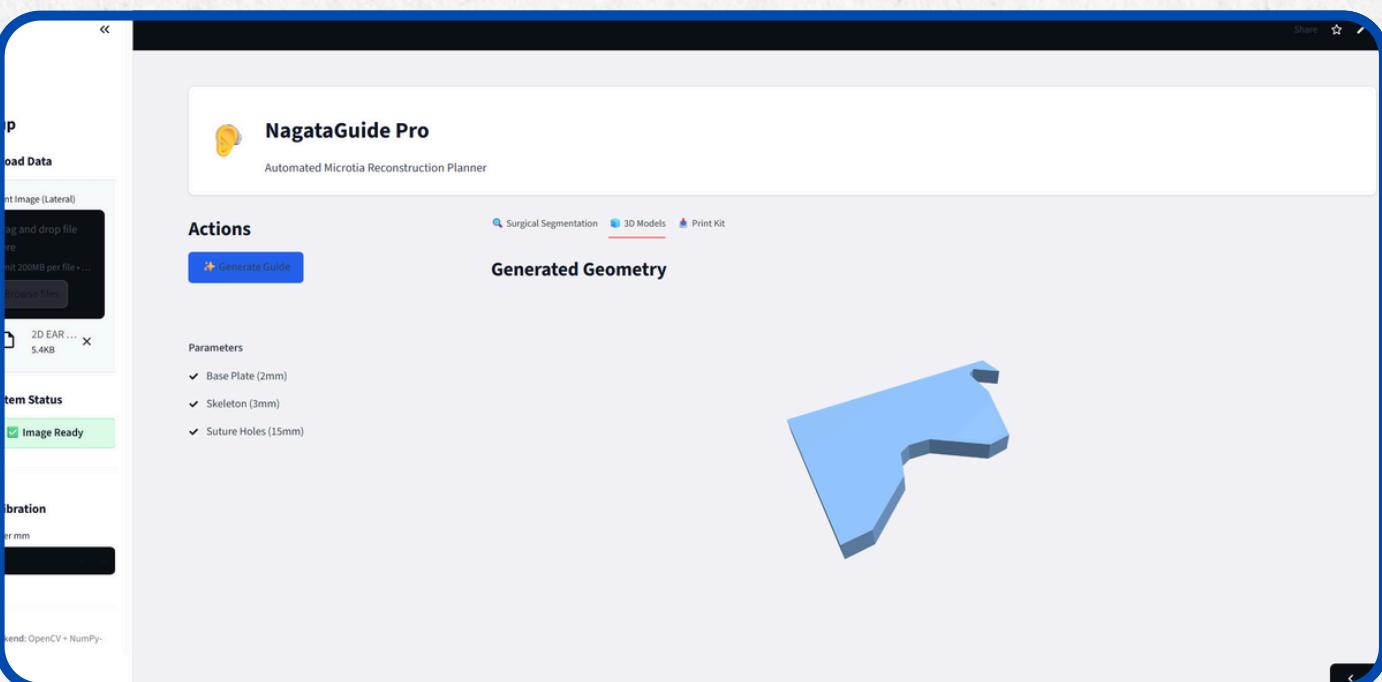
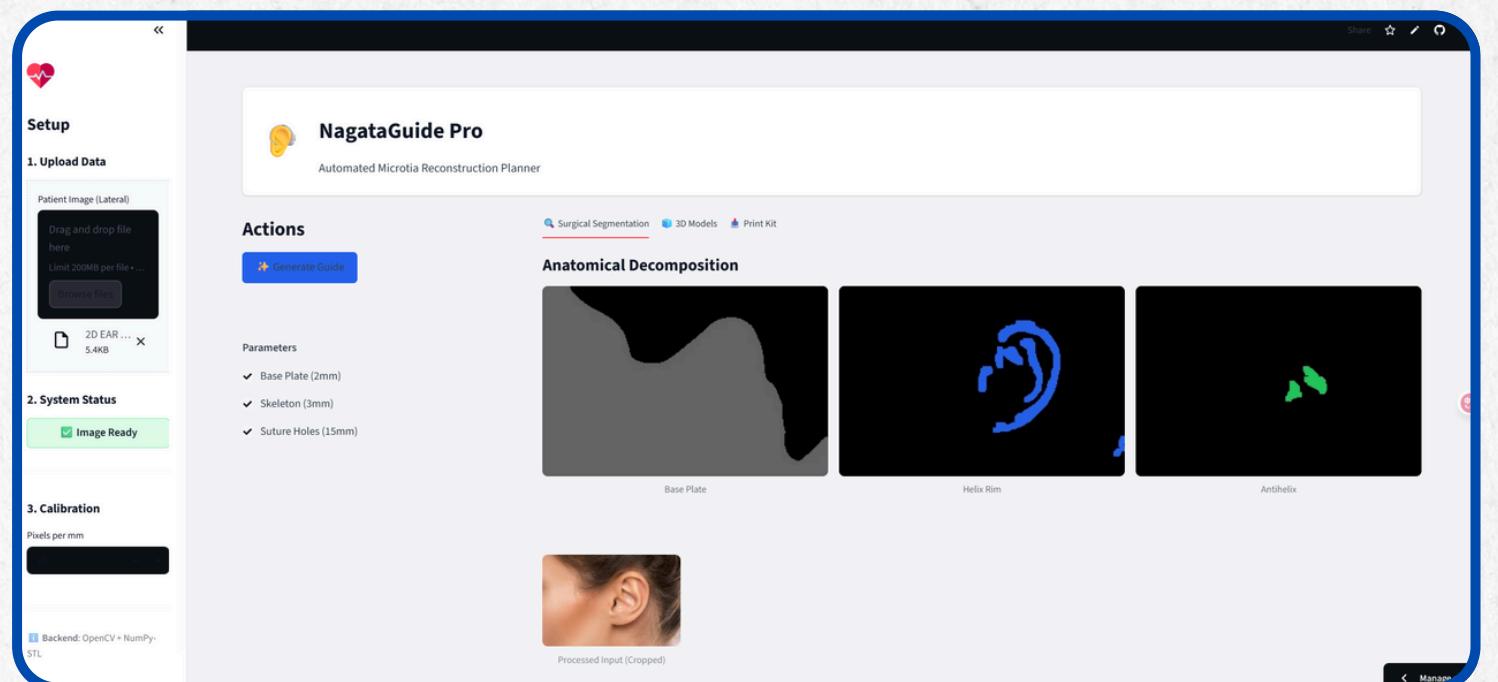
APP DEMO



HTTPS://MICROTIADEMO-
BDAPPMP6Q9PW2NHFVWUUFMP.STREAMLIT.APP/

USER INTERFACE

DESIGN OUTPUT





USER EXPERIENCE

DESIGN OUTPUT

THE TRIGGER



User drags and drops a file in the sidebar.

- Feedback: The upload widget changes state; the status badge turns Green.

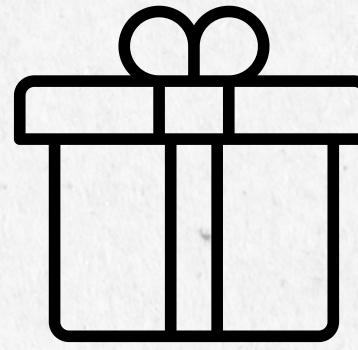
THE ACTION



The user clicks the Primary CTA Button

- Feedback: A spinner overlay ("Running Computer Vision Pipeline..."). This "busy state" tells the user the backend is working.

THE PAYOFF



The tabs appear.

- The user sees the segmentation masks (Blue/Green overlays).
- The user rotates the 3D model in the Plotly viewer.
- Result: They leave with a physical asset (ZIP file).





LET'S MAKE AN
IMPACT!