

# Semantic Brain Segmentation

Team C:

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*Client: Andrew Abumoussa, MD*

# Functional Overview

- Our users: Surgeons, medical professionals
- Our goal: Use machine learning as a tool to process radiographic images, classify their contents into useful features
- Hounsfield values allow us to roughly segment parts of image, but there is fuzziness
- Abnormal physiology/trauma to the skull can make it difficult to discern, even for trained professionals
- This tool will allow for quicker patient analysis, help make diagnostic decisions

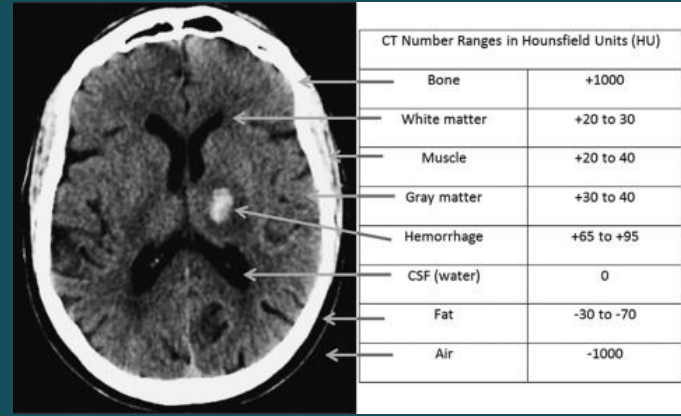


Image via ScienceDirect:

<https://ars.els-cdn.com/content/image/1-s2.0-B9780444534859000015-f01-01-9780444534859.jpg>

# User Interface Mockup

## ML-assisted Segmentation

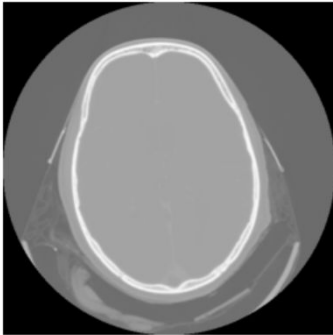
Select the relevant DICOM image(s) to be processed.

Select a file:

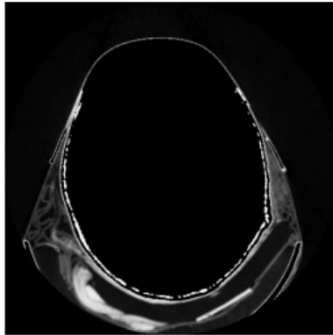
No file chosen

## ML-assisted Segmentation

Scan



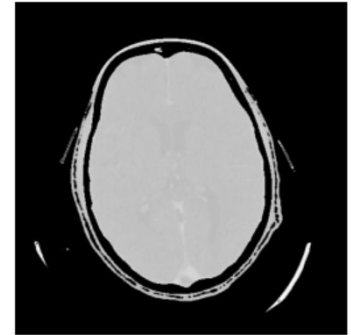
Air



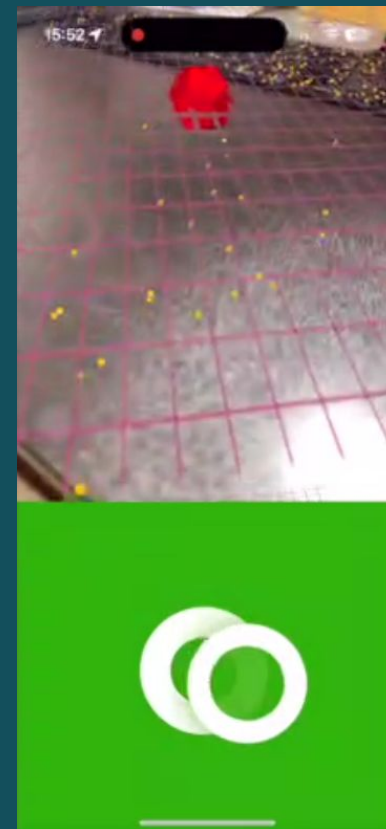
Bone



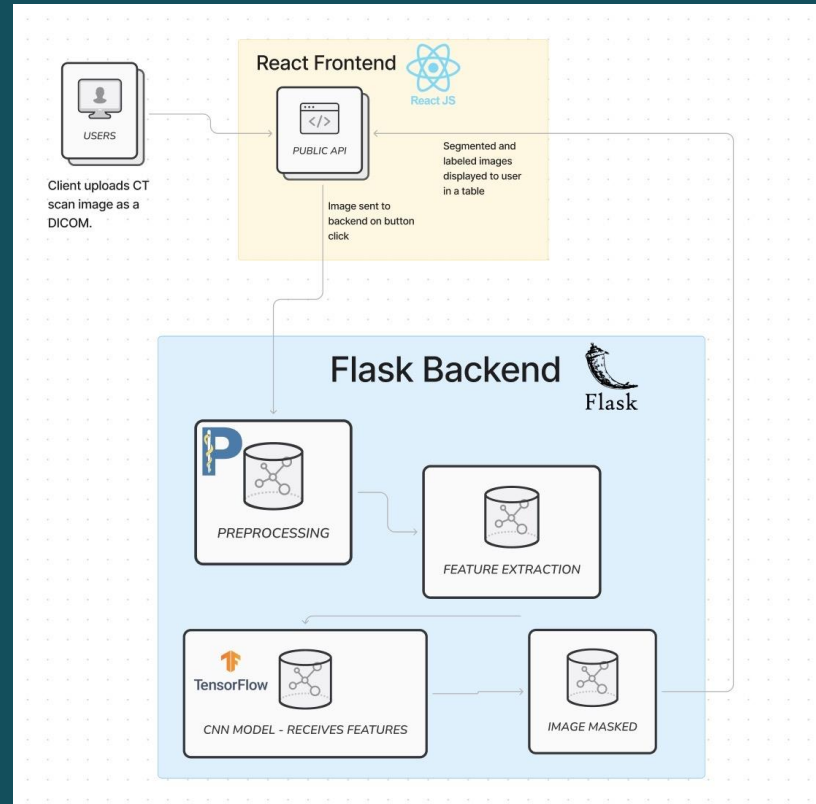
Skin/Fat/Muscle



# User Interface Mockup



# Technical Overview (Architecture Diagram)



# Platform Description

- **Programming language: Python**
  - Wide array of established packages for data processing
  - Flexible and easily readable code
  - Portable
- **Special packages: TensorFlow**
  - Aligns with client's knowledge of machine learning
  - Enables meshing with client's pre-existing application
  - Visualization
  - Popular
- **Other tools: Jupyter Notebook**
  - Quick setup + easy to use
  - Naturally segments code and prints values as it executes
  - Runs in a browser
- **Overall:**
  - We are training a model, so let's make it as easy as possible
  - We have previous experience with TensorFlow and Jupyter Notebooks