

Introduction/Background

Our project focuses on developing a highresolution 3D bone segmentation tool that converts CT scans into detailed 3D models. By integrating advanced computational techniques we aim to to provide a solution that is efficicent, user-friendly, and compatible with exisiting medical imaging systems. This technology has the potential to improve orthopedic diagnostics.

Mission Statement

Developing the ideal environment to contribute to the overall betterment of humanity's health.

Product Specifications

Metric	Importance / Relative Rank	Units	Target Value	Marginal Value
High Definition Visualization	 The product needs to be able to provide clear and precise visualization. 	р	4K	<1080p
Accuracy of Bone Reconstruction	(2) Product needs to be able to provide accurate reconstruction for orthopedic surgeons to plan procedures accordingly.	px	14px	12px
High processing speeds	(3) The product must be able to have quick segmentation and reconstruction time. Low latency in the UI response.	Seconds, Minutes	<30 seconds	1 minute
Customizable	(4) Customizable key features for ease of use	Customization Parameters	> 10 adjustable parameters for user settings	3-5 basic adjustable parameters
Bone compatible	(5) Must have a function to measure spatial compatibility between the reconstructed model and the actual model	(mm)	< 1mm	< 3mm
▼ Visualization	(6) Ensures the system can render the bone models smoothly without lag or delays	FPS	> 30 FPS	> 15 FPS
Updateable	pdateable (7) Measures how quickly updates can be applied to the system, ensuring minimal downtime for users during updates		< 5 minutes	< 15 minutes

More on product specifications here:





3D Bone Reconstruction and Segmentation

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Below are two figures: (1) Table of the dimensions taken from the reconstructed 3D print and the physical bone. (2) The time taken by our algorithm to segment and reconstruct CT scans of different slice counts.

Bone Dimension Comparison: 3D Print vs Real Bone

leasurement Area	3D Print (mm)	Real Bone (mm)	Difference (mm)	% Difference
Side View	26.19	24.31	+1.88	+7.73%
Front View	31.13	26.86	+4.27	+15.89%
Base Width	44.64	66.80	-22.16	-33.16%

Regulatory Pathway

Our 3D bone reconstruction and segmentation software qualifies as a medical device under the FDA definition and it falls under the category of Software as a Medical Device (SaMD), as defined by the FDA and the International Medical Device Regulators Forum (IMDRF). Based on regulatory classification, our product is classified as a Class II medical device

Next Steps: Reconstruction

Future steps for the project will include refining the reconstruction process to *improve efficiency, as well as* implementing new testing techniques to ensure smooth and accurate visualization.