

Image Processing Techniques Used for Dermatology Research

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Research Objective: Use Image processing techniques to segment and threshold a burn patient's arm to diagnose the level of burn.

Introduction

- The University of Dayton has partnered with Premier Health to help incorporate different medical tools into the TeleHealth cart
- This semester's focus was the Dermatology area

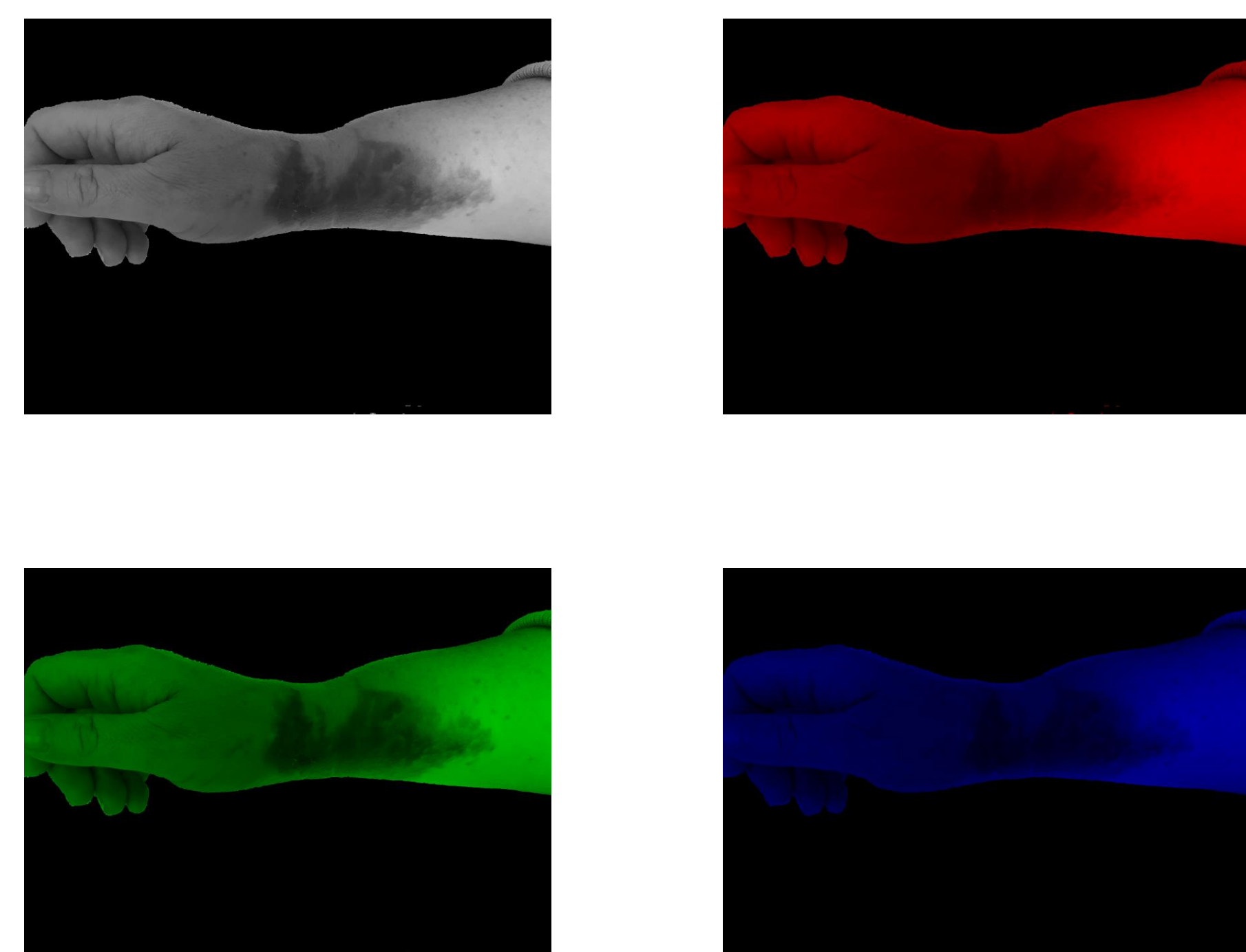


Figure 1: Color Thresholding Filters

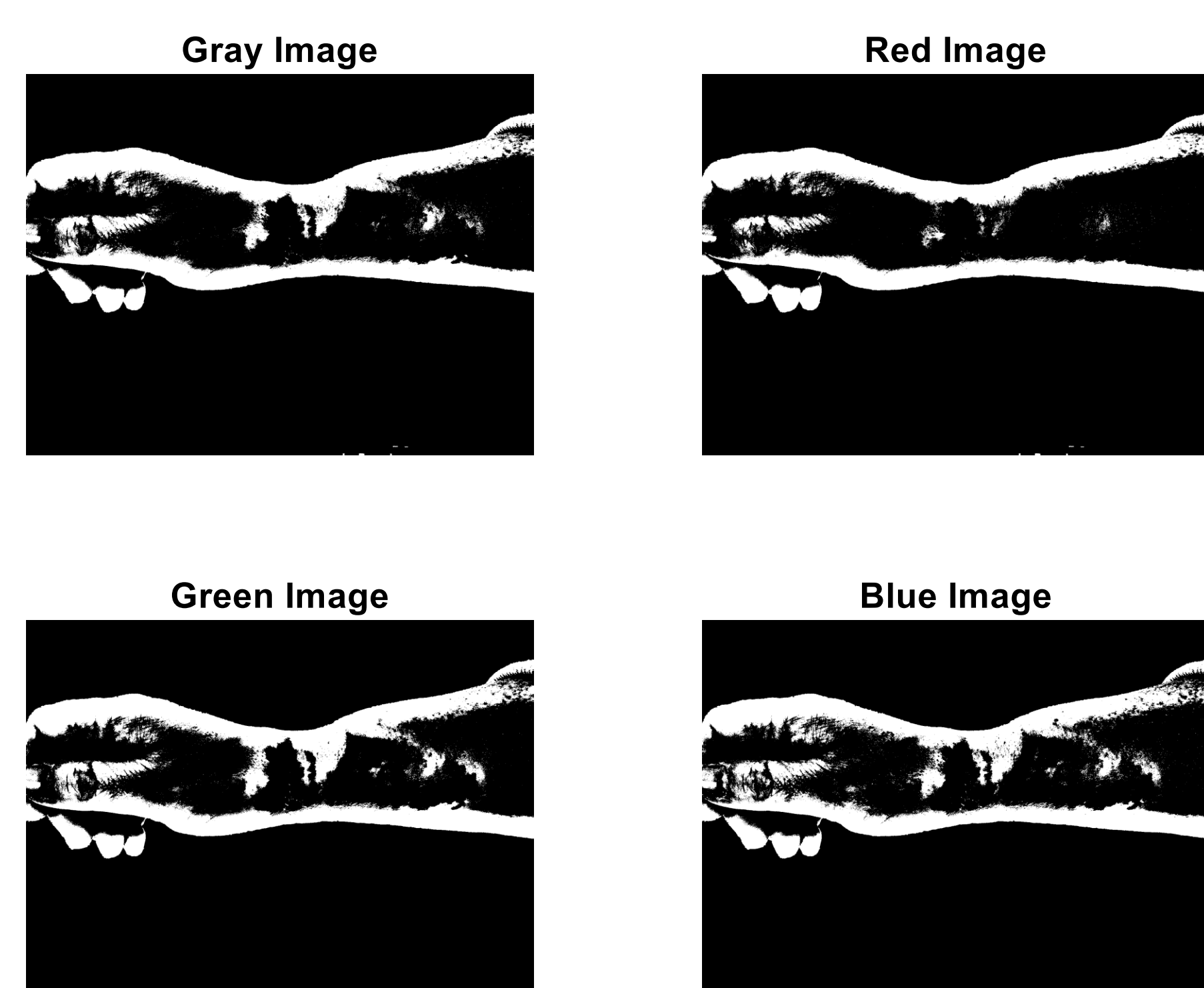


Figure 2: Binary of Colored Filtered Images

Methodology

Part 1 (Refer to Figure 1, 2)

- Capture images using iPhone 7 camera
- Segment out arm using image segmentation function on MATLAB
- Convert images to gray scale and then scale image using min-max scaling
- Use Color thresholding technique to apply color filters
- Convert to binary scale

Part 2 (Refer to Figure 3, 4)

- Convert images attained from part 1 to DICOM images
- Process group of four DICOM images through modified MATLAB [1] script
- Create 3D burn of darkest area which accounts for the deepest wound part

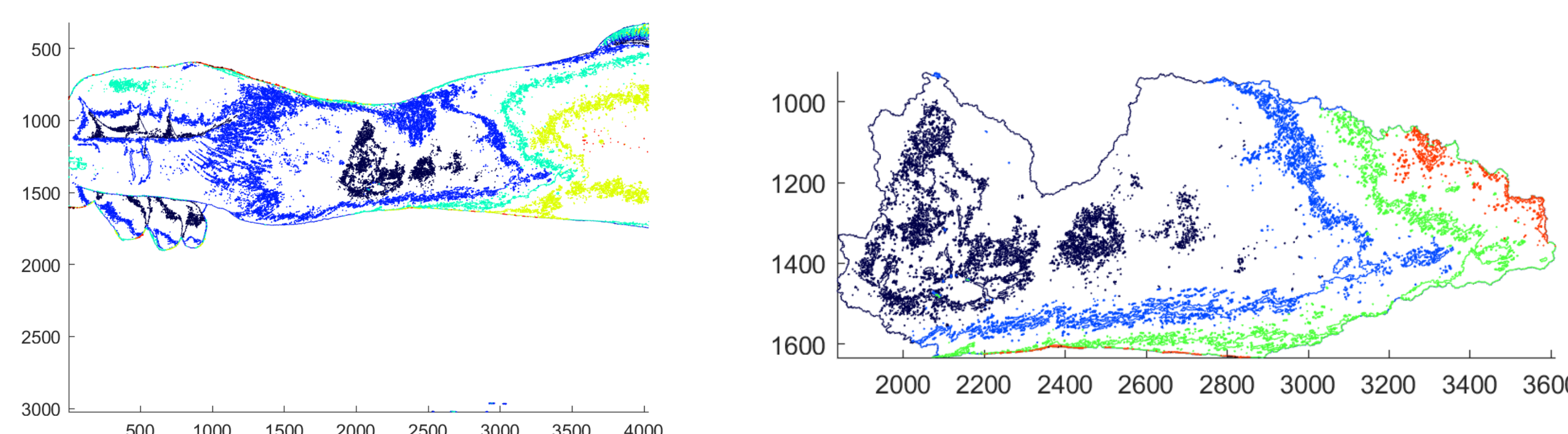


Figure 3: Color Contour Slice Mapping

Conclusions

- The deepest level of burn was determined from the data collected
- Part 1 showed that the deepest burn sections were highlighted by using a red color threshold filter

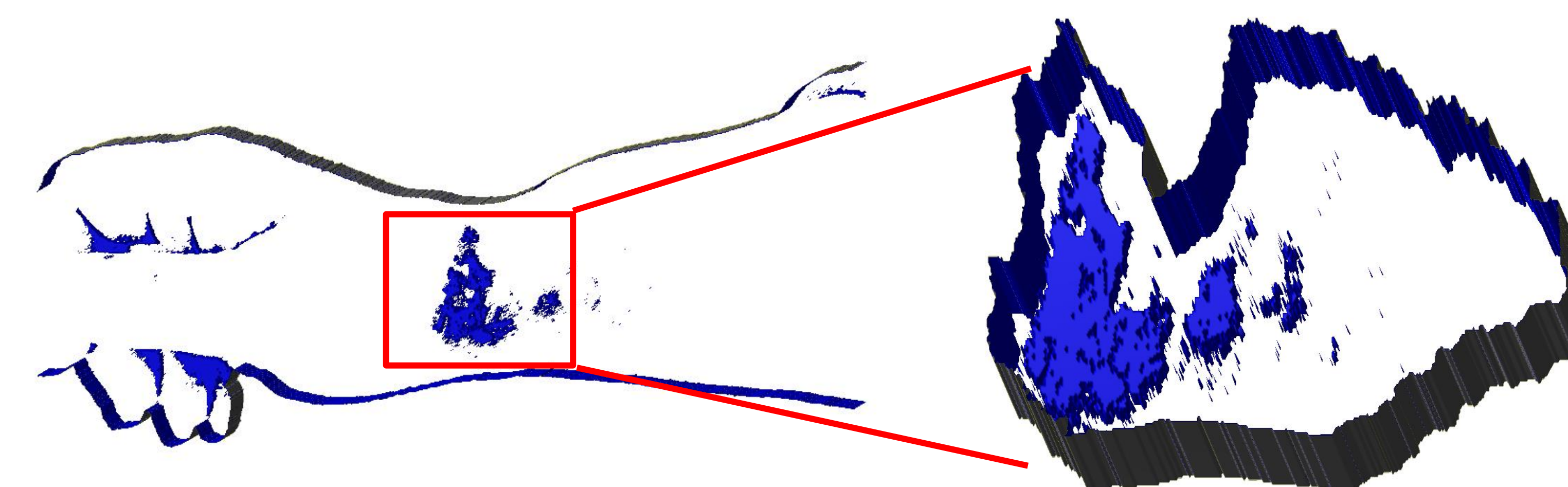


Figure 4: 3D Slice of Densest Burn Area

Recommendations

- Work on using data collected above to measure the deepest level of the burn area
- Use a DermLite scope to capture images using polarized and non-polarized light
- Apply the functions created to other skin anomalies.
- Use a monochromatic camera with a wide range of bandpass filters for better discrimination

References

- [1]"MRI Brain Segmentation - File Exchange - MATLAB Central", *Mathworks.com*, 2020. [Online]. Available: <https://www.mathworks.com/matlabcentral/fileexchange/4879-mri-brain-segmentation>.