

PROJECT OVERVIEW

Heavy Menstrual Bleeding (HMB), or Menorrhagia, is a menstrual condition defined as greater than 80 mL of blood loss per cycle. HMB can be an indicator for many serious conditions, such as endometriosis, reproductive cancer, and anemia. The most used methods to measure menstrual output volume are inaccurate and subjective. Furthermore, the volume threshold for HMB does not consider the unique characteristics between people who menstruate. This means clinicians need more insightful information about a person who menstruates menstrual output to assist in patient care. We are developing an imaging-based app solution that will utilize a machine learning model to offer an accurate and objective way to measure the menstrual blood output during a period, while also using a personalized approach to establish individual baseline blood loss values in order to predict abnormal menstrual bleeding.

THE PROBLEM



1 in 3 women experience heavy menstrual bleeding...



...but only half of those affected receive diagnosis and treatment

THE NEED:

An objective, accessible method of evaluating menstrual blood volume to facilitate prompt diagnosis & treatment of HMB

WHY?

Current assessments are subjective, inaccurate, and/or inaccessible
“Normal” menstrual bleeding is difficult to quantify

Evaluation of Menstrual Blood Output

Our app analyzes user-captured images of used menstrual pads to generate objective, accurate volume estimates and personalized insights.

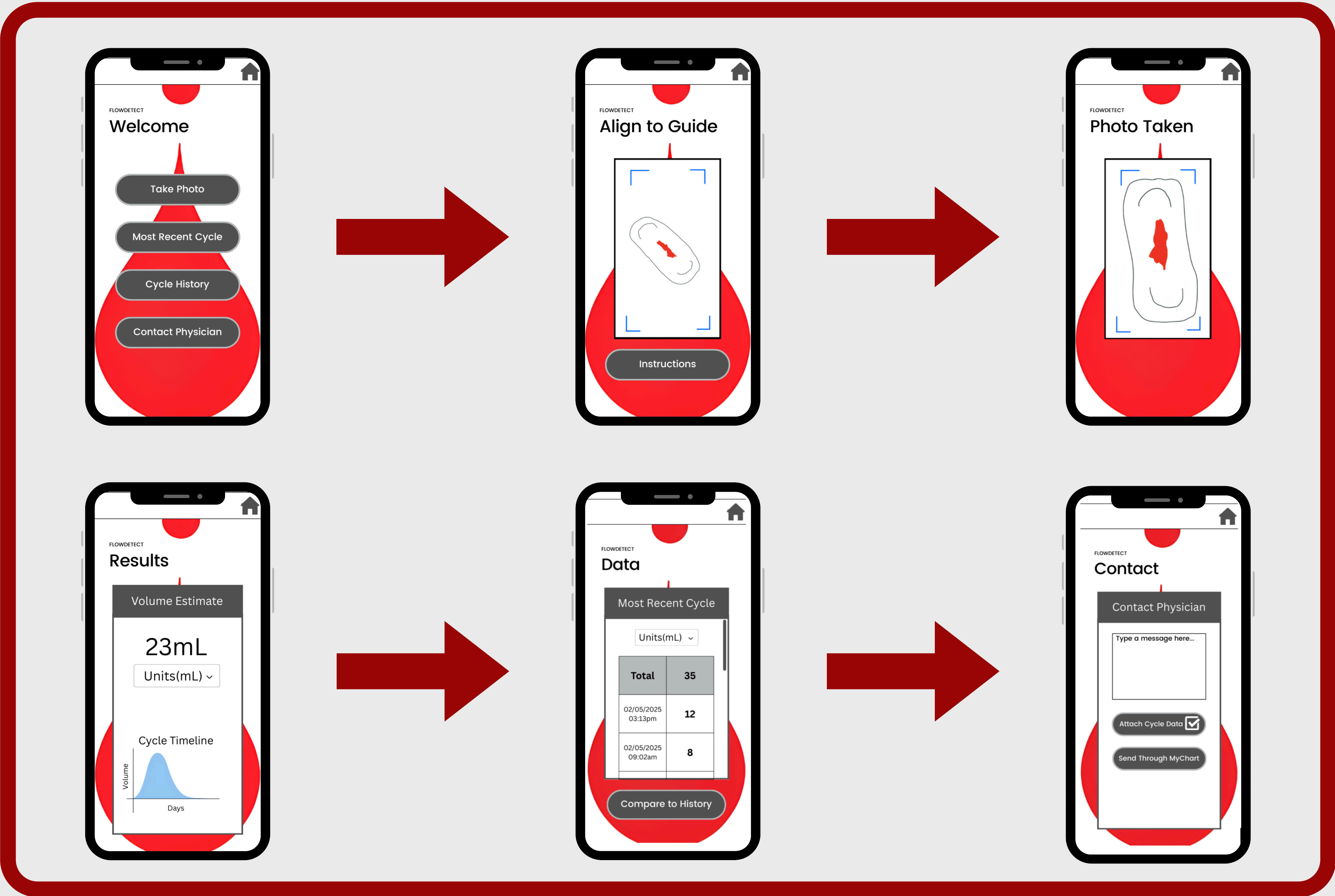
SOLUTION BENEFITS

For Users:

- Objective tracking of menstrual blood volume
- Early identification of abnormal bleeding
- Personalized health insights
- Discreet, convenient, and cost-effective

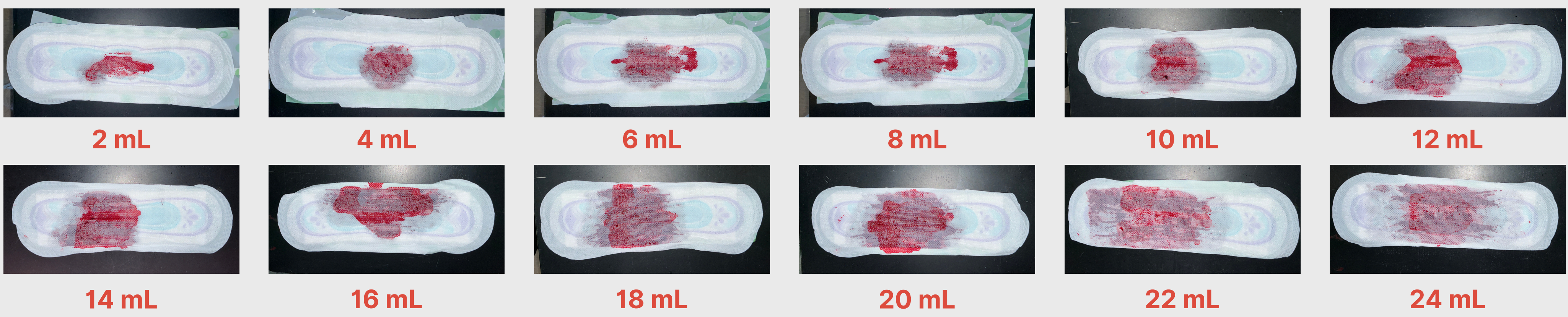
For Clinicians:

- Reduced diagnostic delay of HMB
- More productive patient appointments
- Enhanced record of patient menstrual trends
- Improved monitoring of treatment outcomes

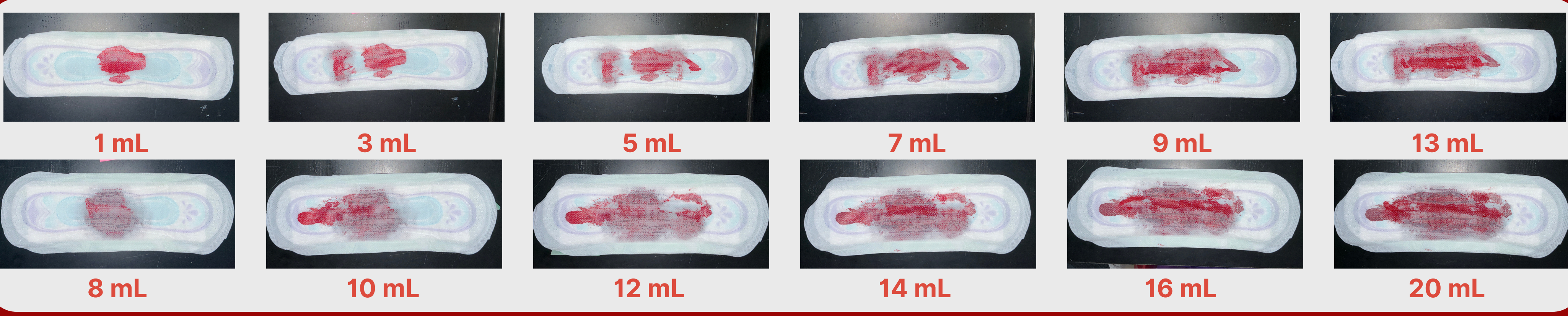


SIMULATED DATASET

Blood added all at once



Blood added incrementally



TEAM MEMBERS

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PROJECT ADVISORS

Dr. Jenell Coleman: Clinical Sponsor, Johns Hopkins Hospital Department of Gynecology and Obstetrics
Michelle Zwernemann: Faculty Mentor, Johns Hopkins University Department of Biomedical Engineering
Jay Taylor: Design Team TA, Johns Hopkins University, Center for Bioengineering Innovation & Design

HMB reduces quality of life and often leads to anemia - which can cause serious complications

OUR PERFORMANCE

Tested preprocessing code on 100 images for successful segmentation and color normalization

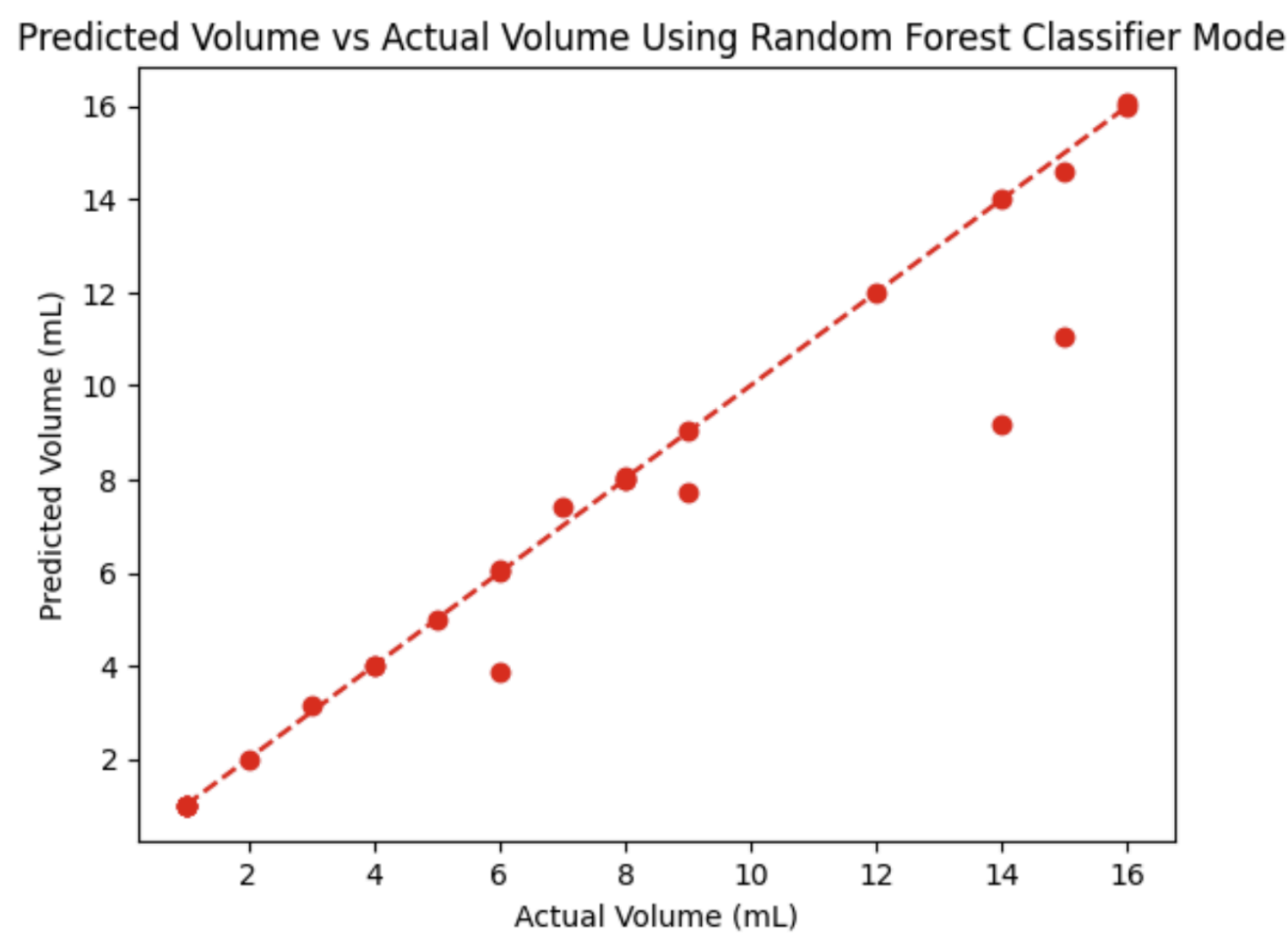
90%

Preprocessing model accuracy at segmenting pad

Tested machine learning algorithm on menstrual pads saturated with known volumes of porcine blood

90%

ML model accuracy at predicting volume within $\pm 2\text{mL}$



REFERENCES

Graphics generated by Canva