GROUP 18
Artwork Super-resolution Scanning Application

Sam Schaphorst, Reece Dodge, Isaac Plambeck, Garrett Powell

Please email feedback to radodge@iastate.edu

Project Overview - Problem Statement

- Freelance artists with small budgets and limited income
- No current cheap/easy solution to digitizing physical artwork
- No way to monetize physical artwork (aside from sale)
- Large-scale prints require high resolution images
- Difficult to create a "backup" of a painting

Project Goals

- Have a functioning program capable of the following functions automatically
  - Border detection
  - Image overlay
  - Perspective correction
  - Color correction
  - Noise Reduction
- Simplified algorithms to reduce computation time
  - Current method within photoshop requires excessive and unnecessary processing power
- Implement ability for user confirmation to ensure high quality results
 - Allow the user to make minor adjustments if necessary

Project Overview - Process Flow

PHASE 1

- Artwork Capture
- Artwork Upload
- Corner Detection
- Perspective Correction
- Color Correction
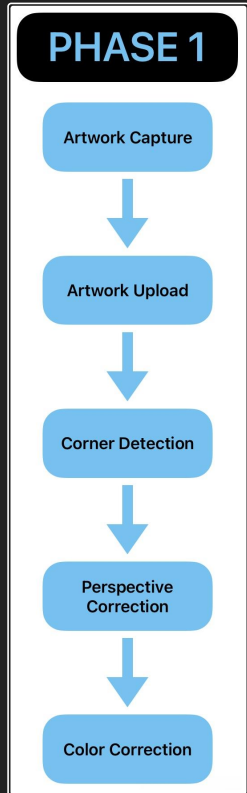
➔ Currently developing in process phase 1

➔ Artwork capture, upload, corner detection, and perspective correction algorithms are working

➔ Perspective correction and color correction are being developed concurrently

PHASE 2

- Image Superposition
- Image Compositing
- Resolution Scaling
- Noise Reduction
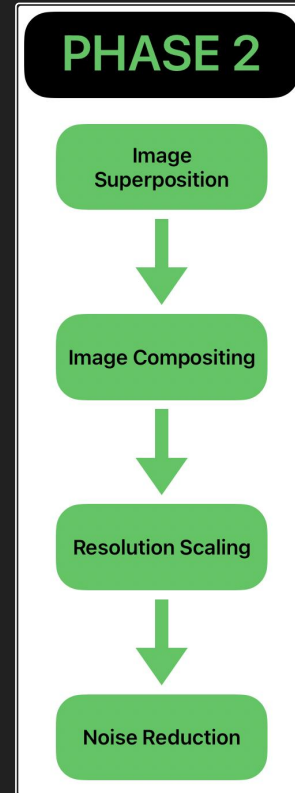
➔ Process phase 2 is expected to begin in the 2nd half of the semester

Accomplishments Since Last PIRM

- Built corner-mounted brackets for AruCo markers and color correction cards
- Working AruCo detection algorithm
- Working perspective correction algorithm
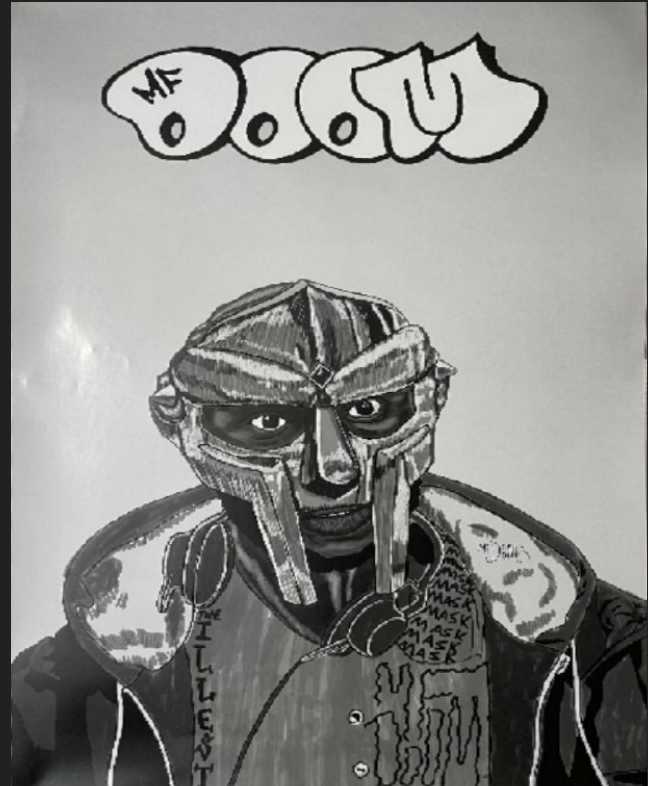- Baseline color correction algorithm

Corner Brackets Mounting to Artwork
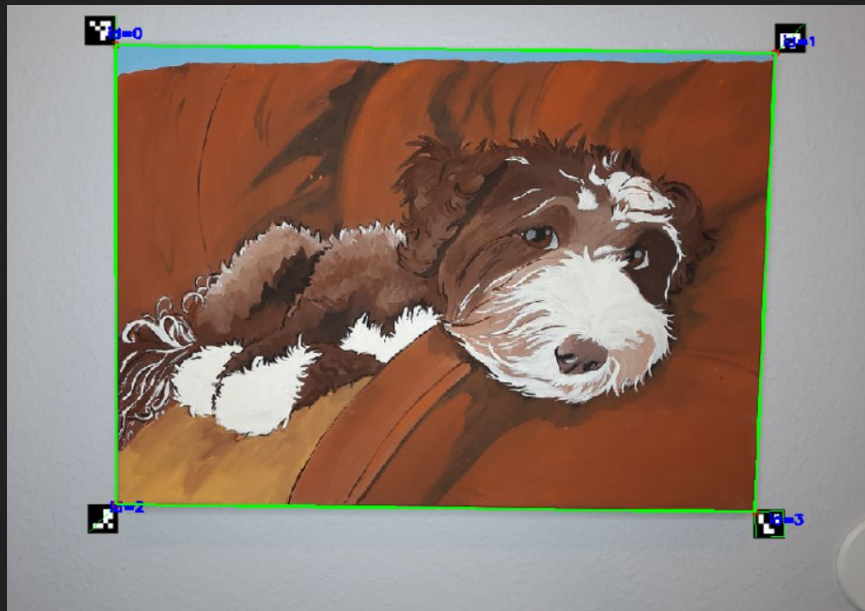
- Wooden L-brackets
    - Tensioned with simple velcro straps
    - Pantone cards for localized color correction
    - AruCo markers will be added

Crop and Perspective Change Working

Crop and Perspective Change Working

Automatic Color Correction with Pantone Cards - Process

Reference Pantone

Image Needing Color Correction

Color Corrected Image

Automatic Color Correction with Pantone Cards - Implementation

Input

Output

Biggest Technical Challenges

- Color correction
  - Detecting pantone cards
  - Incorporating color correction algorithm
  - Consistently detecting ArUco markers on all 4 pantone cards
- Compiling all functions together
  - Ensuring functions are compatible and do not interfere with each other
- Unfamiliarity with opencv functions
  - Aruco commands
- Limited to cheap and accessible hardware
  - Smartphone camera
  - Pantone color match cards
  - Wood brackets and velcro

Thank you!