

The background is a dark blue gradient with a subtle starry pattern. On the left side, there are several overlapping circular and semi-circular elements. A prominent feature is a large circular scale with tick marks and numbers ranging from 140 to 260. Other elements include dashed circles, solid circles, and curved lines, some with arrows indicating direction. The overall aesthetic is technical and futuristic.

DESIGN SECTION

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DESIGN CONTEXT

Area	Description	Examples
Public health, safety, and welfare	Our application for an artwork super-resolution scanner does not affect the general well-being of the public.	N/A
Global, cultural, and social	Our project aims to protect the values and practices reflected by all groups it may affect. The art community is the primary group in mind, while smaller sub-groups stem from that. This can include each individual's ethnic culture.	Maintain a large amount of original detail from the artwork. Preserving the decisions of the artists as it may pertain to their communities/cultures.
Environmental	Due to the project taking the form of a software application, we do not expect the artwork super-resolution scanner to have any environmental impact.	N/A
Economic	We aim for our project to have as little economic impact as possible. Ideally, there will be no need for any user to spend money on the application.	The application will be free to use for all users. Image capture through the use of already accessible hardware, such as smartphones.

DESIGN CONTEXT-USER NEEDS

- Artists need their work in a digital environment
- High quality
- High resolution

DESIGN CONTEXT-PRIOR WORK/SOLUTIONS

- The process to create a super-resolution image for artwork exists today
- Can be accomplished by using already available software, such as Adobe Photoshop
- each step can be performed manually
- By creating an application to perform these processes automatically, the time it takes to digitize artwork will be dramatically reduced while lessening the required processing power

DESIGN CONTEXT-TECHNICAL COMPLEXITY

- Our project consists of multiple components that each utilize distinct scientific, mathematical, or engineering principles.
- to create a super-resolution image, several image processing techniques/algorithms will need to be applied to the image.
- This is seen through border detection, perspective correction, and noise reduction.
- Final design of the project will be a software application.
- The program will be based in Python and will utilize several existing libraries to create the application.

DESIGN EXPLORATION-DESIGN DECISIONS

- Image stitching vs no image stitching
- Having a scanner like physical component vs free hand
- Using a raspberry pi camera vs user handheld phone camera

DESIGN EXPLORATION-IDEATION

- Image stitching vs no image stitching
 - We found that image stitching would yield more accurate and detailed results.
 - We considered many different things including perspective correction, border detection, image alignment, noise reduction, and pixel mapping.

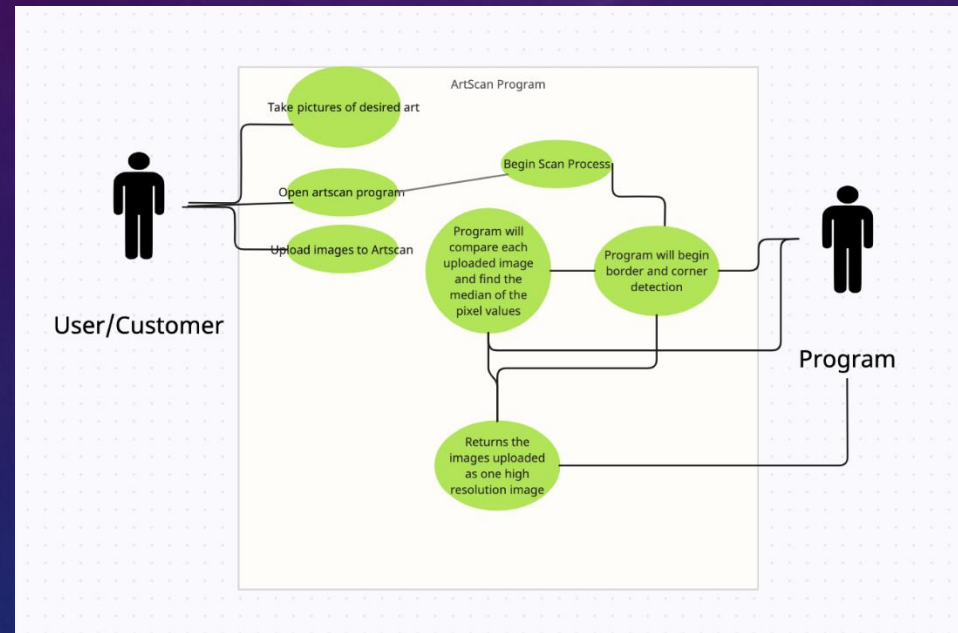
DESIGN EXPLORATION-DECISION MAKING AND TRADE OFFS

- In order to make decisions on different aspects of our project we typically all give our own inputs listing mainly the cons and then discuss how we could possibly resolve the given cons

PROPOSED DESIGN

- Functioning GUI
 - Capable of taking in and displaying images
 - Manual cropping abilities
- Different image processing techniques
 - Autonomous border detection
 - Corner detection
 - Perspective correction
 - Noise reduction.

PROPOSED DESIGN-DESIGN AND VISUAL



PROPOSED DESIGN-DESIGN AND VISUAL CONT.

- diagram shows our main objective
- We want to make the GUI as convenient as possible for the consumer.
- implementing different image processing techniques
 - border detection
 - noise reduction
 - perspective correction
 - image stitching
 - image alignment
 - using open cv

PROPOSED DESIGN-FUNCTIONALITY

- Goal is to make the process of using our product as convenient as possible.
- Implementing a GUI
 - Easy navigation and quick, accurate results.
- Currently have a functioning GUI with upload capabilities

PROPOSED DESIGN-AREAS OF CONCERN AND DEVELOPMENT

- Main concern is how accurate the different aspects of the image processing will be.
 - Want to have our program attain at least 85-90% accuracy.
 - We will need to continuously test each image processing aspect of our program to ensure the accuracy is consistent
- Debugging process

DESIGN ANALYSIS

- Proposed design has not been tested yet
- Could include more image processing techniques in proposed design
- Goal is to maximize consumer convenience
- Yield accurate detailed results