

## Overview

The purpose of this document is to track the active set of specifications that are used for the CSCI 2340: Software Engineering Art Generation semester-long project. Throughout the semester, this document will be maintained to accurately reflect the requirements that are used within the system. The requirements are broken into separate sections: Art Generation Output (AG\_ART\_SPC), Frontend (AG\_FR\_SPC), and Backend (AG\_BE\_SPC) Specifications.

**# Think about this granularity of every aspect of design that we have? What design choices have you had to make in your own system? What design choices have you had to make when integrating with other teams? Completing a list of these can lead to a huge list of trackable specifications.**

# We need specs for the different data sets we are going to use

# We need specs for the different modules we are going to use

# We need specs for how we are going to control the modules

# We need specs for what dataset maps to what aptch

# We need specs for codecs, for data transmission, file types, etc

# Any data being sent needs a requirement for why it is being sent and specifications for how it is being sent

# Specifications for number of videos that can be saved, number of data sets that can be uploaded

## Art Generation Specifications

### AG\_ART\_SPC\_1

**Description:** Art generation videos shall be five seconds in duration



**Associated Requirement(s):** AG\_ART\_REQ\_4

### AG\_ART\_SPC\_2

**Description:** Art generation videos shall be created in a .mov file type.

**Associated Requirement(s):** AG\_ART\_REQ\_5

### AG\_ART\_SPC\_3

**Description:** Art generation videos shall be at fixed pixel resolution of  X .

**Associated Requirement(s):** AG\_ART\_REQ\_6

### AG\_ART\_SPC\_4

**Description:** All art generation files shall be saved with the art generation id in the file name to create a unique file.

**Associated Requirement(s):** AG\_SYS\_REQ\_7

### AG\_ART\_SPC\_5

**Description:** A comprehensive unit test should be made for the loop module

**Associated Requirement(s):** AG\_ART\_REQ\_7

#### AG\_ART\_SPC\_6

**Description:** A comprehensive unit test should be made for the instance module

**Associated Requirement(s):** AG\_SYS\_REQ\_7

#### AG\_ART\_SPC\_7

**Description:** A comprehensive unit test should be made for the earthquake module

**Associated Requirement(s):** AG\_ART\_REQ\_7

#### AG\_ART\_SPC\_8

**Description:** A comprehensive unit test should be made for the watercolor module

**Associated Requirement(s):** AG\_SYS\_REQ\_7

#### AG\_ART\_SPC\_9

**Description:** A comprehensive unit test should be made for the shore module

**Associated Requirement(s):** AG\_ART\_REQ\_7

#### AG\_ART\_SPC\_10

**Description:** A one second buffer delay shall be added for art generation to prevent corruption of the output file.

**Associated Requirement(s):**

### Frontend Specifications

#### AG\_FR\_SPC\_1

**Description:** Google OAuth should be used to create a user account

**Associated Requirement(s):** AG\_USR\_REQ\_9

#### AG\_FR\_SPC\_2

**Description:** Videos should be received on the Frontend as an \*.mp4 file type

**Associated Requirement(s):** AG\_SYS\_REQ\_5

#### AG\_FR\_SPC\_3

**Description:** Art generation module selections shall be sent to the Backend as a one-indexed number

**Associated Requirement(s):** AG\_SYS\_REQ\_9

#### AG\_FR\_SPC\_4

**Description:** Parameter sliders shall be used to control all user parameters including color and numeric values.

**Associated Requirement(s):** AG\_USR\_REQ\_11

#### AG\_FR\_SPC\_5

**Description:** Non-color parameter sliders shall be sent to the Backend as a value between a range of 0 to 99

**Associated Requirement(s):** AG\_USR\_REQ\_10

#### AG\_FR\_SPC\_5

**Description:** Color parameter sliders shall be sent to the Backend as a six-digit hexadecimal value.

**Associated Requirement(s):** AG\_USR\_REQ\_10

#### AG\_FR\_SPC\_6

**Description:** If the parameter slider is color, bit 31 of the integer being sent across the network shall be set to 1, else, bit 31 shall be set to 0.

**Associated Requirement(s):** AG\_USR\_REQ\_15

#### AG\_FR\_SPC\_7

**Description:** User selections shall be sent to the Backend as an unsigned integer.

**Associated Requirement(s):** AG\_USR\_REQ\_10

#### AG\_FR\_SPC\_8

**Description:** The Frontend shall always send six slider values to the backend for an art generation request

**Associated Requirement(s):** AG\_SYS\_REQ\_13

#### AG\_FR\_SPC\_9

**Description:** The Frontend shall always send one module selection to the backend for an art generation request

**Associated Requirement(s):** AG\_SYS\_REQ\_13

#### AG\_FR\_SPC\_10

**Description:** Unpopulated sliders for an art generation request shall be sent from the Frontend as '0'.

**Associated Requirement(s):** AG\_SYS\_REQ\_13

#### AG\_FR\_SPC\_11

**Description:** A series of buttons will control the way in which the user selects the art generation module.

**Associated Requirement(s):** AG\_USR\_REQ\_13

#### AG\_FR\_SPC\_12

**Description:** A /generator page displays art created from parameters selected in the /options page.

**Associated Requirement(s):** AG\_USR\_REQ\_1

#### AG\_FR\_SPC\_13

**Description:** From the /generator media player, users can download their full art media locally.

**Associated Requirement(s):** AG\_USR\_REQ\_2

#### AG\_FR\_SPC\_14

**Description:** When signed in, screenshot and record buttons allow users to save pictures and videos of their art to their /user page from /generator.

**Associated Requirement(s):** AG\_USR\_REQ\_5

#### AG\_FR\_SPC\_15

**Description:** When signed out, buttons from AG\_FR\_SPC\_14 are not available.

**Associated Requirement(s):** AG\_USR\_REQ\_5

#### AG\_FR\_SPC\_16

**Description:** Generated art in /generator page should be dynamically sized to fit all functional ratios of screen dimensions.

**Associated Requirement(s):** AG\_USR\_REQ\_1

#### AG\_FR\_SPC\_17

**Description:** When signed out, the /user page prompts the user to sign in via Google OAuth.

**Associated Requirement(s):** AG\_USR\_REQ\_5

#### AG\_FR\_SPC\_18

**Description:** Saved art is displayed in a grid and sliding carousel as thumbnails; users can toggle between the grid and carousel display via button at the top of the page.

**Associated Requirement(s):** AG\_USR\_REQ\_5

#### AG\_FR\_SPC\_19

**Description:** Clicking on a saved art thumbnail in /user opens a media display that shows the full artwork (whether screenshot or video).

**Associated Requirement(s):** AG\_USR\_REQ\_5

#### AG\_FR\_SPC\_20

**Description:** While a specific artwork is displayed in /user, a button allows users to see which options from /options were originally selected to generate the image.

**Associated Requirement(s):** AG\_USR\_REQ\_5

#### AG\_FR\_SPC\_21

**Description:** A log out button is at the bottom of the screen of /user page to sign out

**Associated Requirement(s):** AG\_USR\_REQ\_9

## Backend Specifications

### AG\_BE\_SPC\_1

**Description:** Videos should be sent to the Frontend as an \*.mp4 file type.

**Associated Requirement(s):** AG\_SYS\_REQ\_5

### AG\_BE\_SPC\_2

**Description:** The Backend shall convert the output \*.mov file into an \*.mp4 that is to be used for sending to the Frontend.

**Associated Requirement(s):** AG\_SYS\_REQ\_5

### AG\_BE\_SPC\_3

**Description:** A FIFO Queue should be used to service the user art generation requests in order

**Associated Requirement(s):** AG\_SYS\_REQ\_3

### AG\_BE\_SPC\_4

**Description:** The maximum size of the queue holding art generation requests is 64.

**Associated Requirement(s):** AG\_SYS\_REQ\_6

### AG\_BE\_SPC\_5

**Description:** The art generation id should be a unique identifier for each individual art generation request

**Associated Requirement(s):** AG\_SYS\_REQ\_7

### AG\_BE\_SPC\_6

**Description:** The art generation id should increment every time a new art generation request is made.

**Associated Requirement(s):** AG\_SYS\_REQ\_7

### AG\_BE\_SPC\_7

**Description:** The art generation id should be used to send video data to the front end.

**Associated Requirement(s):** AG\_SYS\_REQ\_7

#### AG\_BE\_SPC\_8

**Description:** The Backend should only maintain the 10 most recent log files while running. All other log files must be deleted.

**Associated Requirement(s):** AG\_SYS\_REQ\_1

#### AG\_BE\_SPC\_9

**Description:** The Backend should only maintain the 10 most recent video output files while running. All other video output files must be deleted.

**Associated Requirement(s):** AG\_SYS\_REQ\_1

#### AG\_BE\_SPC\_10

**Description:** The Backend shall receive a one-indexed number from the Frontend representing the art module which will be used to utilize the appropriate patch for art generation.

**Associated Requirement(s):** AG\_SYS\_REQ\_9

#### AG\_BE\_SPC\_11

**Description:** For non-color parameter sliders, the Backend shall receive a value 0 to 99 from the Frontend.

**Associated Requirement(s):** AG\_SYS\_REQ\_10

#### AG\_BE\_SPC\_12

**Description:** For color parameter sliders, the Backend shall receive a six-digit hexadecimal input from the Frontend.

**Associated Requirement(s):** AG\_SYS\_REQ\_10

#### AG\_BE\_SPC\_13

**Description:** If slider data corresponds to a non-color parameter, then the data must be scaled to be used for a specific art generation module.

**Associated Requirement(s):** AG\_SYS\_REQ\_11

#### AG\_BE\_SPC\_14

**Description:** If slider data corresponds to a color parameter, then the data must be converted to a series of three values in range 0 to 1.0.

**Associated Requirement(s):** AG\_SYS\_REQ\_11

#### AG\_BE\_SPC\_15

**Description:** To determine if slider data is related to color or non-color, compare the mode bit sent across with the number.

**Associated Requirement(s):** AG\_SYS\_REQ\_12

#### AG\_BE\_SPC\_16

**Description:** The Backend shall always receive six values of slider data for an art generation request.

**Associated Requirement(s):** AG\_SYS\_REQ\_13

AG\_BE\_SPC\_17

**Description:** The Backend shall always receive one value for module selection for an art generation request.

**Associated Requirement(s):** AG\_SYS\_REQ\_13

AG\_BE\_SPC\_18

**Description:** The Art Generation Driver should store the following data for art generation in a JSON file: instance id, art generation output path, art module id, and user input parameters.

**Associated Requirement(s):** AG\_SYS\_REQ\_14

AG\_BE\_SPC\_19

**Description:** Based off of the module, TouchDesigner art generation objects should be initialized with a JSON file that contains all necessary data for art generation.

**Associated Requirement(s):** AG\_SYS\_REQ\_14

AG\_BE\_SPC\_20

**Description:** The Art Generation Driver shall start TouchDesigner and provide it with all necessary data to perform art generation.

**Associated Requirement(s):** AG\_SYS\_REQ\_15

AG\_BE\_SPC\_21

**Description:** The Art Generation Driver shall not start another TouchDesigner instance until the current art generation request has finished.

**Associated Requirement(s):** AG\_SYS\_REQ\_3

AG\_BE\_SPC\_22

**Description:** TouchDesigner patch control objects shall be initialized at the start of every TouchDesigner patch

**Associated Requirement(s):** AG\_SYS\_REQ\_14

AG\_BE\_SPC\_23

**Description:** If TouchDesigner initialization fails, TouchDesigner shall immediately exit and notify the Art Generation Driver Subsystem.

**Associated Requirement(s):** AG\_SYS\_REQ\_14