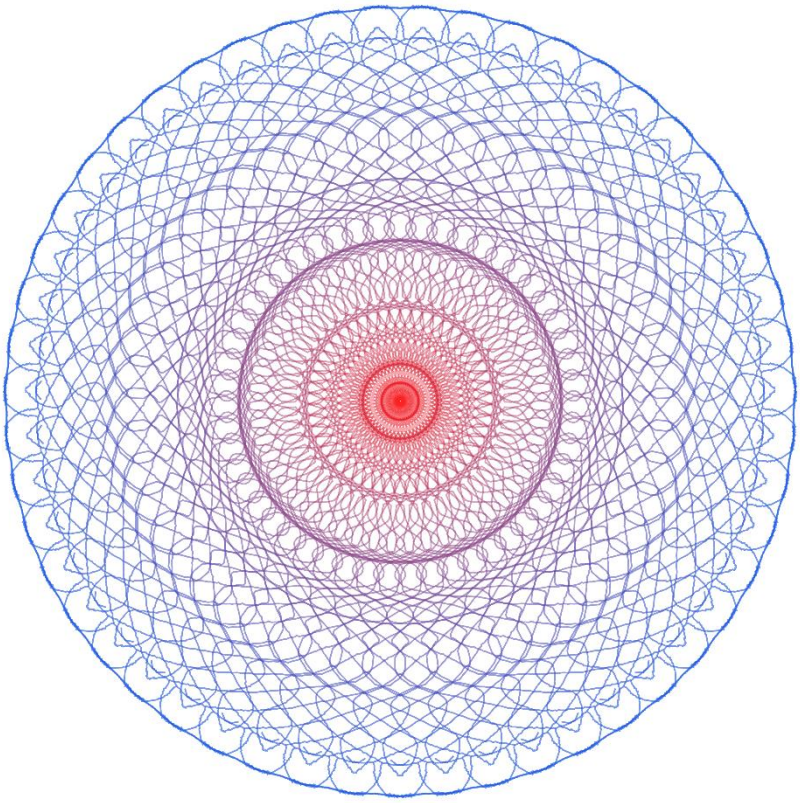
Avant Garde

HANDSFREE CANVAS



December 5, 2019

Group 3: Choi Lam Wong, Eduardo Battistini, Nian Ran
Supervisors: Jarnail Chudge, Ann Paradiso

COMP0016 Systems Engineering

Abstract:

AVANT GARDE is a handsfree painting application in which users are able to draw beautiful images and patterns using eye-tracking technology. It aims to foster a relaxing experience as well as creative expression. For this, two modes will be included, Fleur and Libre.

Fleur will explore the creation of mandalas, which will be generated using a carefully designed drawing mechanism that will ensure users are able to accurately draw lines using their eyesight. The amount of movement on the screen that could distract a user's gaze will be minimised to ensure this.

Libre will allow the user to create paintings freely with some small help from the system, and will aim to reenact a classic paint application, with the handsfree design as a priority.

Progress:

In the last several weeks, the focus for our team has been ideation and planning. From the design of the application's general concept, to individual features and their implementations, most of Avant Garde's plan has been finished. This report will outline the progress so far, in hopes of some feedback regarding design choices and the importance of different features.

Tasks Accomplished:

- UWP Application structure has been explored and the correct environment in Visual Studio was set up.
- A DevOps pipeline using Azure was set up, to generate automated builds, testing, and deployment on git pushes.
- A project management board was made on Azure.
- A skeleton version of the application was developed, with basic painting functionality, (intended for use with mouse). (Fig. 10-12)
- Wireframes of each screen in the application were made. These were intended to be conceptual, and describe the look and feel of the final application. (Fig. 1-5)
- A detailed list of features the application will include was created.
- The development of a website to present the project's portfolio was begun.
- A list of features to ensure the application is compatible for Hands Free users was designed.
- A development plan has been made with goals to complete by January 17, 2020.

MoSCoW:

Must

- Color Picker
- Eraser
- Set Background Color
- Undo/Redo Stroke
- Save/Load
- Bucket Fill
- Handsfree Interaction Mechanism *
- Eye Paths *
- Pen Tool *
- Mandala Drawing Algorithm (*Fleur*)

Should

- Additional Drawing Algorithms (*Fleur*)
- Color Theme Picker (*Fleur*) (Fig. 6)
- Generate Video (*Fleur*)
- Additional Brush Styles
- Add shapes to the canvas (*Libre*)

Could

- Color changing background
- Make mandala video rotate

Additional Information *

- The Handsfree interaction mechanism involves the canvas and all previously drawn graphics becoming blurred out to allow the user to focus very closely on the line or shape they are drawing. (Fig 5)
- The Eye Path feature will allow the user to drag a specific image onto the canvas, to guide their eyesight in drawing a specific line by tracing around it with their gaze, as a ruler would guide a pencil. (Fig 7)
- The Pen Tool will allow the user to pinpoint two separate points on the canvas, and a third point will appear bisecting the line. This point will be movable, to enable the user to make a curved line. (Fig 8)

Prototype Deliverables:

Must

- UI implementation
- Tobii Eye Tracker Integration
- Color Picker
- Undo/Redo
- Basic Brush
- Handsfree Interaction
- Basic Mandala Algorithm
- Eraser

Should

- Eye Paths
- Pen Tool
- Add Shape
- Color Theme Picker

Risk Analysis

Feature	Risk	Fallback
UI Implementation	May not be the most usable design possible. Once integration is done, UI will be reevaluated.	UI is redesigned to better suit needs.
Color Picker	Having a full color picker may be difficult to use.	Use a limited set of predefined colors.
Pen Tool	Math/theory behind coding this may be too advanced and could give us difficulty.	Guidance would be sought from our mentors at UCL.
Handsfree Interaction	After testing this feature may not provide significant benefit to the users.	A skeleton version of this feature will be made, tested, and then a decision will be made.
Eye Paths	The Eye trackers available may be too inaccurate to accurately trace a path.	More focus will be given to the pen tool to be the primary drawing method.
Add Shape	Moving and resizing shapes could be difficult to program.	Guidance would be sought from our mentors at UCL.

Wire Frames:

Figure 1. Intro Page

Figure 2. Menu

Figure 3. Fleur

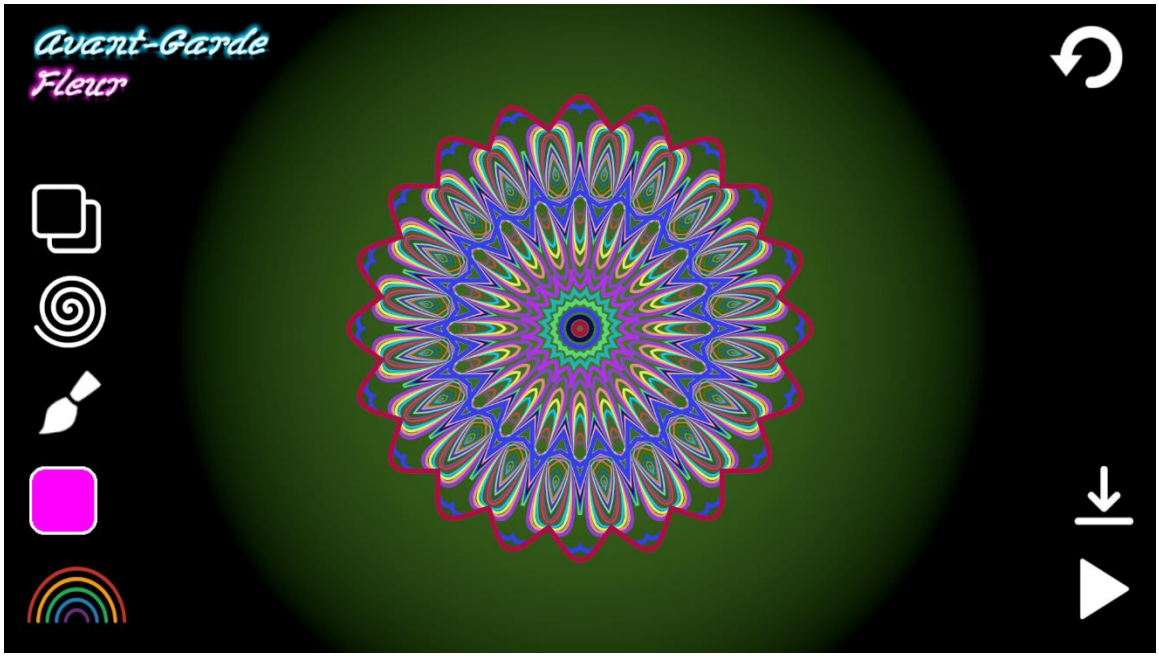


Figure 4. Libre

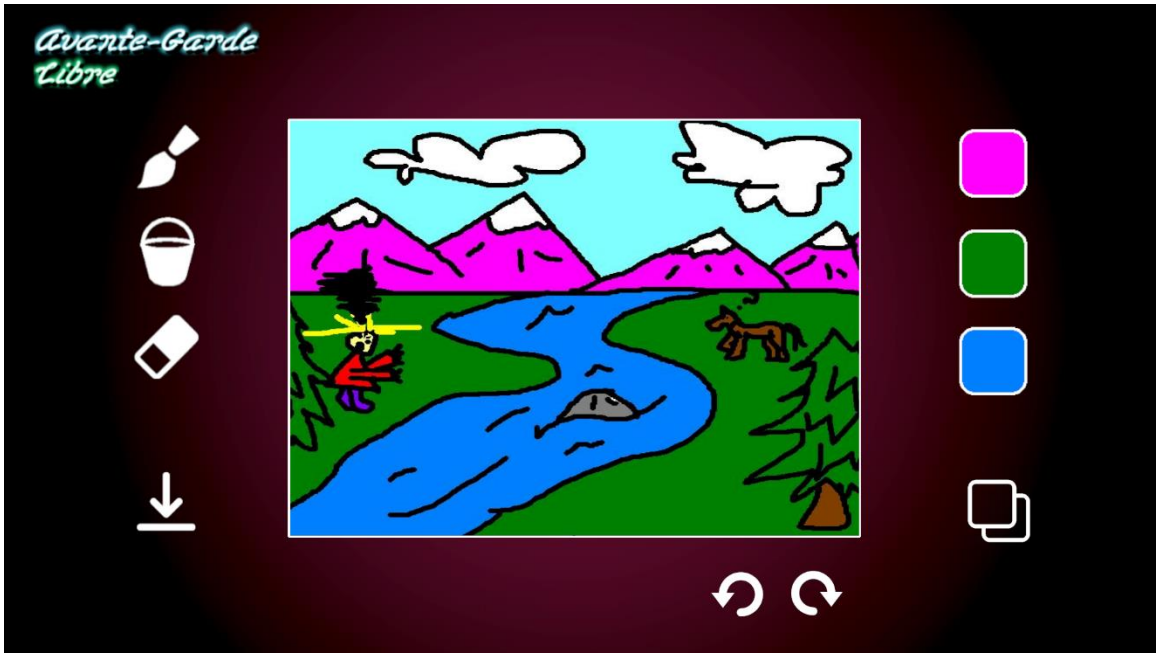


Figure 5. Handsfree Interaction

Rough Sketches of Additional Features:

Figure 6. Color Picker

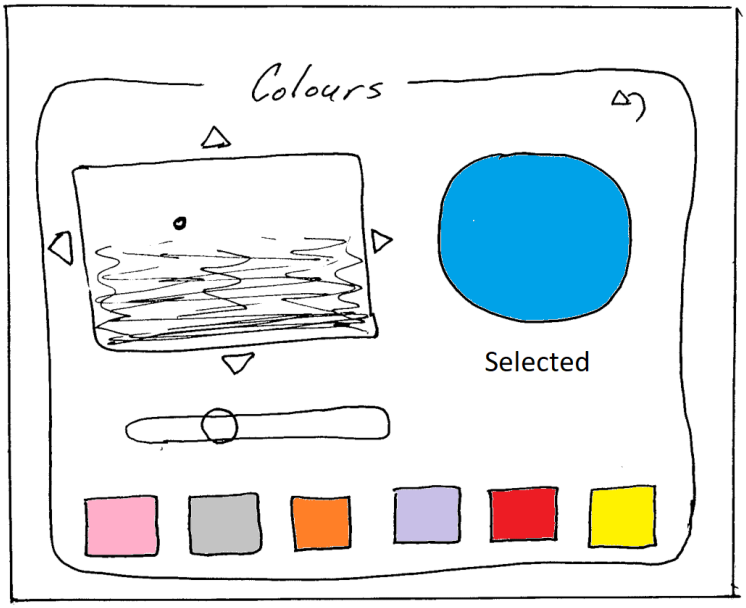


Figure 6. Color Theme Picker (*Fleur*), will allow the user to pick a color scheme, and colors will be alternated automatically for each stroke.

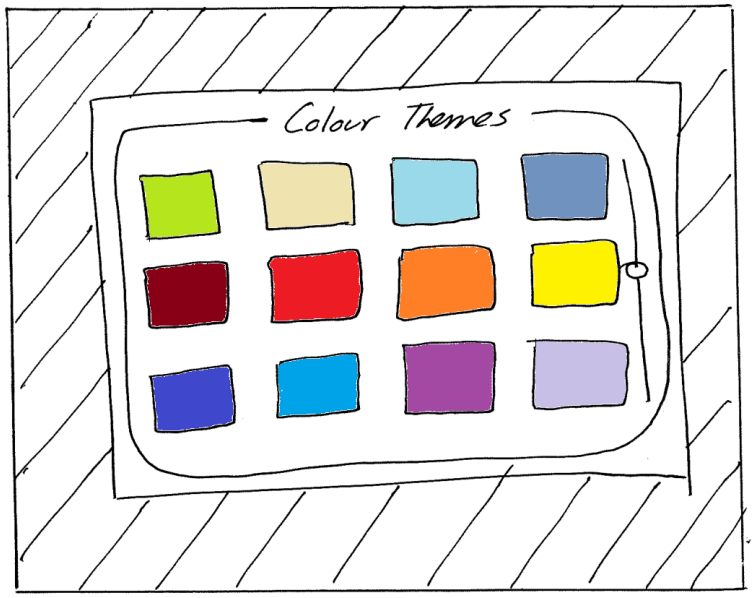


Figure 7. Eye Path Template Picker

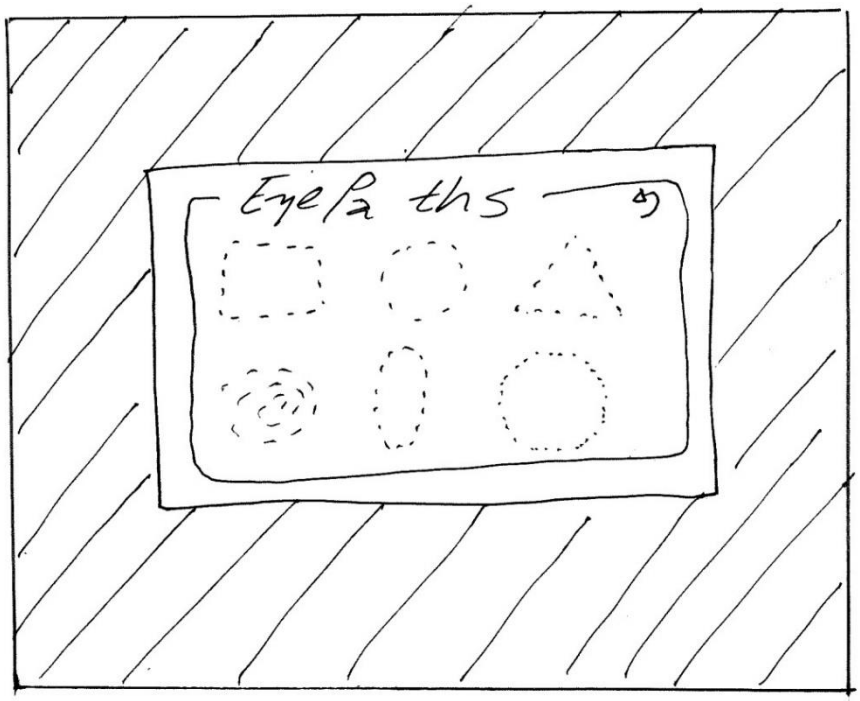


Figure 8. Pen Tool, in addition, the UI for *Libre* will use this format to ensure the canvas can occupy as much of the screen as possible.

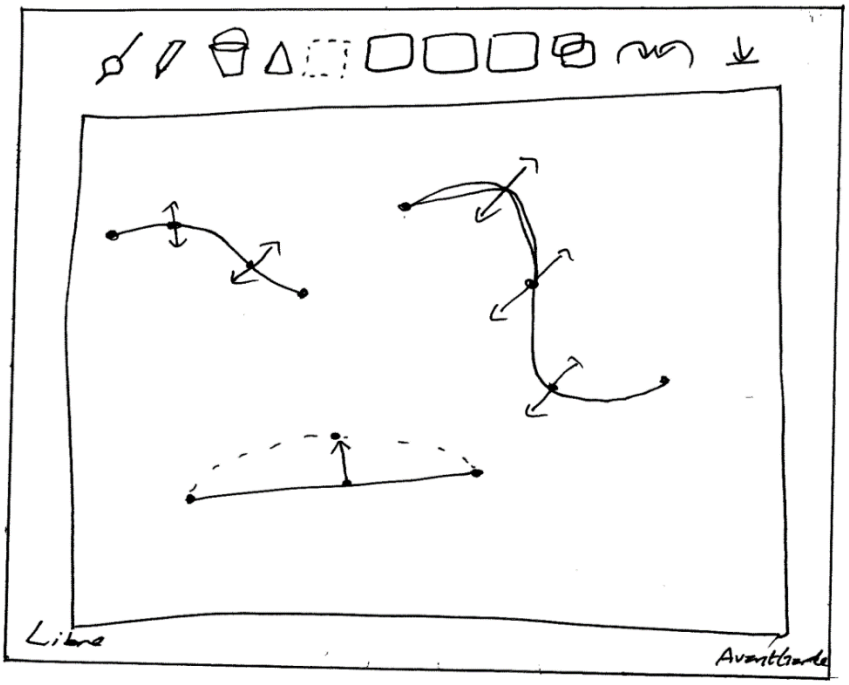


Figure 9. Mandala algorithm selection screen. Enables users to create mandalas with different patterns.

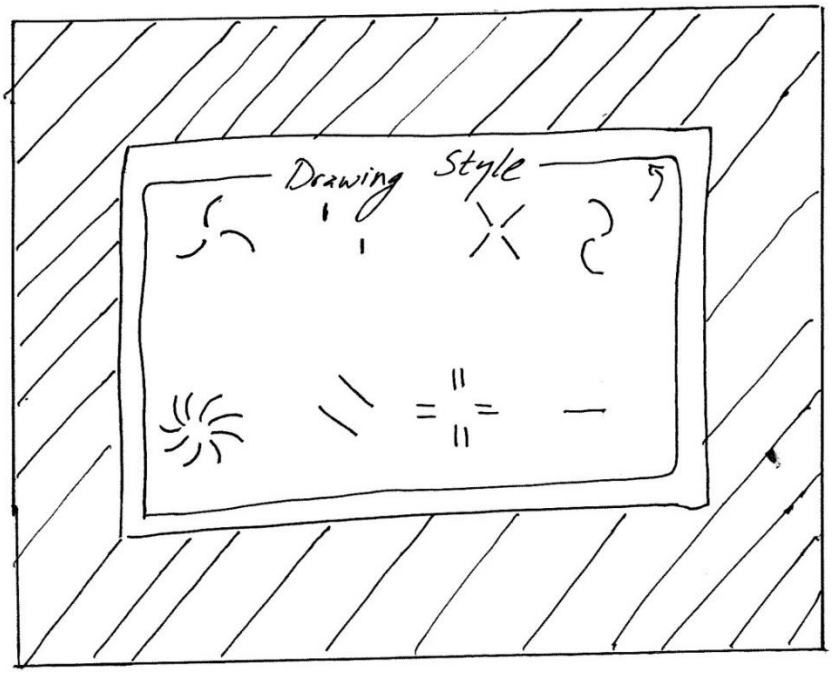


Figure 10. Skeleton Application Home Screen

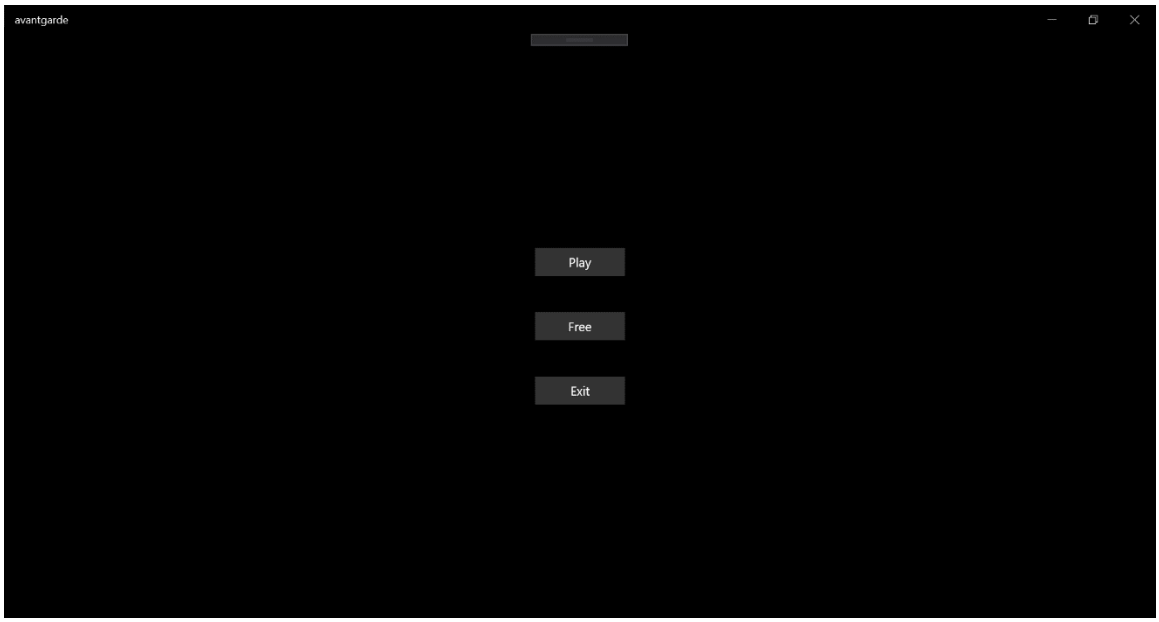


Figure 11. Skeleton Application Libre

Figure 12. Skeleton Application Fleur

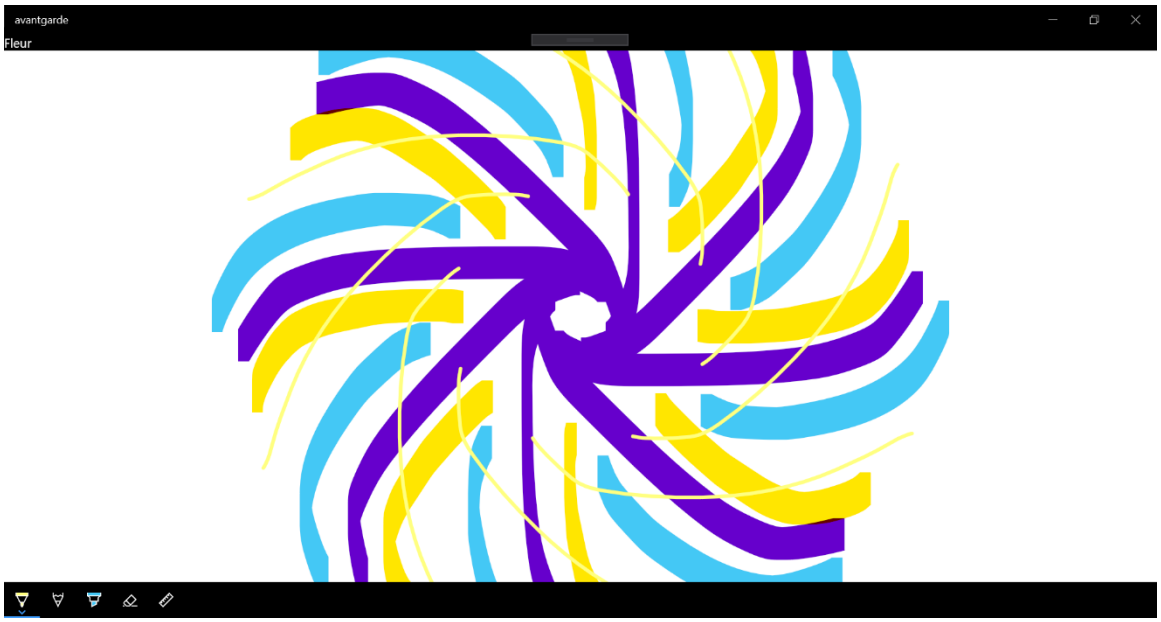


Figure 13. Color Scheme for Application