1.1.1.1 Improvement to color in Fractal Art

This procedure adds the relevant light colour of the predicted emotional colour to transformation number one. Transformation number three coloured using bright colour relevant to the predicted emotional colour.

The below section explains the process used to obtain coordinates for enhanced colour points in the colour wheel graph. Predicted arousal and valence values ranged between (+1 and -1). But colour wheel's colours obtained mapping them to +255 and -255 scale (256 since zero also considered in this study). First obtained arousal and valence values converted to 256 scales using the below formula.

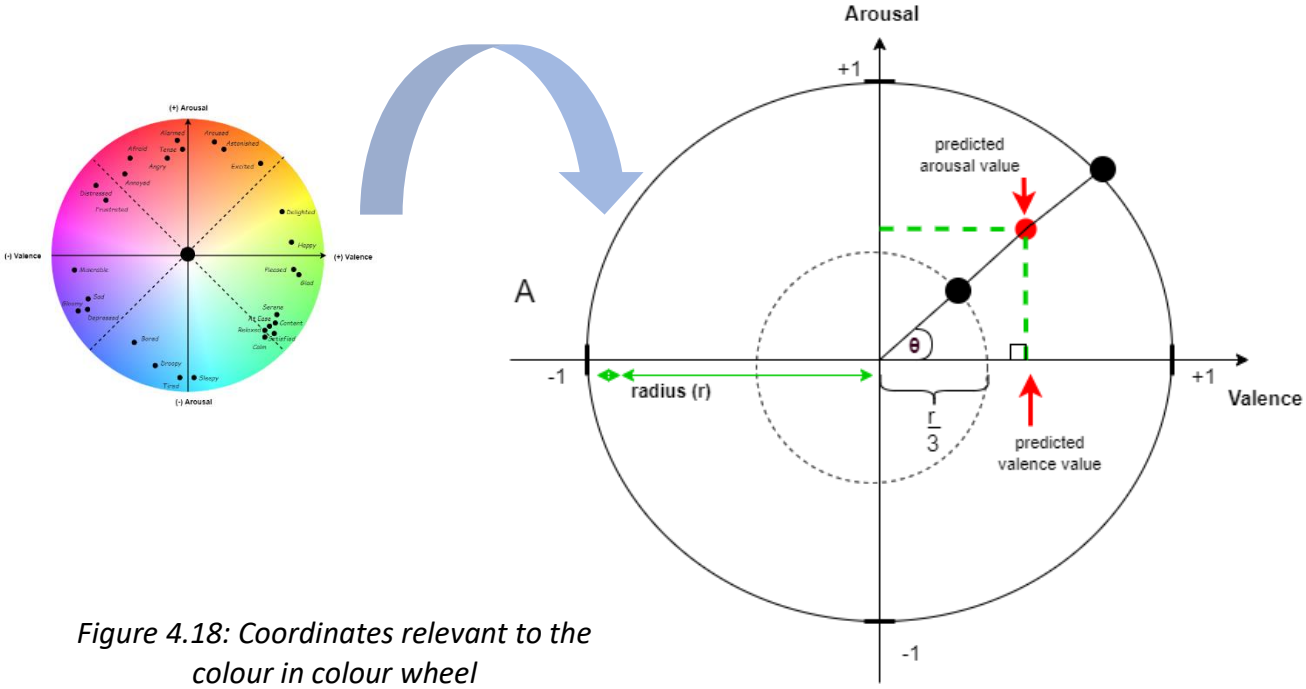

Figure 4.18: Coordinates relevant to the colour in colour wheel

x coordinate value = predicted valence value (According to the Figure)

y coordinate value = predicted arousal value

$$Arosusal\ value\ relevant\ to\ the\ colour\ wheel\ (\ arousal\ ') = \frac{arousal\ value}{1} \times 255$$

$$Valence\ value\ relevant\ to\ the\ colour\ wheel\ (\ valence\ ') = \frac{valence\ value}{1} \times 255$$

$$\tan\theta = \frac{arousal\,'}{valence\,'} \quad \rightarrow \quad \theta = \tan^{-1}\left(\frac{arousal\,'}{valence\,'}\right)$$

As shown in Figure, the radius of the colour wheel divided into three segments (since there are three transformations in the Julian Fractal arts). Then a circle with the radius of $r/3$ was considered to assign colour for transformation 1.

$$\frac{r}{3} = \frac{255}{3} = 85$$

Coordinates relevant to the point A

$$x\ coordinate = \frac{\cos(\theta) \times 85}{255}$$

$$y\ coordinate = \frac{\sin(\theta) \times 85}{255}$$

Coordinates relevant to the point B

$$x\ coordinate = \frac{\cos(\theta) \times 255}{255} = \cos(\theta) \times 1$$

$$y\ coordinate = \frac{\sin(\theta) \times 255}{255} = \sin(\theta) \times 1$$

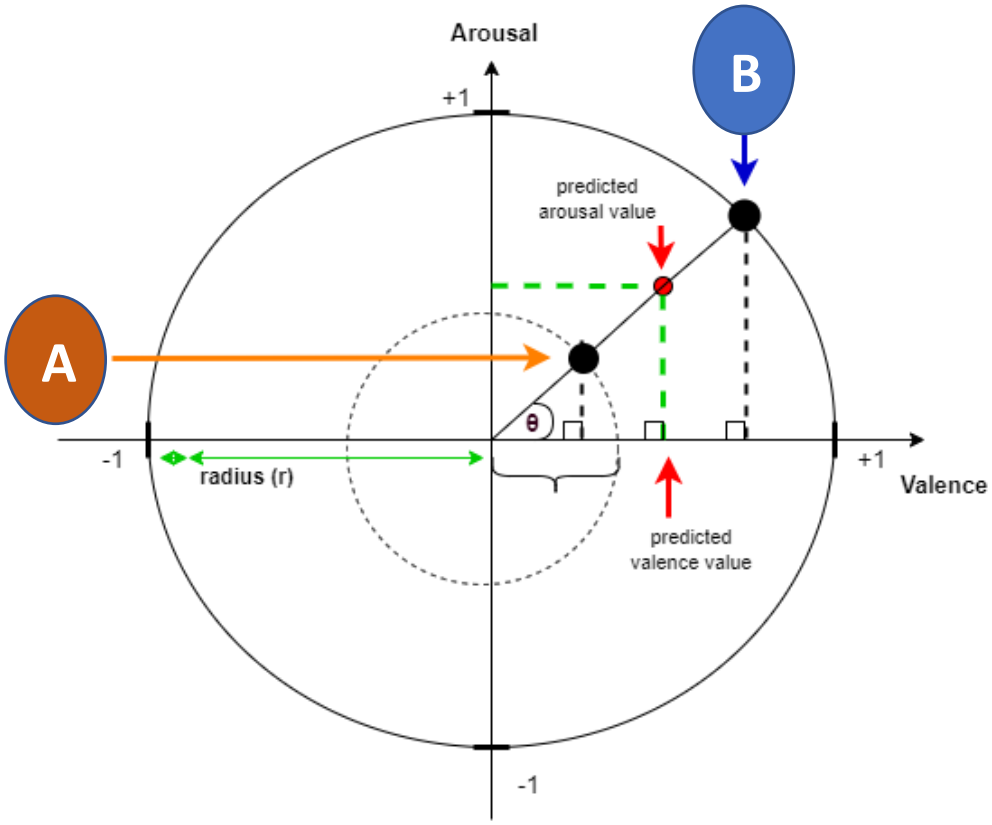

Figure 4.19: Positions relevant to the transformations in colour wheel

Figure shows the relevant colour values obtained according to above-mentioned mapping.

Transformation 2				Transformation 1				Transformation 3			
Arousal	Valence	RGB Codes		Arousal	Valence	RGB Codes		Arousal	Valence	RGB Codes	
-0.199	0.006	189,215,222		-0.333	0.01	165,220,231		-1	0.03	100,216,236	
-0.069	-0.107	208,193,218		-0.181	-0.28	184,171,236		-0.542	-0.84	118,93,241	
0.379	0.236	244,179,114		0.283	0.176	242,189,141		0.849	0.529	224,160,27	
-0.177	-0.062	193,206,226		-0.315	-0.11	167,203,239		-0.944	-0.331	80,158,254	

Figure 4.20: Colour values relevant to each transformation