

Evolutionary Art

No Institute Given

Abstract. <Text of the summary of your article>

1 Introduction

This paper is organized as follows: In the next Section, a brief review on Evolutionary Art is presented.

2 Evolutionary Art

Creative evolutionary systems are used to evolve aesthetically pleasing or innovative structures [5].

2.1 Art Representation for Evolutive Art

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2.2 Aesthetic measures for evolutive art

MAIN CHALLENGE -> HOW TO MEASURE AESTHETIC. **Definition** Two modes of aesthetics measures can be defined [6]:

1. *Aesthetics evaluations are expected to simulate, predict or cater to humans notions of beauty and taste.*
2. *Is an aspect of meta-aesthetic exploration and usually involves aesthetic standards created by software agents in artificial worlds.*

According to Galanter [6], computational aesthetics measures can be classified in the following categories:

- Based in Design Principles. Like the rule of thirds or theory of color (e.g., opposite colors) [3].
- Based in Neural Networks and Connective Models.
- Based in Evolutionary Systems:
 - Interactive Evolutionary Computation. The fitness of the individuals is determined by human agents.
 - Performance based goals. Certain properties of the art piece are evaluated and optimized based in performance measures (e.g., usable surface in furniture design generator). An example of this approach is presented in
 - Error relative to Exemplars. The individual fitness is measured using a real-world example (e.g., a photography or painting) [5].

- Complexity measures. This type of measures is based in the idea the complexity is directly related to aesthetics [7].
 - Multi-objective. Given the multidimensional nature of aesthetics judgement, multi-objective EAs are a clear option in order to deal with this multidimensionality.
 - Extensions to EA (such as, coevolution, agent swarm behavior, etc.).
- Complexity Based Models

En [7], Li et al. proponen las siguiente métricas para el aprendizaje estético:

- Color ingredient.
- Image complexity.
- Image order.
- MC metric.
- BL Metric.

En [4], presenta una comparación de tres métricas estéticas:

- Benford Law.
- Global Contrast Factor.
- Information Theory.

En [1], presenta una comparación de cuatro métricas estéticas:

- Machado and Cardoso.
- Ross and Ralph.
- Fractal Dimension.
- A weighted sum of the above mentioned metrics.

En [2] se presenta una aproximación multi-objetivo para arte evolutivo. Las tres funciones de fitness utilizadas son:

- Benford Law.
- Global Contrast Factor.
- Ross and Ralph (bell curve).

En [3] se presenta un AE para crear arte evolutiva a partir de imágenes vectorizadas. La función de fitness utilizada es la diferencia de tono entre distintas regiones de la imagen a distintas resoluciones.

En [5] they present an automatic fitness function specific to portrait painting based in four scores:

- Resemblance.
- Composition (face vs background).
- Tonality.
- Color.

3 Genetic Operators

3.1 Representation

3.2 Initialization

3.3 Mutation

3.4 Crossover

3.5 Fitness Functions

Image Matching

4 Experimental Results

5 Conclusions and Future Work

References

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