INTERPRETING PAINTINGS USING IMAGE SEMANTIC SEGMENTATION AND DECISION TREES

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General Terms: Terms
Additional Key Words and Phrases:

1. INTRODUCTION

1.1 Background of the Study

Interpreting paintings is not a simple task. It requires to go beyond what our eyes have perceived. They do not look to what the artist is trying to express, but solely judging the surface of the painting. Moreover, it would be much more difficult if the painting expresses a deeper meaning which is harder to interpret for other or most people. Furthermore, each one of us has a different opinion in defining what expressions did the artist convey resulting to a possible off-track from what they want to express. Because of this, the purpose of the artist in creating their arts would be in vain and the message they are trying to pass would not reach to the people looking at their works.

It would be most feasible if there is a tool that would assist people looking to different works of art in interpreting the artist's thoughts, feelings, and emotions. Such a tool would make the viewers of the painting have insights that they could never think about, thus having another perspective that would let them appreciate it more. Moreover, it would be easier for them to interpret these forms of art if the tool provides a list of connotations from the subject matter.

Image Semantic Segmentation is the process of understanding, and recognizing an image by pixel level. It extracts features like shape, or color by dividing it into regions with boundaries in defining the objects present in an image.

Decision Tree is a diagram that branches out the possible outcomes of a certain input, which gives out a tree-like figure. This is commonly used when the factors affecting the outcomes are conditional statements. Each branch represents a statistical probability as to how the input should be interpreted.

In order to accomplish such a task, this study uses the Image Semantic Segmentation approach in getting the possible subject matters seen and depicted by the painting, and Decision Trees for weighing and choosing the best subject matter present in the artwork. Furthermore, in light to address the people such as viewers and critics interpreting artworks by artists whom have expressed their creativity, the proponents pursued this study for handing out assistance to them. Through this study, it would greatly ease their tasks in terms of time efficiency and work efficiency.

1.2 Problem Statement

This study aims to give a list of potential subject matters from the artworks made by the artists through image semantic segmentation and weighing down the most probable subject mostly present in the art chosen through the use of decision trees. This study sought to address the following questions:

1. What are the characteristics that makes a theme unique and similar to the other?
2. What model is suitable for Semantic Segmentation in paintings?
3. How will the results of the Semantic Segmentation affect the Decision Trees?
4. How will the Decision Trees evaluate the results?

1.3 Objectives

This study intends to extract and generate a list of possible topics from paintings that artists use to express their thoughts, emotions, and feelings through the process of image semantic segmentation and deciding the theme or subject that is mostly present from the art through the use of decision trees.

This study had the following general objective:

1. Successfully identify the subject matter of the paintings given.

This study intended to accomplish the following objectives:

1. Compare and contrast the characteristics that are unique and similar to the themes.
2. Find out which model is suitable for Semantic Segmentation in paintings.
3. Explain the relationship between Semantic Segmentation and Decision Trees.
4. Explain how will the Decision Trees evaluate the results.

1.4 Significance of the Study

The results of this study can be used for those people who are critics in art, helping them in getting more thoughts and insights of the art they are currently evaluating. In addition, to the ones who are having trouble interpreting such art, this tool would give some assistance that would list possible interpretations besides their own, thus giving them an extended reach in knowing what the artist has to convey from their viewers of their art.

Furthermore, if there are art curators that would like to categorize paintings based on themes or its subject matter, this tool would be much of help for them. Moreover, this tool can also be used for categorizing their collection, especially if the collection they have is huge, it would be much of greater assistance.

1.5 Scope and Limitations

The study will generate a list based on the given set of themes or subject matters. Semantic Segmentation and Decision Trees were used to interpret the paintings. This will not include abstract images in the data set to lessen the difficulty of the study. The output does not replicate the way a human would interpret the art. The generated list may also not be the actual theme the author had implied.

2. REVIEW OR RELATED LITERATURE

2.1 Section 1 (Replace the heading appropriately.)

Body of Section 1 here.

2.2 Approaches

SUBSECTION 1 (As appropriate only)

Body of subsection 1 here.

Tables should appear as follows.

Table I. Caption of Table I

If there are numbered listings, this is how the numbered listings should appear.

(1) Item 1
(2) Item 2
(3) Item 3

If there are bulleted listings, this is how the bulleted listings should appear.

– *Item 1*
– *Item 2*
– *Item 3*

Theorems should appear as follows.

THEOREM 1.1. *Description of theorem here.*

Formulas should be inserted using an equation editor.

$$f(x) = a_0 + \sum_{n=1}^{\infty} \left(a_n \cos\frac{n\pi x}{L} + b_n \sin\frac{n\pi x}{L} \right)$$

Figures should be captioned as follows.

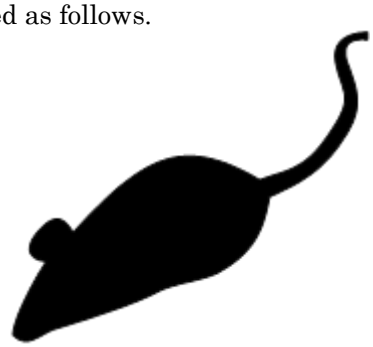

Fig. 1. Caption of figure here.

Pseudocode, prosecode or literate code of algorithms should be presented as follows.

ALGORITHM 1: Iterative Algorithm

```
current_position ← center
current_direction ← up
current_position is inside circle
while current_position is inside circle, do
neighborhood ← all grid hexes within two hexes from current_position
for each hex in neighborhood, do
for each neuron in hex do
convert neuron_orientation to vector
scale vector by neuron_excitation
vector_sum ← vector_sum + vector
end
end
normalize vector_sum
current_position ← current_position + vector_sum
current_direction ← vector_sum
return current_position
end
```

Description of the algorithm here.

2.3 Section 2 (Replace the heading appropriately.)

Body of Section 2 here.

3. METHODOLOGY

3.1 Section 1 (Replace the heading appropriately.)

Body of Section 1 here.

3.2 Section 2 (Replace the heading appropriately.)

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4. THEORETICAL BACKGROUND

4.1 Section 1 (Replace the heading appropriately.)

Body of Section 1 here.

4.2 Section 2 (Replace the heading appropriately.)

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