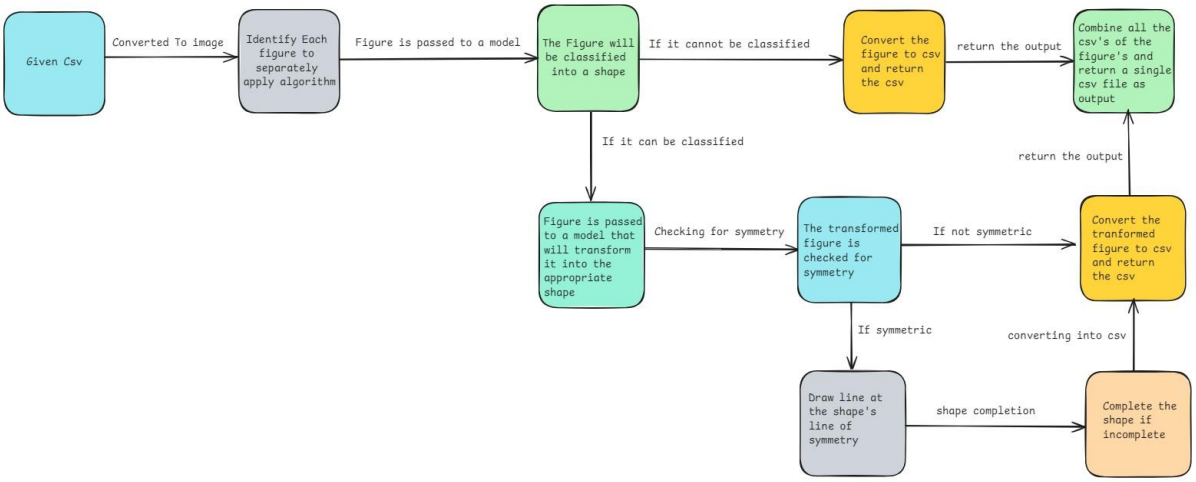
DoodleFix: An Algorithms for regularizing shapes, analyzing symmetry and completing complex doodles.

Introduction

This document outlines the methodology and processes involved in our project, which aims to convert a CSV file into images of shapes, classify those shapes, and apply transformations to generate a final composite CSV of processed shapes. The project integrates image processing, machine learning, and geometric analysis to achieve its objectives.

Work Flow



Project Overview

The project consists of several key stages:

1. CSV to Image Conversion

2. Shape Classification

3. Shape Transformation

4. Symmetry Analysis

5. Shape Completion

6. CSV Compilation

1. CSV to Image Conversion

The first step involves converting the input CSV file, which contains shape data, into visual representations (images) of the shapes. This conversion allows for easier manipulation and analysis of the shapes in subsequent steps.

2. Shape Classification

Once the shapes are represented as images, we employ a classification model to determine whether each shape can be classified as a "real shape." The model analyzes the features of the shapes and outputs a classification result:

- **Classified as Real Shape:** Proceed to the next step.

- **Not Classified:** No further action is taken for these shapes.

3. Shape Transformation

For shapes classified as real, we pass them into a transformation model. This model modifies the shape to enhance its characteristics or to convert it into a more recognizable form. The transformation process may involve adjustments to the shape's dimensions, angles, or overall structure.

4. Symmetry Analysis

After transformation, we evaluate the shapes for symmetry. A symmetry analysis model checks whether the shape exhibits symmetrical properties. If a shape is found to be symmetric, we draw a line of symmetry on it, visually indicating the axis of symmetry.

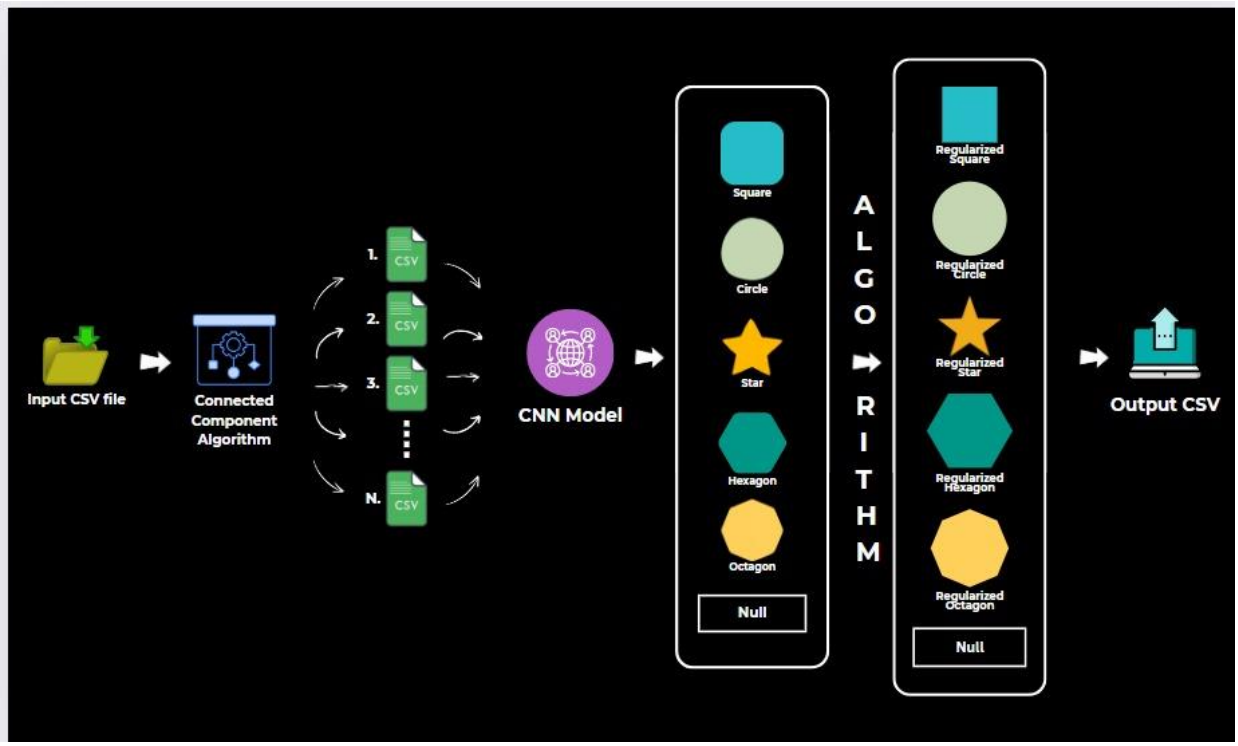
5. Shape Completion

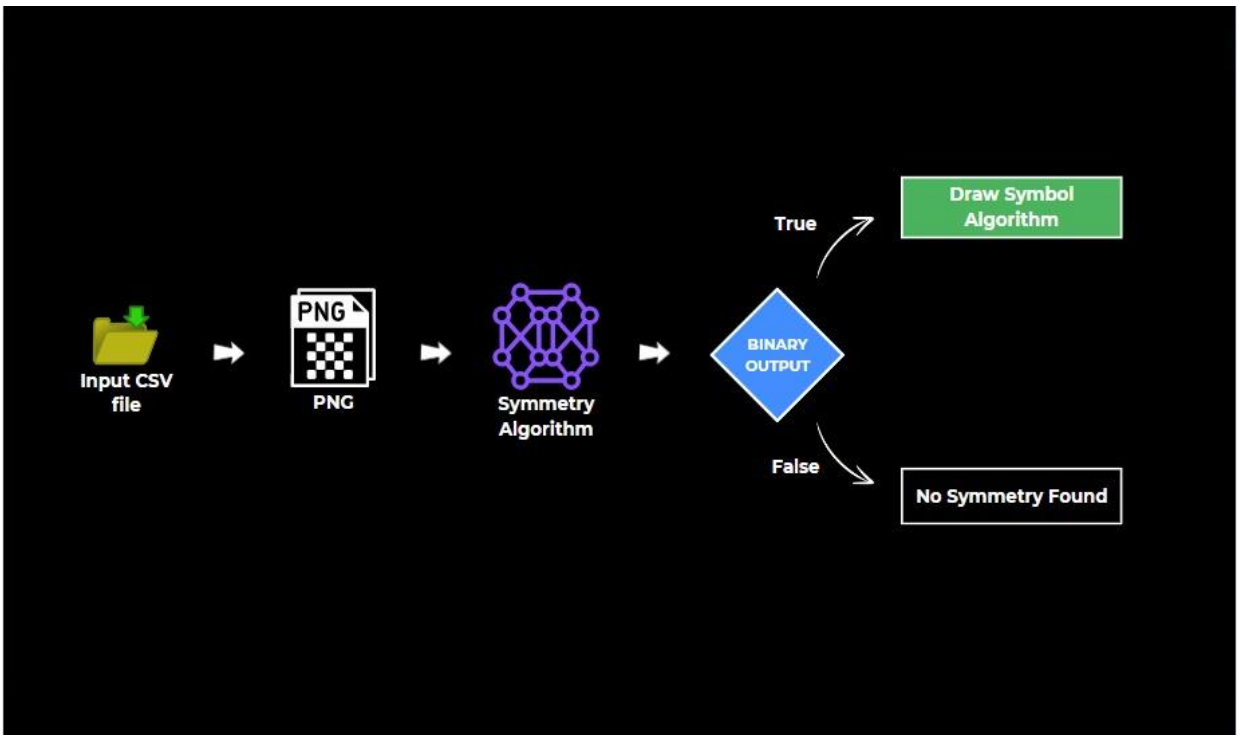
In cases where the shape is identified as incomplete, we employ a completion algorithm to fill in missing parts of the shape. This step ensures that all shapes are fully formed and ready for analysis.

6. CSV Compilation

Finally, all processed shapes are converted back into a structured format and saved as individual CSV files. These individual CSV files are then combined into a single comprehensive CSV file, which contains all the processed shape data.

Flow Chart





Conclusion

This project demonstrates a systematic approach to shape analysis and transformation, leveraging image processing and machine learning techniques. The final output—a consolidated CSV file—provides a valuable resource for further analysis or application in various fields, such as computer vision, geometric modeling, and data visualization.

Future Work

Future enhancements may include:

- Improving the accuracy of shape classification models.

- Expanding the range of shapes and transformations.

- Integrating user feedback for iterative improvements.