



Credit Hours System
CMPN446 Image
Processing and
Computer Vision



Cairo University
Faculty of Engineering

OMR

CRD-06

Submitted By:

Name	ID
Ahmed Wael Hamdy	1162265
Mohamed Ahmed Hussein Hussein	1162165
Ayah Ayman El-Samadoni	1162359
Michael Ramy Ezzat	1162012

Used Algorithms:

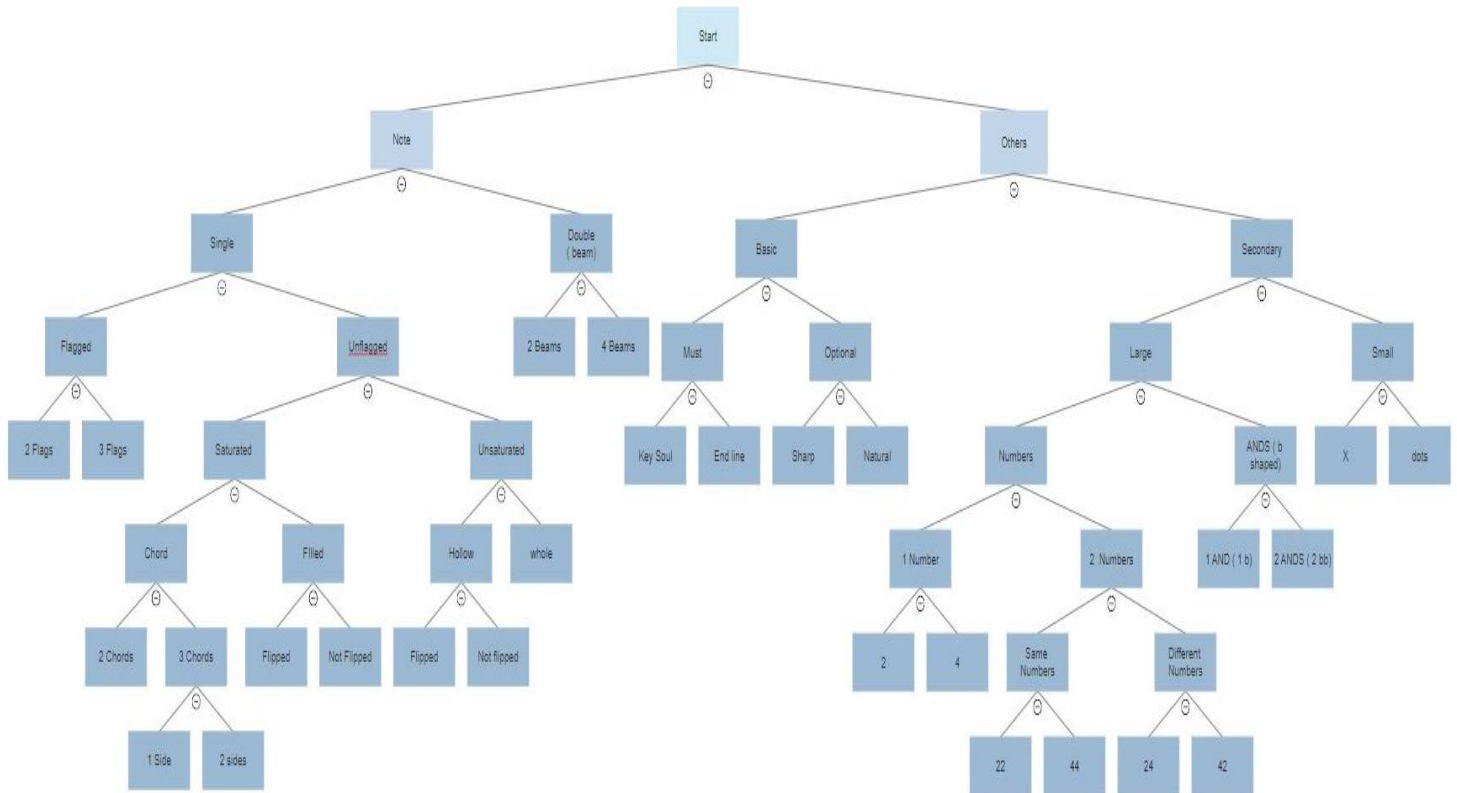
- 1) Run Length Encoding (RLE)
- 2) Feng, OTSU and Adaptive Thresholding Techniques
- 3) Hu-Moments
- 4) Perspective Transform
- 5) Connected Components and Labels
- 6) Convex Hull
- 7) Approximate Polygon DP
- 8) Finding Contours
- 9) Edge Detection
- 10) Region properties

Experiment Analysis:

In pre-processing, we detect the lines in the image, and then rotate depending on the median of these angles.

In Segmentation, we can say it is divided into 2 parts. The first one is Octave segmentation and its whole goal is to crop the image and then we get the connected components, then we pass the cropped parts (labels) to the region property. Finally, we can get the segmented parts which are the octaves. Every Octave passes through some morphological operations (SEs are calculated depending on the staff thickness) using RLE. 2 masks are obtained, the vertical mask is used to remove the staff lines, Horizontal Mask To obtain the notes

In classification, We had to represent the problem as a tree with 2 branches, each have a 2-branch sub tree and it goes as represented below.



Workload:

Pre-Processing, Classification and Feature Extraction:

- 1) Ahmed Wael Hamdy
- 2) Mohamed Ahmed Hussein

Segmentation and Docker and Feature Extraction:

- 1) Ayah Ayman El-Samadoni
- 2) Michael Ramy Ezzat

Accuracy and Performance:

The performance is quite reasonable and fast on intel i7 and 16 GB RAM, the classifier is simple (KNN), The methods/libraries used does not have high complexities. The accuracy is quite well on digitalized test cases and it does quite a good job on the handwritten samples as well.

References:

- 1) <https://www.learnopencv.com/shape-matching-using-hu-moments-c-python/>
- 2) <https://apacha.github.io/OMR-Datasets/>
- 3) https://lionel.kr.hs-niederrhein.de/~dalitz/data/publications/ismir05_gameraotr.pdf