Image proccessing project report

Team 16

Used Algorithms:

Required	Algorithm
Binarization	Adaptive thresholding
Corner detection	Harries
Staff line detection	Hough
Feature extraction	HOG
Classifier	SVM

Work Division:

Name	Sec	BN	Work
Adel Mohamed Abdelhamid Rizq	1	31	- Staff line detection and removal - Segmentation - Classification - writing output
Ahmed Mohamed Mohmed Mahmoud Mahboub	1	6	- Binarization - Geometric transformation - Classification - Writing output - Writing report
Abdullah Ahmed Hemdan	2	1	- Staff line detection and removal - Segmentation - Classification - Writing output - Recording video
Kareem Mohammed Mohamed Mohamed	2	10	- Binarization - Geometric transformation - Classification - Auto grading with docker

Experiment results and analysis:

We have run our experiment on 12 buckets (which is a clef contains five staff lines) and each clef contains 16 symbols on average passing through the following steps:

1. Remove the noise.
2. Binarize the image using adaptive method.
3. Detect the staff lines, line spacing, reference lines and their positions.
4. Remove the staff lines from the image.
5. Segment all symbols and detect their relative distances to reference line.
6. Predict the symbol type.
7. Classify the note.

And we reached the following results:

Average time per bucket = 0.61515366

Accuracy and performance:

Accuracy	Training: 99.2831
Performance	0.61515366

Conclusion and references:

Conclusion:

1. For the whole project we used this paper “Optical music recognition State of the art and ope”[1].
2. For binarization we tried to implement algorithm in this paper “Music Score Binarization Based on Domain Knowledge” [2]. But we did not complete this as the adaptive thresholding gave a good result.
3. For rotated images we applied corner detection and then mathematical transformation to make the image horizontal but the image still not perfectly horizontal.
4. For staff line detection we used famous Hough algorithm
5. For line removal we iterate over the rows and select the blackest rows in each bucket and remove if and only if there is a symbol in this section and cut every bucket alone
6. Then we apply segmentation and cut every symbol in this bucket extract features from it.
7. Then we send it to the model to predict it
8. Then we start to write the output files.

References:

[1] Optical music recognition State of the art and ope.

[2] Music Score Binarization Based on Domain Knowledge.