Computer Vision (COL780)

Assignment-1 Report

K N Ajay Shastry(2021CSY7547)

Suraj Patni (2021CSY7550)

(Note: commands to run the program are given on the last page)

1. Baseline

Steps to generate the foreground masks:

- Converted the image from BGR to Grayscale.
- Applied MedianBlur on the image to reduce the noise.
- Used Gaussian Mixture Model to generate the foreground mask.
- Performed thresholding and Morphological operations on the mask.

Mean IOU Score: 0.6461684008800689

Link to the generated output masks

2. Illumination changes

Steps to generate the foreground masks:

- Converted the image from BGR to LAB color model.
- Performed a split on the LAB image to different channels.
- Applied CLAHE(Contrast Limited Adaptive Histogram Equalization) to L-channel.
- Merged the CLAHE enhanced L-channel with the A and B channel.
- Converted the image from LAB Color model to BGR model.
- Converted the image from BGR to Grayscale.
- Used Gaussian Mixture Model to generate the foreground mask.
- Performed thresholding and Morphological operations on the mask.

Mean IOU Score: 0.35188767410893323

Link to the generated output masks

3. Camera shake (jitter)

Steps to generate the foreground masks:

- Used feature detector to determine feature points and tracked it using differential point tracking.
- Performed geometric transformations to stabilize the image.
- Scaled the image by 0.4%.
- Converted the image from BGR to Grayscale.
- Applied MedianBlur on the image to reduce the noise.
- Used Gaussian Mixture Model to generate the foreground mask.
- Performed thresholding and Morphological operations on the mask.

Mean IOU Score: 0.5431844518520618

Link to the generated output masks

4. Dynamic scenes: changing background

Steps to generate the foreground masks:

- Converted the image from BGR to Grayscale
- Applied GaussianBlur on the image to reduce the noise.
- Used Gaussian Mixture Model to generate the foreground mask.
- Performed thresholding and Morphological operations on the mask.

Mean IOU Score: 0.3745731833160578

Link to the generated output masks

Commands to Execute

 # Baseline
python3 main.py -i ./data/baseline/input/ -o ./output1/ -c b -e "./data/baseline/"
python3 exec.py -p ./output1 -g ./data/baseline/groundtruth/
mIOU: 0.6477870905409411

 # illumination
python3 main.py -i ./data/illumination/input/ -o ./output2/ -c i -e "./data/illumination/"
python3 exec.py -p ./output2 -g ./data/illumination/groundtruth/
mIOU: 0.35188767410893323

 # jitter
python3 main.py -i ./data/jitter/input/ -o ./output3/ -c j -e "./data/jitter/"
python3 exec.py -p ./output3 -g ./data/jitter/groundtruth/
mIOU: 0.5431844518520618

 # Moving_bg
python3 main.py -i ./data/moving_bg/input/ -o ./output4/ -c m -e "./data/moving_bg/"
python3 exec.py -p ./output4 -g ./data/moving_bg/groundtruth/
mIOU: 0.3745731833160578