

BDMH PROJECT :

ReadMe:

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Libraries Used:

Keras and Tensorflow
Cv2 (Computer Vision)
skimage.

DESCRIPTION OF FILES :

1. load_images.py
Load the images as grayscale images and stores that in matrix.
2. process_images.py
Applies the median filter and stores it in the matrix.
3. glcm_features.py
Extracts the glcm features from the image matrix and creates the features dataset.
4. apply_models.py
Applies different machine learning models on both original and filtered images.
5. CnnModel.py
Applies various feature selection and deep learning model (CNN) on the images.

METHODOLOGY :

1. Used computer vision library to load images as image matrix.
2. Converted Images to grayscale images.
3. Applied median filter on the images and stored this filtered image matrix.
4. Extracted glcm features from the original image matrix and filtered image matrix.
5. Created feature dataset from this extracted glcm features.
6. Applied machine learning models such as SVM , Logistic Regression , Gaussian Naive Bayes and reported the results for both original matrix and filtered image matrix.

Improvement:

7. Implemented advanced feature selection techniques :
hog transform , kaze, surf and sift.
8. Implemented Deep Learning Model CNN.

NOTE : Results may vary since, train and test split is used.

STEPS to run the code :

1. Extract the files from the zip.
2. Run the **apply_models.py** to generate the results for original image matrix and filtered image matrix.
3. Run the **CnnModel.py** to generate the results for the hog,sift,surf,kaze transform and CNN Model .

NOTE : Running CNNModel.py may create problems hence, please look .ipynb file.

- **CNNModel** code is run on google colab .
- **LINK** is:- https://colab.research.google.com/drive/1sm-VuhRRBpclgBIVKnldCh_aJ3-A3nbw
- Please upload the data in colab folder for local storage . We have implemented via mounting google drive for dataset . As Tensorflow facility is inbuilt in colab for fast processing on images. Output for each cell are shown in it.

SHORT REPORT :

Results for the baseline Model :

Without filter

After applying median filter :

Improvement :

1. Used different feature selection techniques to improve the performance.

Hog transform , sift,surf ,kaze feature selection techniques has been applied .

Models applied :

SVM and Random Forest Classifier and XGBoost :

Results obtained :

2. Applied Deep Learning Model (Convolution Neural Network) .

Layers Applied :

- 1 layer of input layer.
- 2 layers of 2D Convolution layers.
- 1 layer of MaxPooling layer.
- 2 layers of 2D Convolution layers.
- 1 layer of MaxPooling layer.
- 1 layer of flatten layer.
- 1 layer of Dense output layer.

REFERENCES :

https://opencv-python-tutroals.readthedocs.io/en/latest/py_tutorials/py_feature2d/py_matcher/py_matcher.html

<https://www.tensorflow.org/tutorials/images/cnn>

<https://towardsdatascience.com/step-by-step-vgg16-implementation-in-keras-for-beginners-a833c686ae6c>

<https://stackoverflow.com/questions/30230592/loading-all-images-using-imread-from-a-given-folder/47114735>

https://scikit-learn.org/stable/supervised_learning.html

<https://scikit-image.org/docs/0.7.0/api/skimage.feature.texture.html>

installing cv2 skimage link:

<https://pypi.org/project/opencv-python/>

<https://pypi.org/project/scikit-image/>