

Feature Extraction Using Depth Maps for Object Recognition

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Dependencies for the Implementation Code :

1. Pandas
2. Opencv
3. Numpy ,
4. Sklearn , for SVM Classifier

Code Files:

1. hog.py - Contains the Implementation of HOG features calculation
2. lbp.py - Contains the implementation of LBP features calculation
3. main.py - main file containing the code , using lbp.py and hog.py

To Run the Code:

1. Since the Dataset was too large (Around 4.8 GB) , we didn't attach it in this folder.
2. The Dataset is at this link <https://rgbd-dataset.cs.washington.edu/dataset/> . We have used the Cropped RGB images and Depth Maps .
3. The Dataset Folder should be in the format:
Dataset/
 -Appl(Class1)/
 -Appl1(Instance1)/
 -Contains images and Depth Maps
4. there is no external command line arguments required . we just have to run main.py

Literature Surveys:

1. Wenchao Zhang , Shiguang Shan , Wen Gao , „*Local Gabor Binary Pattern Histogram Sequence (LGBPHS):A Novel Non-Statistical Model for Face Representation and Recognition*”,in Tenth IEEE International Conference on Computer Vision (ICCV'05)
2. K. Lai, L. Bo, X. Ren, and D. Fox. "A Large-Scale Hierarchical Multi-View RGB-D Object Dataset". IEEE International Conference on on Robotics and Automation, 2011.
3. Xiaoyu Wang, Tony X. Han, Shuicheng Yan, An " *HOG-LBP human detector with partial occlusion handling*", in IEEE International Conference on Computer Vision. IEEE International Conference on Computer Vision · November 2009 .

Brief Description for the approach:

The project can be re-divided into three tasks:

1. Getting the Depth Maps for the Images
2. Feature Extraction from Depth Maps
3. Using the Features Extracted for the Object Recognition

1. Using Depth Maps:

1. .We have taken the Microsoft Kinetics Dataset for our task .
2. The Microsoft Kinect Dataset consists of objects from 51 classes and 300 different instances .
3. Each Image is provided with an automatically created Depth Map.

2. Feature Extraction from the Depth Maps

To Extract the Features from the Depth Maps We have used following techniques :

1. HOG(Histogram of Gradients)
2. LBP(Local Binary Patterns).
3. Hybrid Feature Using Both LBP and HOG .

3 Using the Features Extracted for the Object Recognition

1. We have used the class based object recognition using the Microsoft Kinect Dataset.
2. We have Created the Baseline Features - HOG of Image and HOG of the Depth Map for the comparison.
3. We have used the SVM as the Classifier for the object recognition,