Division of Computer Engineering
Hankuk University of Foreign Studies




Computer Vision – Spring 2023

Final Project

Instructor:
Walid Abdullah Al

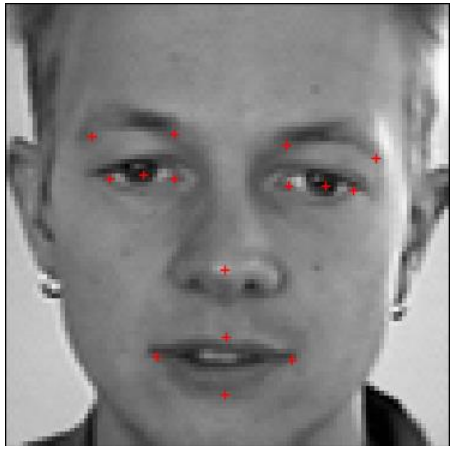
Computer Vision Lab
Hankuk University of Foreign Studies

Outline

- Dataset/Goal
- Network architecture
- Submission guide

Dataset and Goal

- Goal:
  - Facial landmark detection
  - Input: 96x96 grayscale image containing a human face
  - Output: locations (x_coord, y_coord) of 15 facial landmarks
- Total 2140 examples
  - Randomly split to obtain:
  - Training (60%), validation (20%), testing (20%) subsets
- Tasks:
  - Train using training subset
  - Finalize the network selection, loss functions, etc., based on the validation subset
  - Evaluate the final performance on the testing subset



```
im_shape: (2140, 96, 96)
landmarks_shape: (2140, 15, 2)
```

Network Structure

- Layers:
  - Input: [N, 96, 96, 1]
  - Conv: (3x3 kernels, 32)
  - Pool: (2x2 max-pool, stride=2)
  - Conv: (3x3 kernels, 32)
  - Pool: (2x2 max-pool, stride=2)
  - Conv: (3x3 kernels, 64)
  - Pool: (2x2 max-pool, stride=2)
  - Conv: (3x3 kernels, 64)
  - Pool: (2x2 max-pool, stride=2)
  - Flatten:
  - FC1: (64 units)
  - Output layer: (you decide)

Submission Guide

- Submit Code and PPT report in Eclass
- PPT report guide:
- (1) Dataset visualization:
  - Describe your goal
  - Visualize a few random images
  - Also mark the corresponding keypoints/landmarks on each image
- (2) Preprocessing (if any):
  - E.g., normalization, reshaping, etc.
- (3) Network structure:
  - Describe and draw

PPT report guide (2)

- (4) Loss functions:
  - L2-loss, L1-loss, cosine-loss
  - Can you combine two loss functions to better the performance, e.g. L2-loss+ lamda*cosine-loss.
  - Do not use tensorflow/library loss functions
- (5) Results:
  - Validation performance comparison:
    - For different loss functions
    - For different lamda values (ff you combined loss-functions)
    - For different regularization
    - For dropout/ no-dropout
  - Final performance on test set:
    - Present prediction error
    - And visualize a few good prediction, and a few bad prediction
  - Present your discussion