1/ The main contribution of this paper is it introduces the angular softmax (A-Softmax) loss function to deal with the face recognition task. This function allows the CNNs to learn discriminative face features on the hypersphere manifold. The A-Softmax can maximize the angular margin between different classes and minimizes the angular margin within the same class. The SphereFace leads to a better performance on some benchmarks, such as LFW, YTF, and MegaFace. It improves the face recognition performance.

2/

Property 1: The A-Softmax loss function allows the control of angular margin and the difficulty of the learning task by adjusting the margin parameter ‘m’. When m is larger, there’s a larger angular margin between class and more difficult learning task. With the minimal m, the maximal intra-class angular distance is smaller thant he minimal intra-class angular distance.

Property 2: In the binary-class case, the lower bound of the minimal m is m\_min 2+.

Property3: In the multi-class case, the lower bound of the minimal m is m\_min 3.

3/ The evaluation metric for LFW dataset is accuracy. The accuracy is the percentage of correct classification over the total number of pairs.

4/

Epoch: 1, Loss: 20.3252

Epoch: 2, Loss: 20.3228

Epoch: 3, Loss: 20.3207

Epoch: 4, Loss: 20.3188

Epoch: 5, Loss: 20.3173

Epoch: 6, Loss: 20.3159

Epoch: 7, Loss: 20.3148

Epoch: 8, Loss: 20.3138

Epoch: 9, Loss: 20.3123

Epoch: 10, Loss: 20.2685

Epoch: 11, Loss: 20.1605

Epoch: 12, Loss: 20.1039

Epoch: 13, Loss: 20.0935

Epoch: 14, Loss: 20.1013

Epoch: 15, Loss: 20.1067

Epoch: 16, Loss: 20.1079

Epoch: 17, Loss: 20.0980

Epoch: 18, Loss: 20.1027

Epoch: 19, Loss: 20.1035

Epoch: 20, Loss: 20.1210

Epoch: 21, Loss: 20.0990

Epoch: 22, Loss: 20.0991

Epoch: 23, Loss: 20.1032

Epoch: 24, Loss: 20.1054

Epoch: 25, Loss: 20.1088

Epoch: 26, Loss: 20.0934

Epoch: 27, Loss: 20.1086

Epoch: 28, Loss: 20.1081

Epoch: 29, Loss: 20.0981

Epoch: 30, Loss: 20.1074

Epoch: 31, Loss: 20.0941

Epoch: 32, Loss: 20.0986

Epoch: 33, Loss: 20.1125

Epoch: 34, Loss: 20.1014

Epoch: 35, Loss: 20.0955

Epoch: 36, Loss: 20.1039

Epoch: 37, Loss: 20.1165

Epoch: 38, Loss: 20.1011

Epoch: 39, Loss: 20.1030

Epoch: 40, Loss: 20.0982

Test accuracy: 0.5000