AE

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| Enconder | 1 | [BS,3,256,256]-> [BS,32,128,128] | CONV(K4,S2,P1) , LeakyReLU(0.2) |
| 2 | [BS,32,128,128]-> [BS,64,64,64] | CONV(K4,S2,P1) , BN,LeakyReLU(0.2) |
| 3 | [BS,64,64,64]-> [BS,128,32,32] | CONV(K4,S2,P1) , BN,LeakyReLU(0.2) |
| 4 | [BS,128,32,32]-> [BS,256,16,16] | CONV(K4,S2,P1) , BN,LeakyReLU(0.2) |
| 5 | [BS,256,16,16]-> [BS,512,8,8] | CONV(K4,S2,P1) , BN,LeakyReLU(0.2) |
| 6 | [BS,512,8,8]-> [BS,512,4,4] | CONV(K4,S2,P1) , BN,LeakyReLU(0.2) |
| Deconder | 1 | [BS,512+n\_attr,4,4] ->[BS,512,8,8] | DCONV(K4,S2,P1), BatchNorm, ReLU(0.2) |
| 2 | [BS,512+n\_attr,8,8]-> [BS,256,16,16] | DCONV(K4,S2,P1), BatchNorm, ReLU(0.2) |
| 3 | [BS,256+n\_attr,16,16]->[BS,128,32,32] | DCONV(K4,S2,P1), BatchNorm, ReLU(0.2) |
| 4 | [BS,128+n\_attr,32,32]->[BS,64,64,64] | DCONV(K4,S2,P1), BatchNorm, ReLU(0.2) |
| 5 | [BS,64+n\_attr,64,64] ->[BS,32,128,128] | DCONV(K4,S2,P1), BatchNorm, ReLU(0.2) |
| 6 | [BS,32+n\_attr,128,128]–>[BS,3,256,256] | DCONV(K4,S2,P1), Tanh |

Latent Dis

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| 1 | [BS,512,4,4]->[BS,512,2,2] | CONV(K4,S2,P1) , BN,LeakyReLU(0.2),Dropout(0.3) |
| 2 | [BS,512,2,2]->[BS,512,1,1] | CONV(K4,S2,P1) , BN,LeakyReLU(0.2),Dropout(0.3) |
|  | [BS,512,1,1]->[BS,512] | reshape |
| 3 | [BS,512]->[BS,512] | FC, LeakyReLU(0.2) |
| 5 | [BS,512]->[BS,n\_attr] | FC |

Patch Dis

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| --- | --- | --- |
| 1 | [BS,3,256,256]->[BS,32,128,128] | CONV(K4,S2,P1) , LeakyReLU(0.2) |
| 2 | [BS,32,128,128]->[BS,64,64,64] | CONV(K4,S2,P1) , BN,LeakyReLU(0.2) |
| 3 | [BS,64,64,64]->[BS,128,32,32] | CONV(K4,S2,P1) , BN,LeakyReLU(0.2) |
| 4 | [BS,128,32,32]->[BS,256,32,32] | CONV(K4,S1,P1) , BN,LeakyReLU(0.2) |
| 5 | [BS,256,32,32]->[BS,1,32,32] | CONV(K4,S1,P1) , sigmoid |
| 6 | [BS,1,32,32]->[BS,32\*32]  [BS,32\*32]->[BS,1] | Reshape  mean |

cls Dis

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| --- | --- | --- |
| 1 | [BS,3,256,256]->[BS,32,128,128] | CONV(K4,S2,P1) , LeakyReLU(0.2) |
| 2 | [BS,32,128,128]->[BS,64,64,64] | CONV(K4,S2,P1) , BN,LeakyReLU(0.2) |
| 3 | [BS,64,64,64]->[BS,128,32,32] | CONV(K4,S2,P1) , BN,LeakyReLU(0.2) |
| 4 | [BS,128,32,32]->[BS,256,16,16] | CONV(K4,S2,P1) , BN,LeakyReLU(0.2) |
| 5 | [BS,256,16,16]->[BS,512,8,8] | CONV(K4,S2,P1) , BN,LeakyReLU(0.2) |
| 6 | [BS,512,8,8]->[BS,512,4,4] | CONV(K4,S2,P1) , BN,LeakyReLU(0.2) |
| 7 | [BS,512,4,4]->[BS,512,2,2] | CONV(K4,S2,P1) , BN,LeakyReLU(0.2) |
| 8 | [BS,512,2,2]->[BS,512,1,1] | CONV(K4,S2,P1) , BN,LeakyReLU(0.2) |
|  | [BS,512,1,1]->[BS,512] | reshape |
| 9 | [BS,512]->[BS,512] | FC, LeakyReLU(0.2) |
| 10 | [BS,512]->[BS,n\_attr] | FC |

**LOSS**

1 **lat\_loss** ： get\_attr\_loss(lat \_pred, y) # y为attribute

2 **ptc\_loss** ：交叉熵( ptc(dec\_img\_flipped)， -y ) + 交叉熵( ptc(img) ， y )

# y为真，此处值为1-y\_fake=0.8；-y为假，y\_fake=0.2;

# dec\_img\_flipped：enc(img) 和 flipped\_attribute得来

3 **cls\_loss** ： get\_attr\_loss( cls(img), y ) # y->attribute

4 **AE\_loss** = ae\_lamda(1) \* Rec\_cost + lat\_lamda(0.0001) \* lat\_loss + ptc\_lamda(0.) \* ptc\_loss + cls\_lamda(0.) \* cls\_loss

Rec\_cost：(img - dec\_img)^2 # dec\_img由img和attribute得来

lat\_loss：get\_attr\_loss(lat \_pred, 1-y) # y为attribute

ptc\_loss: 交叉熵(ptc(dec\_img\_flipped)， y ) # y为真假， y代表此处为真，值为1-Y\_fake=0.8; dec\_img\_flipped由img和flipped\_attribute得来

cls\_loss : get\_attr\_loss( cls(dec\_img\_flipped) , flipped )