**Table S1**. The network architecture of ResNet50.

|  |  |  |
| --- | --- | --- |
| **Layer name** | **Input size** | **Output size** |
| Conv1 | 7 × 7, 64 | 224 × 224 × 3 | 112 × 112 × 64 |
| MaxPooling | 3 × 3 max pool | 112 × 112 × 64 | 56 × 56 × 64 |
| Res block 1 | Conv block | 1 × 1, 64 | 56 × 56 × 64 | 56 × 56 × 64 |
| 3 × 3, 64 | 56 × 56 × 64 | 56 × 56 × 64 |
| 1 × 1, 256 | 56 × 56 × 64 | 56 × 56 × 256 |
| Identity block | 1 × 1, 64 | 56 × 56 × 256 | 56 × 56 × 64 |
| 3 × 3, 64 | 56 × 56 × 64 | 56 × 56 × 64 |
| 1 × 1, 256 | 56 × 56 × 64 | 56 × 56 × 256 |
| Identity block | 1 × 1, 64 | 56 × 56 × 256 | 56 × 56 × 64 |
| 3 × 3, 64 | 56 × 56 × 64 | 56 × 56 × 64 |
| 1 × 1, 256 | 56 × 56 × 64 | 56 × 56 × 256 |
| Res block 2 | Conv block | 1 × 1, 128 | 56 × 56 × 256 | 28 × 28 × 128 |
| 3 × 3, 128 | 28 × 28 × 128 | 28 × 28 × 128 |
| 1 × 1, 512 | 28 × 28 × 128 | 28 × 28 × 512 |
| Identity block | 1 × 1, 128 | 28 × 28 × 512 | 28 × 28 × 128 |
| 3 × 3, 128 | 28 × 28 × 128 | 28 × 28 × 128 |
| 1 × 1, 512 | 28 × 28 × 128 | 28 × 28 × 512 |
| Identity block | 1 × 1, 128 | 28 × 28 × 512 | 28 × 28 × 128 |
| 3 × 3, 128 | 28 × 28 × 128 | 28 × 28 × 128 |
| 1 × 1, 512 | 28 × 28 × 128 | 28 × 28 × 512 |
| Identity block | 1 × 1, 128 | 28 × 28 × 512 | 28 × 28 × 128 |
| 3 × 3, 128 | 28 × 28 × 128 | 28 × 28 × 128 |
| 1 × 1, 512 | 28 × 28 × 128 | 28 × 28 × 512 |
| Res block 3 | Conv block | 1 × 1, 256 | 28 × 28 × 512 | 14 × 14 × 256 |
| 3 × 3, 256 | 14 × 14 × 256 | 14 × 14 × 256 |
| 1 × 1, 1024 | 14 × 14 × 256 | 14 × 14 × 1024 |
| Identity block | 1 × 1, 256 | 14 × 14 × 1024 | 14 × 14 × 256 |
| 3 × 3, 256 | 14 × 14 × 256 | 14 × 14 × 256 |
| 1 × 1, 1024 | 14 × 14 × 256 | 14 × 14 × 1024 |
| Identity block | 1 × 1, 256 | 14 × 14 × 1024 | 14 × 14 × 256 |
| 3 × 3, 256 | 14 × 14 × 256 | 14 × 14 × 256 |
| 1 × 1, 1024 | 14 × 14 × 256 | 14 × 14 × 1024 |
| Identity block | 1 × 1, 256 | 14 × 14 × 1024 | 14 × 14 × 256 |
| 3 × 3, 256 | 14 × 14 × 256 | 14 × 14 × 256 |
| 1 × 1, 1024 | 14 × 14 × 256 | 14 × 14 × 1024 |
| Identity block | 1 × 1, 256 | 14 × 14 × 1024 | 14 × 14 × 256 |
| 3 × 3, 256 | 14 × 14 × 256 | 14 × 14 × 256 |
| 1 × 1, 1024 | 14 × 14 × 256 | 14 × 14 × 1024 |
| Identity block | 1 × 1, 256 | 14 × 14 × 1024 | 14 × 14 × 256 |
| 3 × 3, 256 | 14 × 14 × 256 | 14 × 14 × 256 |
| 1 × 1, 1024 | 14 × 14 × 256 | 14 × 14 × 1024 |
| Identity block | 1 × 1, 256 | 14 × 14 × 1024 | 14 × 14 × 256 |
| 3 × 3, 256 | 14 × 14 × 256 | 14 × 14 × 256 |
| 1 × 1, 1024 | 14 × 14 × 256 | 14 × 14 × 1024 |
| Res block 4 | Conv block | 1 × 1, 512 | 14 × 14 × 1024 | 7 × 7 × 512 |
| 3 × 3, 512 | 7 × 7 × 512 | 7 × 7 × 512 |
| 1 × 1, 2048 | 7 × 7 × 512 | 7 × 7 × 2048 |
| Identity block | 1 × 1, 512 | 7 × 7 × 2048 | 7 × 7 × 512 |
| 3 × 3, 512 | 7 × 7 × 512 | 7 × 7 × 512 |
| 1 × 1, 2048 | 7 × 7 × 512 | 7 × 7 × 2048 |
| Identity block | 1 × 1, 512 | 7 × 7 × 2048 | 7 × 7 × 512 |
| 3 × 3, 512 | 7 × 7 × 512 | 7 × 7 × 512 |
| 1 × 1, 2048 | 7 × 7 × 512 | 7 × 7 × 2048 |
| AveragePooling | 7 × 7 × 2048 | 1 × 1 × 2048 |
| Flatten | 1 × 1 × 2048 | 2048 |
| fc 1000 | 2048 | 1000 |
| softmax |