# Dynamic sampling pointnet notes

xyz

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# 1 Quick notes for important events while using one file to test

## 1.1 batch size

### 1.1.1 bs=27 vs bs=81

batch size: 9,27,81
data: xyz-color_1norm
model: 1AG
sampling & grouping: stride_0d1_step_0d1_bmap_nh5_2048_0d5_1_fmn1-160_32-32_12-0d2_0d6-0d2_0d6

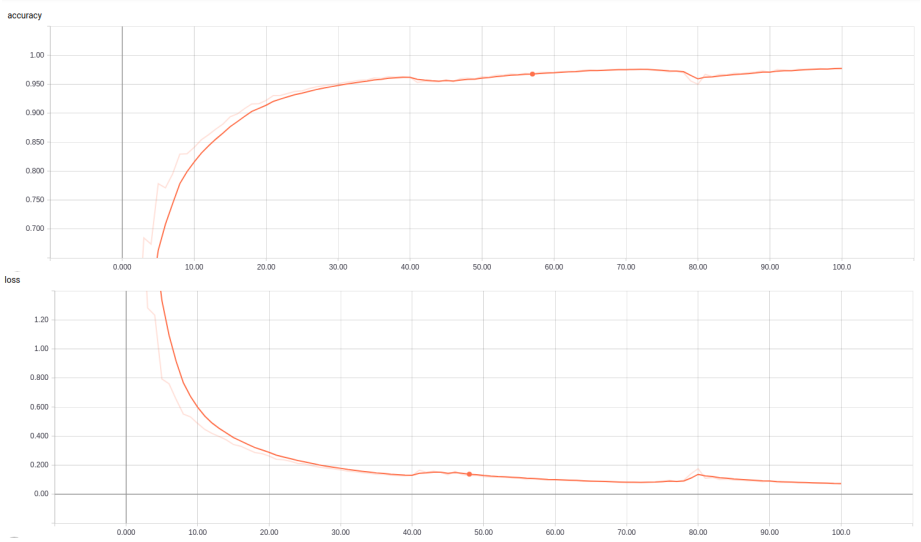
Figure 1: bs=9


## 1.2 feed elements

epoch num = 100
stride_0d1_step_0d1_bmap_nh5_2048_0d5_1_fmn1-160_32-32_12-0d2_0d6-0d2_0d6

Figure 2: bs=27


Figure 3: bs=81




| model | batch size | data elements | acc | loss |
|---|---|---|---|---|
| 1AG | 9 | xyz color | 0.890 | 0.356 |
| 1AG | 27 | xyz color | 0.920 | 0.240 |
| 3AG | 27 | xyz color | 0.912 | 0.273 |
| 2A | 27 | xyz color | 0.908 | 0.294 |
| 2AG | 27 | xyz color | 0.902 | 0.293 |
| 1A | 27 | xyz color | 0.883 | 0.351 |
| 1AG | 81 | xyz color | 0.978 | 0.072 |
| 1AG | 9 | xyz | 0.861 | 0.427 |
| 1AG | 27 | xyz | 0.907 | 0.257 |
| 1AG | 81 | xyz | 0.975 | 0.078 |
| 1A | 27 | xyzmid color | 0.889 | 0.357 |
| 3AG | 27 | xyzmid color | 0.933 | 0.193 |

1. large batch size is better
2. $1AG(0.92) > 3AG(0.912) > 2A(0.908) > 2AG(0.902) > 1A(883)$
1AG is much better than 1A
**1AG is a bit better than 3AG ???**
3. xyz-color is only a bit better than xyz
4. xyzmid-color is much better than xyz-color
5. **xyzmid-color is normally much better than xyz-xyzmid-color ???**

## 1.3 model

batch size: 50
data: xyz_midnorm_block-color_1norm
epoch_num = 600
sampling & grouping: stride_0d1_step_0d1_bmap_nh5_12800_1d6_2_fmn3-600_64_24-60_16_12-0d2_0d6_1d2-0d2_0d6_1d2

| model | acc | loss |
|---|---|---|
| 3A | 0.909 | 0.248 |
| 3AG | 0.913 | 0.231 |
| 4AG | 0.912 | 0.232 |

batch size: 32
data: xyz_midnorm_block-color_1norm
sampling & grouping: stride_0d1_step_0d1_bmap_nh5_12800_1d6_2_fmn6-2048_256_64-32_32_16-0d2_0d6_1d2-0d1_0d3_0d6
matterport3d
feed_data_elements:['xyz_midnorm_block', 'color_1norm']
feed_label_elements:['label_category', 'label_instance']
train data shape: [ 362 12800 6]
test data shape: [ 384 12800 6]
max epoch = 500

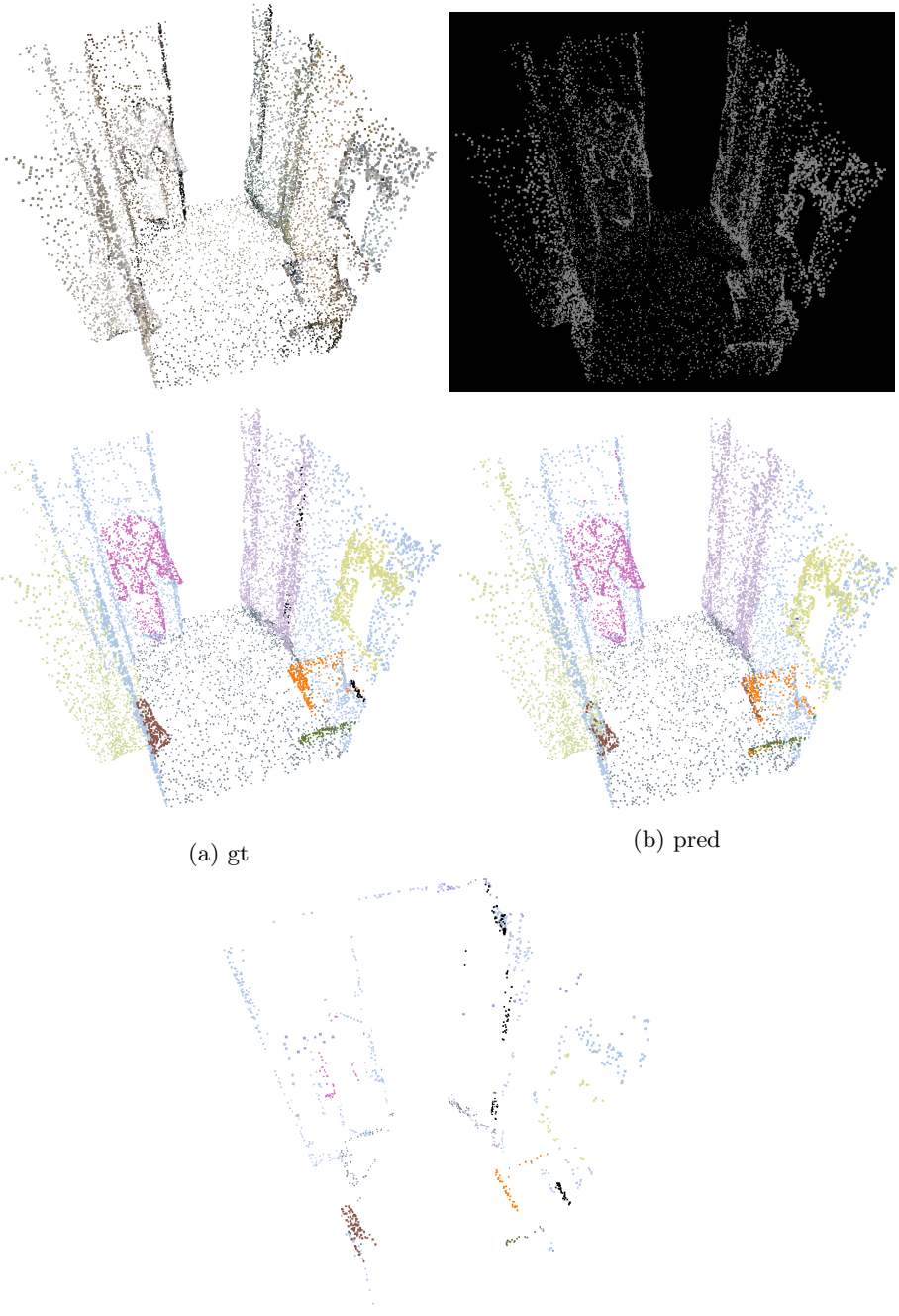
| model | acc | loss |
|---|---|---|
| 1AG | 0.944/0.431 | 0.161/4.633 |
| 4AG | 0.835/0.401 | 0.520/3.644 |

## 1.4 integration

| stride_0d1_step_0d1_bmap_nh5_12800_1d6_2_fmn3-512_64_24-48_16_12-0d2_0d6_1d2-0d2_0d6_1d2<br>17D_1LX_1pX_29h_2az | | | | |
|---|---|---|---|---|
| model | batch size<br>batch num | lr<br>ds | data elements | epoch-acc mean-std<br>train/eval |
| 1aG | 30/1083 | 0.003 | 'xyz_midnorm_block',<br>'color_1norm', 'nxnynz' | 200-0.947 |
| 1aG | 30/1083 | 0.01 | 'xyz_midnorm_block',<br>'color_1norm' | 200-0.783<br>500-0.791 |
| 1aG | 30/1083 | 0.003/30<br>300-0.00012 | 'xyz_midnorm_block',<br>'color_1norm' | 200-0.903<br>300-0.921 |
| 1bG | 25/1083 | 0.001-30<br>100-3e-4<br>300-4e-5 | 'xyz_midnorm_block' | 100-0.854<br>200-0.918<br>300-0.936 |
| 1bG | 25/1083 | 0.001-30<br>100-3e-4<br>300-4e-5 | 'xyz_midnorm_block',<br>'color_1norm', 'nxnynz' | 100-0.914<br>200-0.957<br>300-0.966 |
| 1bG | 25/1083 | 0.02 | 'xyz_midnorm_block',<br>'color_1norm' | 200-0.655<br>300-0.718 |
| 1bG | 25/1083 | 0.02 | 'xyz_midnorm_block',<br>'color_1norm', 'nxnynz' | 200-0.772<br>300-0.823 |
| 1bG | 25/1083 | 0.001 | 'xyz' | 200-0.772<br>90-0.553-0.210 |
| 4bG | 25/1083 | 0.001-30<br>100-3e-4<br>200-1e-4<br>300-4e-5 | 'xyz_midnorm_block',<br>'color_1norm', 'nxnynz' | 100-0.752<br>200-0.816<br>300-0.832 |
| 1aG | 30/19755 | 0.001-30<br>50-7e-4<br>100-3e-4 | 'xyz_midnorm_block',<br>'color_1norm','nxnynz' | 50-0.752/0.580<br>100-0.843/0.574 ( NoShuf )<br>102-0.806/0.570 ( Shufle ) |
| 1bG | 25/19755 | 0.001-30 | 'xyz_midnorm_block',<br>'color_1norm','nxnynz' | 38-0.719/0.587<br>80-0.823/0.583 ( NoShuf )<br>81-0.782/0.587 ( Shufle ) |
| 1aG | 30/19755 | 0.02 | 'xyz_midnorm_block',<br>'color_1norm' | 56-0.562 |
| 1aG | 30/19755 | 0.02<br>127-0.00483 | 'xyz_midnorm_block',<br>'color_1norm', 'nxnynz' | 87-0.616<br>127-0.686 |
| Conclusion:<br>1: nxnynz helps a lot<br>2: 1bG is much deeper than 1aG, why worse than 1aG<br>3: learning rate is important, cannot be too large | | | | |

### 1.5 Semantic segmentation expamples

model: 1bG
sampling & grouping:
stride_0d1_step_0d1_bmap_nh5_12800_1d6_2_fmn3-512_64_24-48_16_12-0d2_0d6_1d2-0d2_0d6_1d2
batch size: 25
learning rate: 0.001000
decay_epoch_step: 30
matterport3d
feed_data_elements:['xyz_midnorm_block', 'color_1norm', 'nxnynz']
feed_label_elements:['label_category', 'label_instance']
train data shape: [ 1083 12800 9]

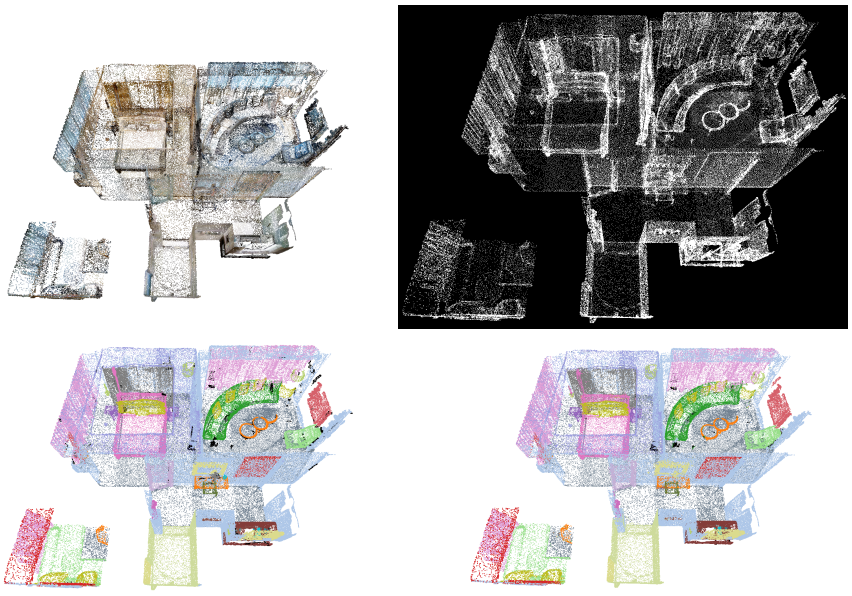


(a) gt

(b) pred

(c) err

Figure 4: 17DRP5sb8fy_1_2_a946



(a) gt

(b) pred

(c) err

Figure 5: 17DRP5sb8fy_0_25_a946