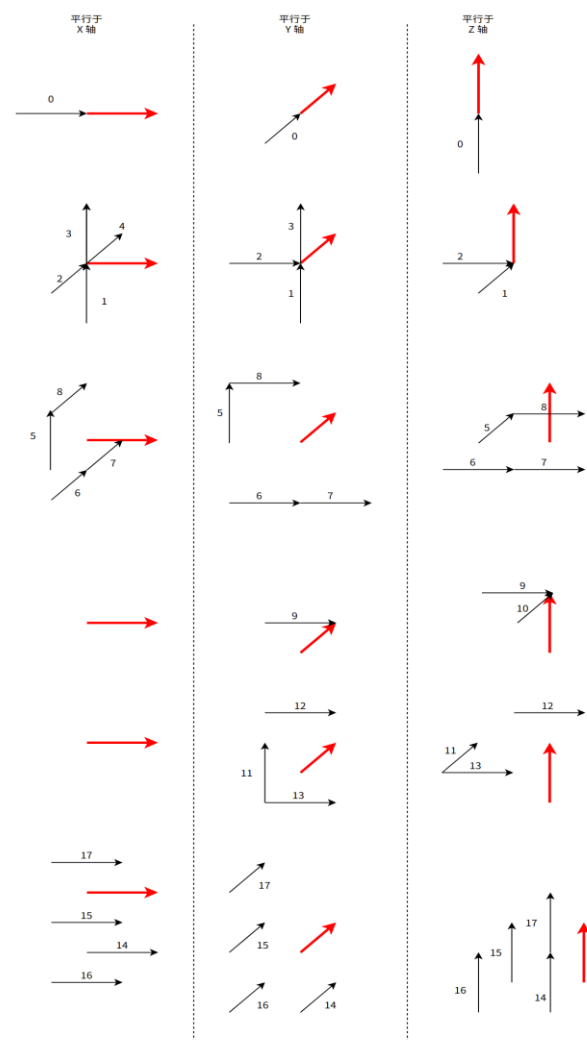


# 测 18 条边熵



## 数据统计

### 未分方向测试标识信息熵值

		18 条边中某条边未被占据	18 条边中某条边被占据
当前待编码边未被占据	0	P00	P10

当前待编码边被占据	1	P01	P11
	entropy	E1	E2

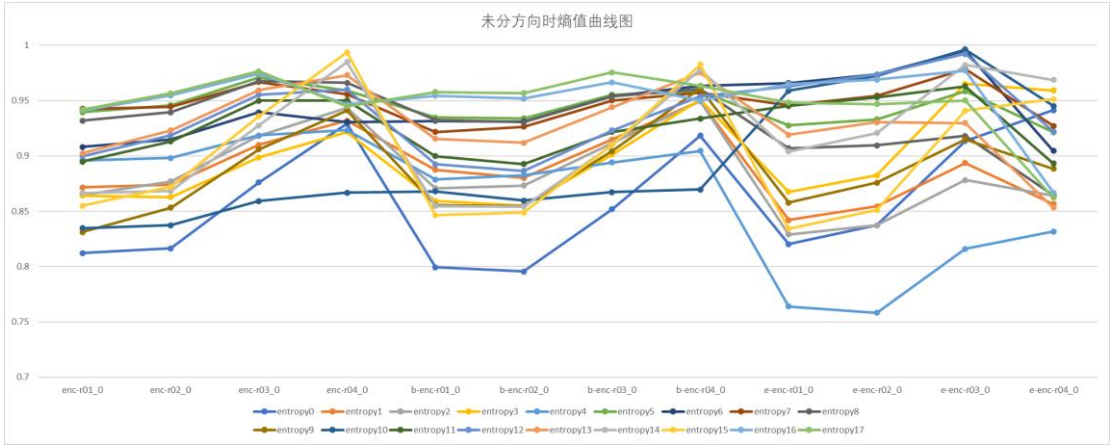
按公式：

$$E = \sum rate * \sum P \log_2 \frac{1}{p}$$

其中 $rate$ 表示 18 条边中某条边被占据和未被占据的概率。

每个序列每个码率点求得一个平均值

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
1		entropy0	entropy1	entropy2	entropy3	entropy4	entropy5	entropy6	entropy7	entropy8	entropy9	entropy10	entropy11	entropy12	entropy13	entropy14	entropy15	entropy16	entropy17
2	basket-solid	0.81217	0.871576	0.864785	0.8641	0.895929	0.939493	0.908268	0.94263	0.931927	0.831235	0.834779	0.894805	0.899744	0.902561	0.86658	0.854827	0.941219	0.941926
3		0.816385	0.874064	0.876923	0.862805	0.89824	0.945817	0.914695	0.944556	0.939491	0.853334	0.837301	0.913199	0.918804	0.923227	0.868304	0.872024	0.95473	0.956663
4		0.876043	0.910105	0.918226	0.898614	0.918624	0.970903	0.939394	0.966783	0.967788	0.906013	0.859202	0.950024	0.955307	0.959445	0.927666	0.935942	0.974314	0.976549
5		0.929046	0.931951	0.943601	0.92169	0.923239	0.959195	0.930743	0.955641	0.966165	0.941155	0.866758	0.950225	0.960188	0.97291	0.98489	0.993695	0.9467	0.944856
6	boxer-dense	0.799386	0.887535	0.870828	0.859277	0.878632	0.93483	0.931655	0.921789	0.932317	0.855728	0.868099	0.899859	0.892448	0.915556	0.854808	0.846312	0.954489	0.957719
7		0.795458	0.880011	0.873159	0.855125	0.882449	0.934067	0.931197	0.926528	0.930406	0.854637	0.859659	0.892628	0.886632	0.911936	0.854251	0.848827	0.951893	0.95689
8		0.851809	0.914713	0.911618	0.901328	0.894151	0.955345	0.95411	0.9502	0.953727	0.904459	0.867177	0.921709	0.923176	0.944061	0.909841	0.910329	0.966584	0.975549
9		0.918434	0.949442	0.949674	0.951023	0.904503	0.958751	0.963183	0.956985	0.960661	0.960907	0.869589	0.933919	0.95371	0.975442	0.978057	0.982615	0.950041	0.963524
10	egyptian-mask	0.820321	0.842033	0.828982	0.867551	0.763981	0.927602	0.965929	0.945622	0.906934	0.857803	0.959	0.945157	0.962861	0.919112	0.904103	0.834202	0.964878	0.948372
11		0.837354	0.854558	0.837331	0.88246	0.758347	0.93318	0.973806	0.954502	0.909536	0.875871	0.972525	0.952933	0.973757	0.930503	0.920731	0.851172	0.96897	0.946931
12		0.913586	0.893671	0.878224	0.965052	0.815926	0.958544	0.995329	0.978705	0.918201	0.915131	0.996352	0.96298	0.992151	0.929839	0.982367	0.941045	0.977265	0.950197
13		0.941508	0.856498	0.863892	0.959247	0.831618	0.921569	0.904694	0.927053	0.864519	0.888324	0.945218	0.893093	0.921849	0.853365	0.968765	0.951363	0.866752	0.862381



## 分方向测试标识信息熵值

- 标黄表示现有使用的 9 条边
- 每一行按熵增顺序排列

direction=0

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
1	0entropy9	0entropy10	0entropy11	0entropy12	0entropy13	0entropy15	0entropy0	0entropy2	0entropy4	0entropy3	0entropy1	0entropy6	0entropy14	0entropy17	0entropy16	0entropy7	0entropy5	0entropy8
2	0	0	0	0	0	0.8174585	0.83091467	0.89214767	0.89592883	0.94103883	0.9444862	0.94507817	0.94641	0.95126783	0.95570267	0.95623167	0.96701717	0.96729517
3																		
4	0entropy9	0entropy10	0entropy11	0entropy12	0entropy13	0entropy15	0entropy0	0entropy4	0entropy2	0entropy3	0entropy6	0entropy1	0entropy14	0entropy7	0entropy8	0entropy5	0entropy16	0entropy17
5	0	0	0	0	0	0.83720983	0.851473	0.8982395	0.8989145	0.93698483	0.938536	0.94074867	0.94146583	0.96475433	0.966659	0.96876733	0.97001633	0.97681017
6																		
7	0entropy9	0entropy10	0entropy11	0entropy12	0entropy13	0entropy15	0entropy0	0entropy2	0entropy4	0entropy6	0entropy3	0entropy1	0entropy7	0entropy16	0entropy14	0entropy8	0entropy5	0entropy17
8	0	0	0	0	0	0.88931867	0.91089533	0.9183455	0.91862433	0.94316533	0.956363	0.962319	0.968345	0.96922833	0.97191117	0.978385	0.98205483	0.982844
9																		
10	0entropy9	0entropy10	0entropy11	0entropy12	0entropy13	0entropy6	0entropy16	0entropy4	0entropy2	0entropy7	0entropy15	0entropy17	0entropy8	0entropy5	0entropy3	0entropy0	0entropy1	0entropy14
11	0	0	0	0	0	0.90337867	0.922286	0.92323867	0.92519	0.92901333	0.9358605	0.936052	0.9466365	0.95006867	0.95726567	0.960935	0.96573283	0.98543983

direction=1

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
1	1entropy4	1entropy10	1entropy9	1entropy3	1entropy1	1entropy2	1entropy9	1entropy15	1entropy14	1entropy6	1entropy12	1entropy11	1entropy13	1entropy8	1entropy5	1entropy17	1entropy16	1entropy7
2	0	0	0.69421933	0.74104667	0.7441715	0.74863167	0.749592	0.76349483	0.78803367	0.82970583	0.839708	0.84257133	0.84547833	0.8481885	0.848618	0.84935	0.85638433	0.85938917
3																		
4	1entropy4	1entropy10	1entropy9	1entropy3	1entropy1	1entropy2	1entropy9	1entropy14	1entropy15	1entropy6	1entropy12	1entropy11	1entropy13	1entropy7	1entropy5	1entropy8	1entropy17	1entropy16
5	0	0	0.717569	0.75110383	0.767056	0.78189083	0.78258417	0.80049817	0.80188033	0.85322067	0.8669905	0.86882917	0.8735965	0.87669317	0.87682433	0.87853217	0.8808595	0.88732433
6																		
7	1entropy4	1entropy10	1entropy9	1entropy3	1entropy1	1entropy9	1entropy2	1entropy14	1entropy15	1entropy6	1entropy11	1entropy13	1entropy12	1entropy7	1entropy5	1entropy17	1entropy16	1entropy8
8	0	0	0.77872767	0.80907467	0.832963	0.85209117	0.85473167	0.88343183	0.89310417	0.90499767	0.92176317	0.92326367	0.92434567	0.9252685	0.93542583	0.93613983	0.9378255	0.93956717
9																		
10	1entropy4	1entropy10	1entropy9	1entropy3	1entropy1	1entropy9	1entropy2	1entropy6	1entropy17	1entropy11	1entropy7	1entropy16	1entropy12	1entropy5	1entropy13	1entropy8	1entropy14	1entropy15
11	0	0	0.837727	0.85735317	0.886557	0.9118665	0.91306417	0.92646217	0.93991617	0.9468375	0.948196	0.948473	0.949287	0.95587033	0.95606783	0.97173333	0.97467	0.97884817

direction=2

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
1	2entropy3	2entropy4	2entropy14	2entropy10	2entropy0	2entropy1	2entropy15	2entropy9	2entropy2	2entropy6	2entropy8	2entropy11	2entropy16	2entropy13	2entropy12	2entropy17	2entropy5	2entropy7
2	0	0	0.80235817	0.83477917	0.84348167	0.857568	0.88576017	0.88846117	0.89305267	0.89796717	0.92290833	0.9282095	0.9282185	0.9296385	0.932051	0.933705	0.941696	0.96087117
3																		
4	2entropy3	2entropy4	2entropy14	2entropy10	2entropy0	2entropy1	2entropy9	2entropy2	2entropy15	2entropy6	2entropy8	2entropy11	2entropy5	2entropy12	2entropy13	2entropy16	2entropy17	2entropy7
5	0	0	0.82034067	0.83730083	0.83873667	0.85742267	0.904479	0.90916033	0.91396833	0.91840017	0.9384375	0.943367	0.94893217	0.94983017	0.95013517	0.95046133	0.95354267	0.954998
6																		
7	2entropy3	2entropy4	2entropy10	2entropy14	2entropy1	2entropy0	2entropy9	2entropy6	2entropy2	2entropy8	2entropy15	2entropy5	2entropy17	2entropy11	2entropy16	2entropy12	2entropy7	2entropy13
8	0	0	0.859202	0.8783405	0.88464117	0.90066967	0.94338933	0.9443395	0.9497655	0.96098133	0.96154733	0.96299	0.96644217	0.96644867	0.9666005	0.970001	0.97165867	0.975942
9																		
10	2entropy3	2entropy4	2entropy10	2entropy1	2entropy16	2entropy17	2entropy14	2entropy5	2entropy6	2entropy11	2entropy0	2entropy7	2entropy9	2entropy12	2entropy8	2entropy2	2entropy13	2entropy15
11	0	0	0.86675767	0.90070467	0.92324067	0.923466	0.92711933	0.9366735	0.9430515	0.94474	0.9556555	0.9562325	0.956645	0.95820117	0.96152	0.96752583	0.96992583	0.98456367

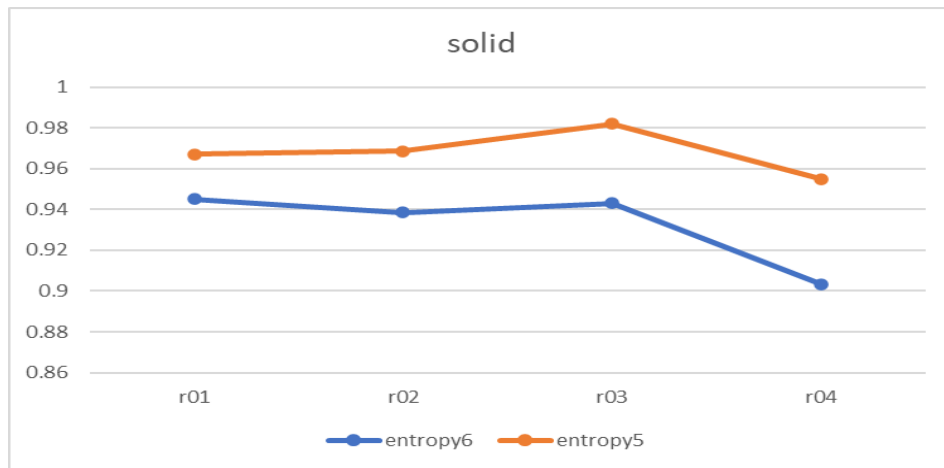
```
int mapping18to9[3][9] = { {0, 1, 2, 3, 4, 15, 14, 5, 7}, {0, 1, 2, 3, 9, 15, 14, 7, 12}, {0, 1, 2, 9, 10, 15, 14, 7, 12} };
```

• 基本上是使用熵值较小的边，但最后使用的不相邻的垂直与平行边熵值不是最合适的：

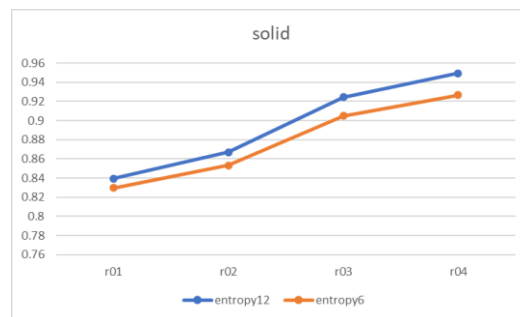
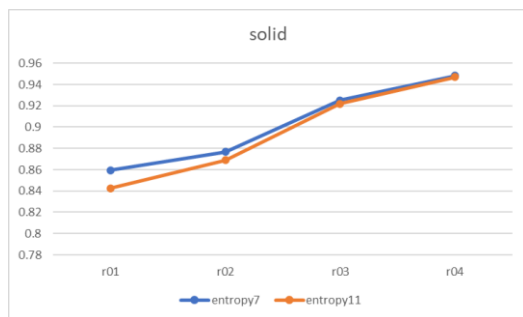
direction	不合适的边	合适的边
0	5	6
1	7、12	11、6
2	7、12	6、11

• 依据上述数据，我打算修改各个方向使用的边，用熵值较小的替换熵值较大的边，以寻求性能增益。

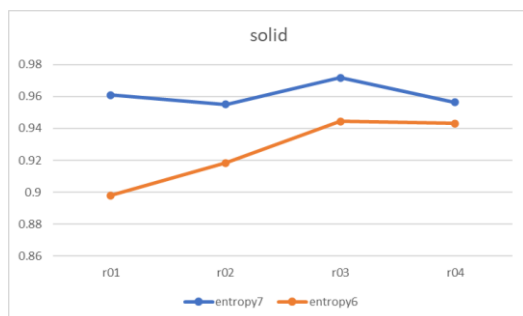
1. direction=0 时——用 entropy6 替换 entropy5



2. direction=1 时——用 entropy11 替换 entropy7、用 entropy6 替换 entropy12



3. direction=2 时——用 entropy6 替换 entropy7、用 entropy11 替换 entropy12



## 分方向测试位置信息熵值

- 与优化标识信息所使用的边流程相同，对位置信息进行熵值计算与分析

1. direction=0

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
1	solid	0entropy9	0entropy10	0entropy11	0entropy12	0entropy13	0entropy0	0entropy4	0entropy2	0entropy3	0entropy6	0entropy15	0entropy1	0entropy7	0entropy8	0entropy16	0entropy14	0entropy5	0entropy17
2	四个码率点熵和值	0	0	0	0	0	3.7806486	4.22560218	4.42692578	4.52310857	4.54978457	4.6814774	4.7281825	4.75638664	4.84472342	4.94074433	4.99510528	5.0071228	5.20290497
3																			
4	dense	0entropy9	0entropy10	0entropy11	0entropy12	0entropy13	0entropy0	0entropy4	0entropy2	0entropy15	0entropy8	0entropy6	0entropy3	0entropy7	0entropy5	0entropy1	0entropy17	0entropy16	0entropy14
5		0	0	0	0	0	3.71596163	4.02781525	4.14890278	4.18531953	4.39907418	4.59141655	4.59676365	4.68631743	4.81331773	4.93223705	5.0799229	5.10252085	5.13243173
6																			
7	sparse	0entropy9	0entropy10	0entropy11	0entropy12	0entropy13	0entropy0	0entropy4	0entropy8	0entropy2	0entropy17	0entropy15	0entropy3	0entropy7	0entropy14	0entropy1	0entropy5	0entropy6	0entropy16
8		0	0	0	0	0	3.8433062	4.1206965	4.1614547	4.2938427	4.3368688	4.5554108	4.561924	4.6387933	4.6950406	4.8070841	4.8412937	4.9368166	5.1377559

## 2. direction=1

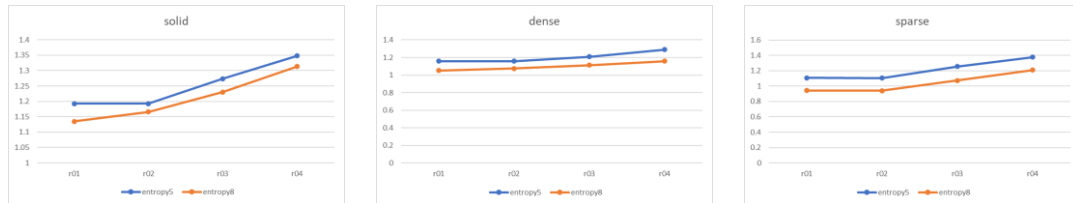
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
1	1entropy4	1entropy10	1entropy0	1entropy9	1entropy3	1entropy1	1entropy14	1entropy2	1entropy15	1entropy6	1entropy16	1entropy17	1entropy11	1entropy12	1entropy13	1entropy8	1entropy5	1entropy7
2	0	0	3.41221232	3.91833612	4.06360702	4.15845515	4.23252862	4.24576563	4.27452586	4.3310785	4.40133513	4.45232618	4.5557016	4.5705815	4.61224285	4.63172198	4.65062526	4.68818173
3																		
4	1entropy4	1entropy10	1entropy0	1entropy9	1entropy15	1entropy14	1entropy2	1entropy1	1entropy17	1entropy16	1entropy8	1entropy12	1entropy7	1entropy5	1entropy3	1entropy6	1entropy11	1entropy13
5	0	0	2.8774448	3.4683681	3.60348643	3.61239192	3.7286723	3.76791626	3.84488693	3.96005392	3.97529648	4.03322287	4.0346092	4.09196578	4.10276854	4.2109967	4.22611374	4.32904185
6																		
7	1entropy4	1entropy10	1entropy0	1entropy9	1entropy8	1entropy2	1entropy17	1entropy15	1entropy3	1entropy13	1entropy12	1entropy14	1entropy1	1entropy5	1entropy16	1entropy7	1entropy11	1entropy6
8	0	0	3.8247587	4.0935083	4.1925632	4.3112371	4.4286962	4.465247	4.5371135	4.5731694	4.6516677	4.7671345	4.7903309	4.9031633	4.9631205	4.9782805	5.0179345	5.0456521

## 3. direction=2

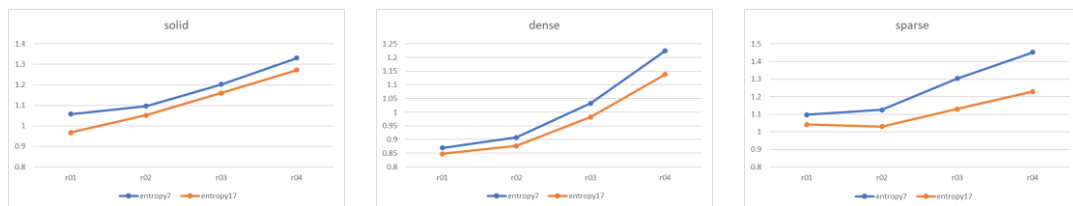
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
1	2entropy3	2entropy4	2entropy0	2entropy10	2entropy1	2entropy9	2entropy14	2entropy2	2entropy6	2entropy5	2entropy11	2entropy15	2entropy16	2entropy8	2entropy17	2entropy12	2entropy13	2entropy7
2	0	0	3.79249246	4.19354705	4.26727705	4.40504572	4.55654452	4.65973307	4.66422555	4.73258443	4.77055185	4.80561897	4.81168057	4.81912033	4.91994875	4.94176302	4.97696667	5.02532755
3																		
4	2entropy3	2entropy4	2entropy0	2entropy1	2entropy14	2entropy10	2entropy9	2entropy11	2entropy5	2entropy7	2entropy13	2entropy12	2entropy15	2entropy2	2entropy16	2entropy6	2entropy17	2entropy8
5	0	0	3.75811396	4.19002687	4.22568073	4.25463355	4.47758125	4.55065751	4.61829355	4.79097968	4.8313638	4.86836155	4.93056048	4.98443795	4.98639423	5.039824	5.06923943	5.20731975
6																		
7	2entropy3	2entropy4	2entropy0	2entropy10	2entropy9	2entropy8	2entropy2	2entropy1	2entropy13	2entropy11	2entropy5	2entropy15	2entropy17	2entropy12	2entropy14	2entropy7	2entropy16	2entropy6
8	0	0	4.1154757	4.6295803	4.6891549	4.8226422	4.8316886	4.8557231	4.9607626	4.9878141	5.0164014	5.1507635	5.3098269	5.3313563	5.3825204	5.4000604	5.4179521	5.4360135

- 分析数据得到以下待修改边与修改边的熵值对比折线图：

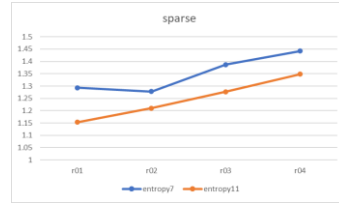
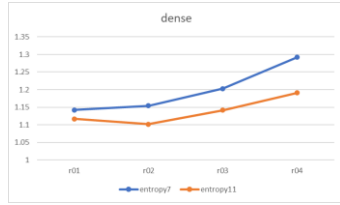
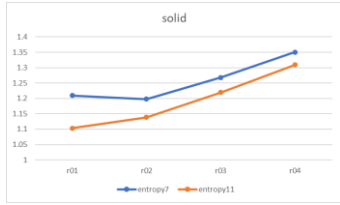
### 1. direction=0——用 entropy8 替换 entropy5



### 2. direction=1——用 entropy17 替换 entropy7



### 3. direction=2——用 entropy11 替换 entropy7



## 不同方向上 18 条边分别存在数量在总存在边数中的占比

为了考虑各个边在进行上下文构建时的所占权重，我对 18 条边的存在数量占比进行了统计，替换前熵值较大的边与替换后熵值较小的边，两者在 18 条边中的存在数量占比是一致的，因此不会因为占比问题影响熵编码效果。

- solid 类型 basketballplayer 序列下测试：

### R01 码率点

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
1 direction		entropy0	entropy2	entropy4	entropy15	entropy1	entropy3	entropy14	entropy5	entropy6	entropy7	entropy8	entropy16	entropy17	entropy9	entropy10	entropy11	entropy12	entropy13
2	0	1121	987	987	987	950	950	950	709	709	709	709	709	709	0	0	0	0	0
3		10.02%	8.82%	8.82%	8.82%	8.49%	8.49%	8.49%	6.34%	6.34%	6.34%	6.34%	6.34%	6.34%	0.00%	0.00%	0.00%	0.00%	0.00%
4		entropy2	entropy9	entropy15	entropy0	entropy1	entropy3	entropy14	entropy5	entropy6	entropy7	entropy8	entropy11	entropy12	entropy13	entropy16	entropy17	entropy4	entropy10
5	1	987	987	987	947	913	913	913	709	709	709	709	709	709	709	709	709	0	0
6		7.58%	7.58%	7.58%	7.27%	7.01%	7.01%	7.01%	5.44%	5.44%	5.44%	5.44%	5.44%	5.44%	5.44%	5.44%	5.44%	0.00%	0.00%
7		entropy0	entropy2	entropy9	entropy15	entropy1	entropy10	entropy14	entropy5	entropy6	entropy7	entropy8	entropy11	entropy12	entropy13	entropy16	entropy17	entropy3	entropy4
8	2	958	950	950	950	913	913	913	709	709	709	709	709	709	709	709	709	0	0
9		7.41%	7.35%	7.35%	7.35%	7.06%	7.06%	7.06%	5.48%	5.48%	5.48%	5.48%	5.48%	5.48%	5.48%	5.48%	5.48%	0.00%	0.00%

### R02 码率点

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
1 direction		entropy0	entropy2	entropy4	entropy15	entropy1	entropy3	entropy14	entropy5	entropy6	entropy7	entropy8	entropy16	entropy17	entropy9	entropy10	entropy11	entropy12	entropy13
2	0	4214	3827	3827	3827	3601	3601	3601	2730	2730	2730	2730	2730	2730	0	0	0	0	0
3		9.83%	8.93%	8.93%	8.93%	8.40%	8.40%	8.40%	6.37%	6.37%	6.37%	6.37%	6.37%	6.37%	0.00%	0.00%	0.00%	0.00%	0.00%
4		entropy2	entropy9	entropy15	entropy0	entropy1	entropy3	entropy14	entropy5	entropy6	entropy7	entropy8	entropy11	entropy12	entropy13	entropy16	entropy17	entropy4	entropy10
5	1	3827	3827	3827	3778	3521	3521	3521	2730	2730	2730	2730	2730	2730	2730	2730	2730	0	0
6		7.59%	7.59%	7.59%	7.50%	6.99%	6.99%	6.99%	5.42%	5.42%	5.42%	5.42%	5.42%	5.42%	5.42%	5.42%	5.42%	0.00%	0.00%
7		entropy2	entropy9	entropy15	entropy0	entropy1	entropy10	entropy14	entropy5	entropy6	entropy7	entropy8	entropy11	entropy12	entropy13	entropy16	entropy17	entropy3	entropy4
8	2	3601	3601	3601	3579	3521	3521	3521	2730	2730	2730	2730	2730	2730	2730	2730	2730	0	0
9		7.27%	7.27%	7.27%	7.23%	7.11%	7.11%	7.11%	5.51%	5.51%	5.51%	5.51%	5.51%	5.51%	5.51%	5.51%	5.51%	0.00%	0.00%

### R03 码率点

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
1 direction		entropy0	entropy2	entropy4	entropy15	entropy1	entropy3	entropy14	entropy5	entropy6	entropy7	entropy8	entropy17	entropy16	entropy9	entropy10	entropy11	entropy12	entropy13
2	0	16027	14894	14894	14894	13722	13722	13722	10512	10512	10512	10512	10512	7687	0	0	0	0	0
3		9.89%	9.19%	9.19%	9.19%	8.46%	8.46%	8.46%	6.48%	6.48%	6.48%	6.48%	6.48%	4.74%	0.00%	0.00%	0.00%	0.00%	0.00%
4		entropy0	entropy2	entropy9	entropy15	entropy1	entropy3	entropy14	entropy5	entropy6	entropy7	entropy8	entropy11	entropy12	entropy13	entropy16	entropy17	entropy4	entropy10
5	1	15043	14894	14894	14894	13695	13695	13695	10512	10512	10512	10512	10512	10512	10512	10512	10512	0	0
6		7.70%	7.62%	7.62%	7.62%	7.01%	7.01%	7.01%	5.38%	5.38%	5.38%	5.38%	5.38%	5.38%	5.38%	5.38%	5.38%	0.00%	0.00%
7		entropy2	entropy9	entropy15	entropy1	entropy10	entropy0	entropy14	entropy5	entropy6	entropy7	entropy8	entropy11	entropy12	entropy13	entropy16	entropy17	entropy3	entropy4
8	2	13722	13722	13722	13695	13695	13661	13659	10512	10512	10512	10512	10512	10512	10512	10512	10512	0	0
9		7.20%	7.20%	7.20%	7.19%	7.19%	7.17%	7.17%	5.52%	5.52%	5.52%	5.52%	5.52%	5.52%	5.52%	5.52%	5.52%	0.00%	0.00%

### R04 码率点



C2_ai		lossy geometry, lossy attributes [all intra]				Geom. BD-TotGeomRate [%]	
		End-to-End BD-AttrRate [%]				D1	
		Luma	Chroma Ch	Chroma Cr	Reflectance	D1	D2
Solid average		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

问题：为什么将使用的边换成熵值较小的边以后，熵编码效率没有得到提高？