

Analysis of Prediction Modes and Quantization for Satellogic Data Set

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Introduction

1. It is suggested to compute the results for two different datasets: boats and fields (according to GICI nomenclature).
2. The experiment has been performed on each corpus and therefore the results shown are the average on each corpus. However the predicted image visualization is shown for only one image, *image_20200508-092838-434-0085* in the case of boats and *image_20201008-135317-234-0003* in the case of fields.
3. The metrics computed are described below:
 - **min**: being the minimum symbol value for all the images of the corpus.
 - **max**: being the maximum symbol value for all the images of the corpus.
 - **Avg**: being the average symbol value for all the images of the corpus.
 - $|\Sigma|$: being the average number of unique symbol values for all the images of the corpus.
 - **H**: being the average entropy for all the images of the corpus.

Table 1: Pixel

A	B	C	D
E	F	G	H
I	J	[X]	-

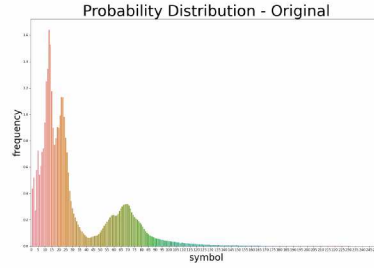
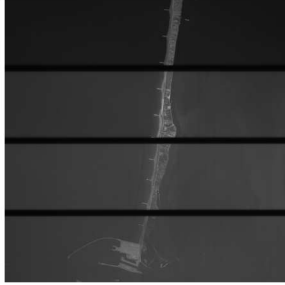
Table 2: Entropy Summary Table

	Boats			Fields		
	Q=1	Q=3	Q=5	Q=1	Q=3	Q=5
Original	6.1480	4.5802	3.8706	6.3783	4.8057	4.0873
West (W or J)	3.4248	1.9907	1.4671	3.3664	1.9257	1.4031
North (N or G)	3.4161	1.9808	1.4577	3.3985	1.9517	1.4225
JPEG-LS (JLS)	3.3285	1.9427	1.4577	3.3640	1.9611	1.4674
2-West (IJ)	3.4157	2.0197	1.5180	3.2522	1.8572	1.3743
North-West (NW or F)	3.5552	2.1070	1.5664	3.4582	2.004	1.4658
JG	3.5552	1.8076	1.3424	3.1607	1.7798	1.3147
FGHI	3.3309	1.9543	1.4832	3.1758	1.7967	1.3417
FGJ	3.1816	1.8223	1.3641	3.1264	1.7603	1.3075
FGJI	3.2225	1.8610	1.4082	3.1081	1.7431	1.3044

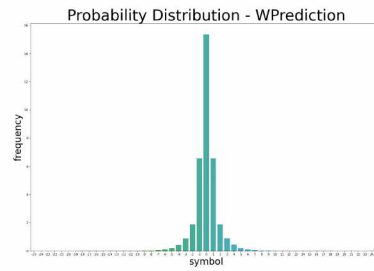
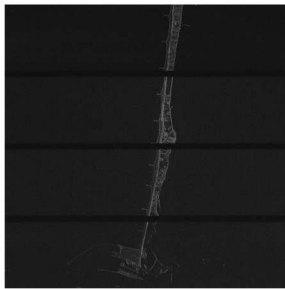
Boats

Q=1, PAE=0

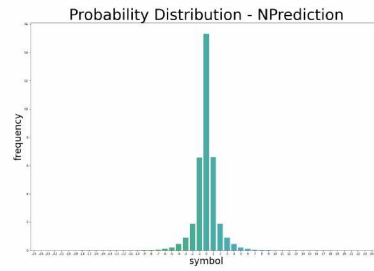
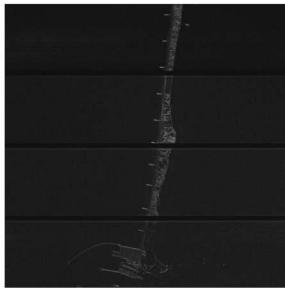
For visualization pixel value scaled by $\text{int}(\frac{255}{35}) = 7$



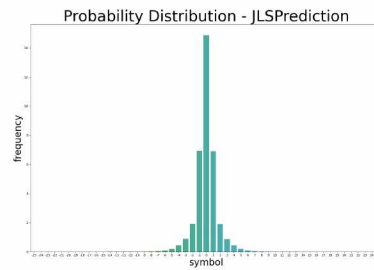
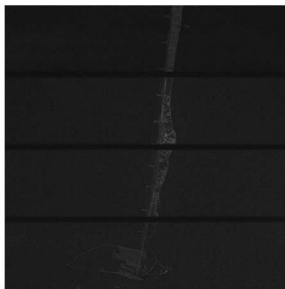
min: 2
max: 255
Avg: 118.4019
| Σ |: 239
H: 6.1480



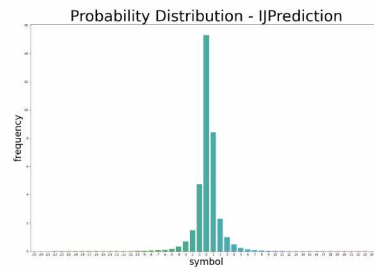
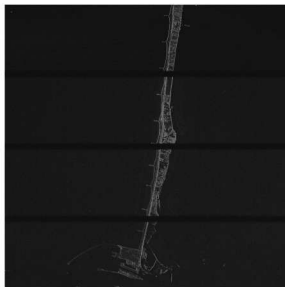
min: -191
max: 208
Avg: 11.9867
| Σ |: 169
H: 3.4248



min: -191
max: 194
Avg: 11.7943
| Σ |: 175
H: 3.4161



min: -191
max: 193
Avg: -4.0539
| Σ |: 164
H: 3.3285

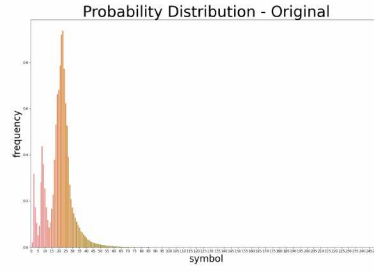
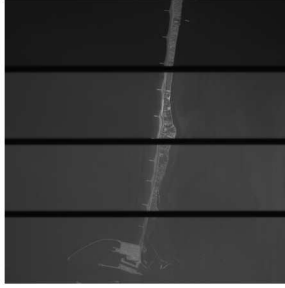


min: -182
max: 210
Avg: 16.2672
| Σ |: 179
H: 3.4157

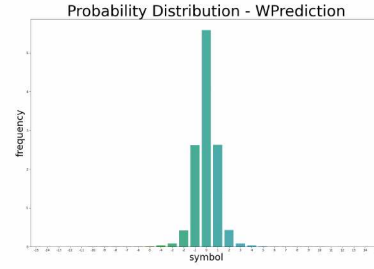
	<p>Probability Distribution - NWPrediction</p>	<p>min: -192 max: 208 Avg: 10.6897 Σ: 189 H: 3.5552</p>
	<p>Probability Distribution - JGPrediction</p>	<p>min: -120 max: 208 Avg: 32.5084 Σ: 150 H: 3.1761</p>
	<p>Probability Distribution - FGHPrediction</p>	<p>min: -143 max: 210 Avg: 24.7051 Σ: 178 H: 3.3309</p>
	<p>Probability Distribution - FGJPrediction</p>	<p>min: -121 max: 208 Avg: 31.3498 Σ: 154 H: 3.1816</p>
	<p>Probability Distribution - FGIPrediction</p>	<p>min: -138 max: 210 Avg: 30.0586 Σ: 165 H: 3.2225</p>

Q=3, PAE=1

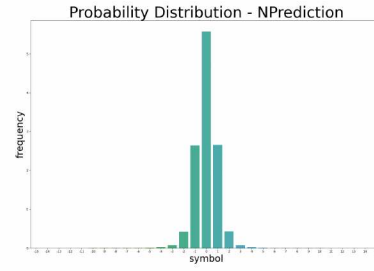
For visualization pixel value scaled by $\text{int}(\frac{255}{15}) = 17$



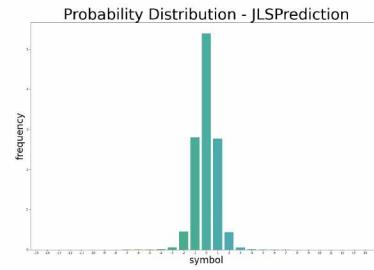
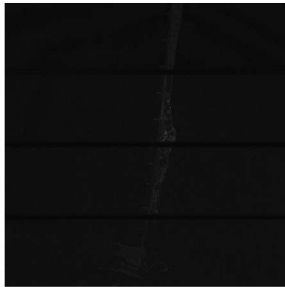
min: 0
max: 85
Avg: 39.8695
| Σ |: 85
H: 4.5802



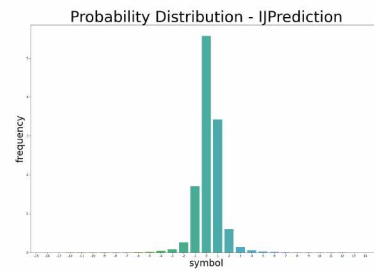
min: -64
max: 69
Avg: 3.4955
| Σ |: 68
H: 1.9907



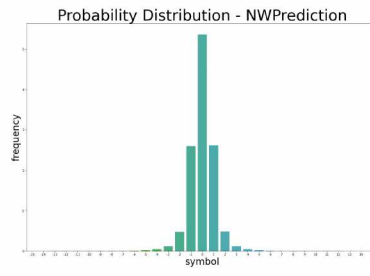
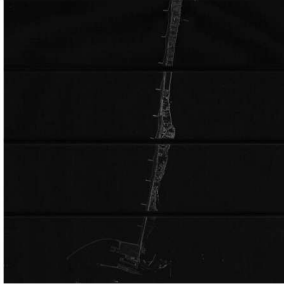
min: -64
max: 65
Avg: 1.7975
| Σ |: 67
H: 1.9808



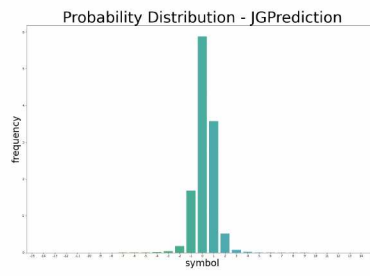
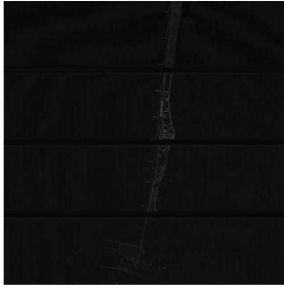
min: -64
max: 65
Avg: -1.3803
| Σ |: 66
H: 1.9427



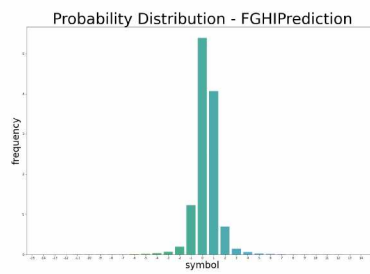
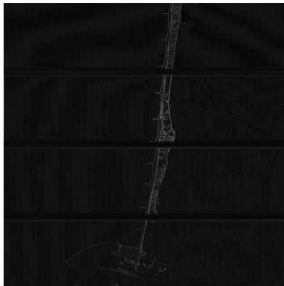
min: -61
max: 70
Avg: 6.5664
| Σ |: 70
H: 2.0197



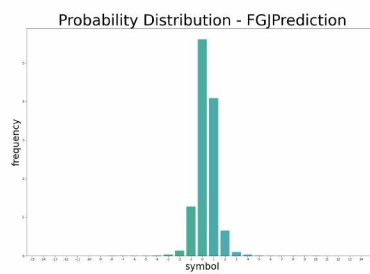
min: -64
max: 69
Avg: 1.2369
 $|\Sigma|$: 74
H: 2.1070



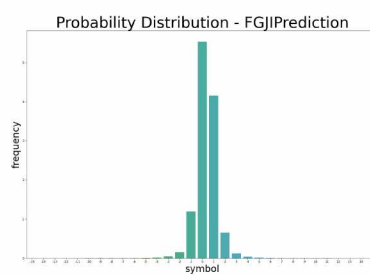
min: -40
max: 69
Avg: 11.1152
 $|\Sigma|$: 55
H: 1.8076



min: -47
max: 69
Avg: 8.8214
 $|\Sigma|$: 66
H: 1.9543



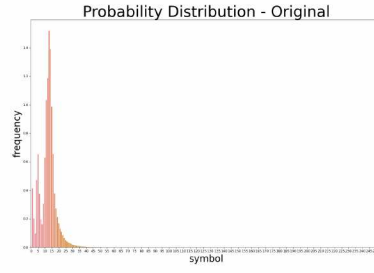
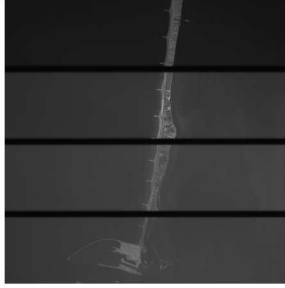
min: -40
max: 70
Avg: 11.0611
 $|\Sigma|$: 57
H: 1.8223



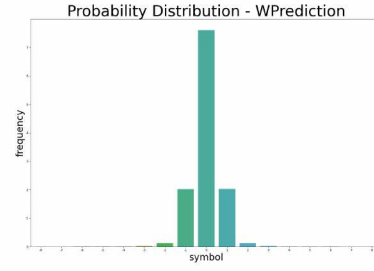
min: -46
max: 69
Avg: 10.3983
 $|\Sigma|$: 61
H: 1.8610

Q=5, PAE=2

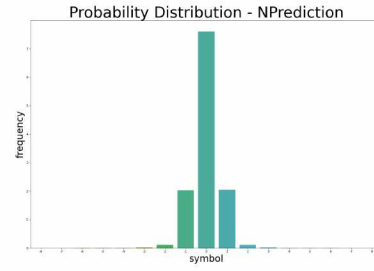
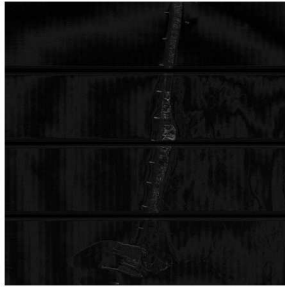
For visualization pixel value scaled by $\text{int}(\frac{255}{8}) = 31$



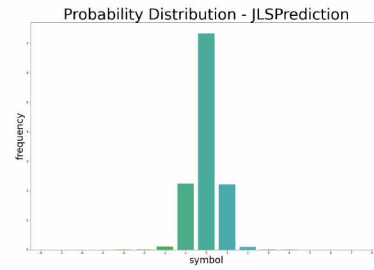
min: 0
max: 51
Avg: 23.9381
|Σ|: 52
H: 3.8706



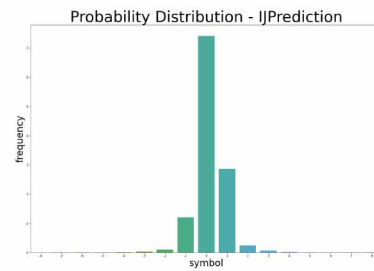
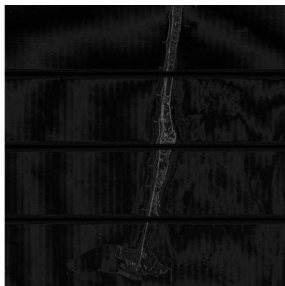
min: -39
max: 41
Avg: 1.8414
|Σ|: 42
H: 1.4671



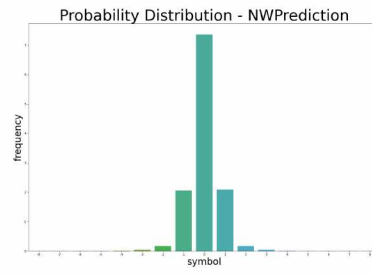
min: -39
max: 39
Avg: 0.4674
|Σ|: 45
H: 1.4577



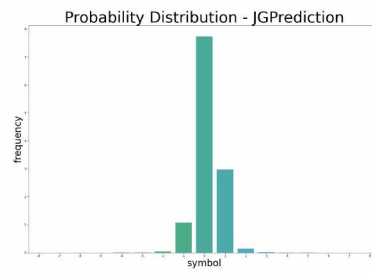
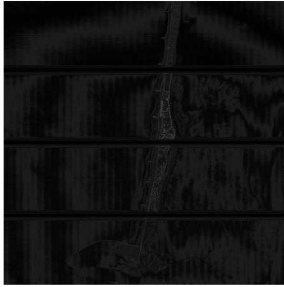
min: -39
max: 39
Avg: -0.7860
|Σ|: 43
H: 1.4577



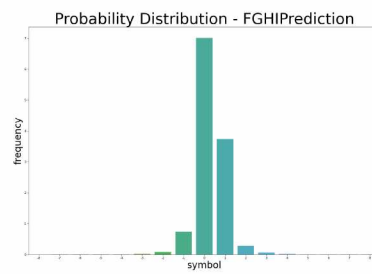
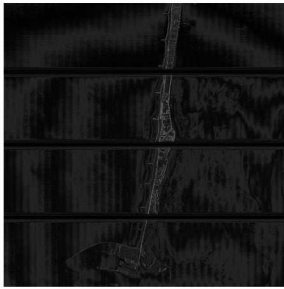
min: -37
max: 42
Avg: 4.0941
|Σ|: 44
H: 1.5180



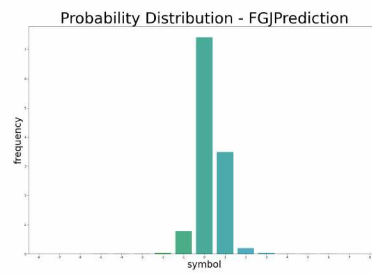
min: -39
max: 41
Avg: 1.2369
 $|\Sigma|$: 47
H: 1.5664



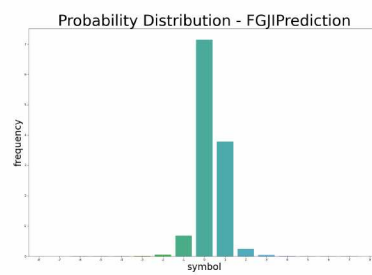
min: -24
max: 41
Avg: 6.8006
 $|\Sigma|$: 34
H: 1.3424



min: -29
max: 42
Avg: 5.7951
 $|\Sigma|$: 41
H: 1.4832



min: -24
max: 41
Avg: 6.7896
 $|\Sigma|$: 35
H: 1.3641

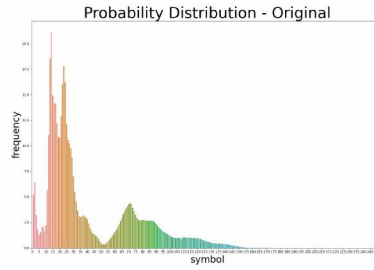
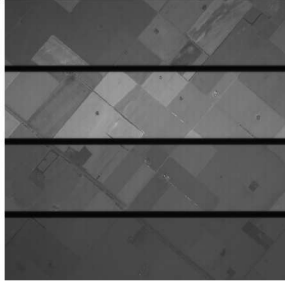


min: -28
max: 42
Avg: 6.7868
 $|\Sigma|$: 38
H: 1.4082

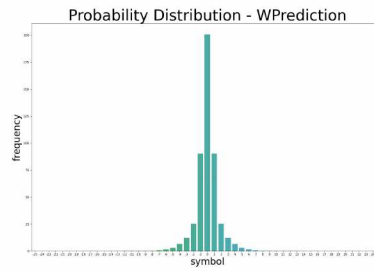
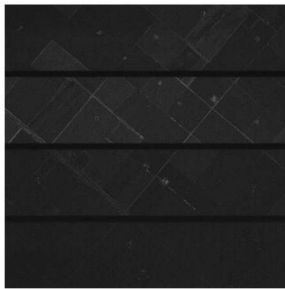
Fields

Q=1, PAE=0

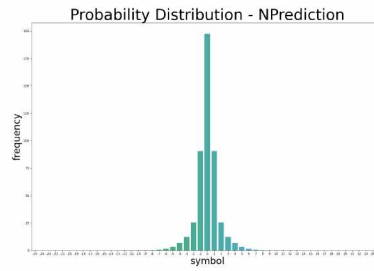
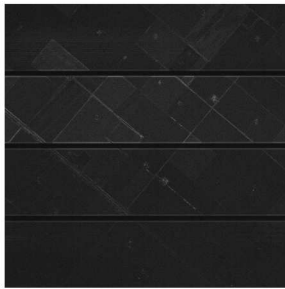
For visualization pixel value scaled by $\text{int}(\frac{255}{35}) = 7$



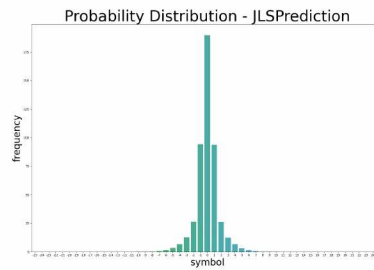
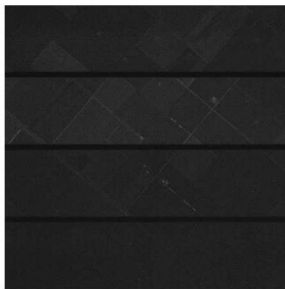
min: 1
max: 255
Avg: 125.6462
| Σ |: 253
H: 6.3783



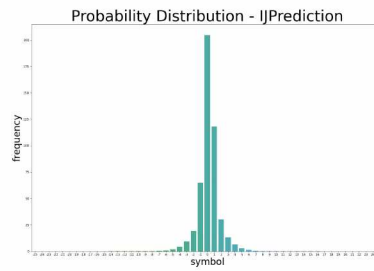
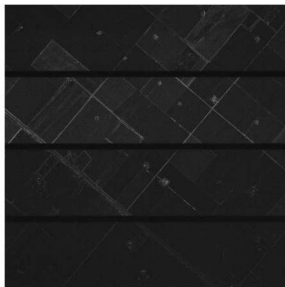
min: -205
max: 235
Avg: 19.7665
| Σ |: 228
H: 3.3664




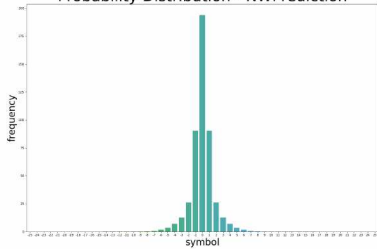

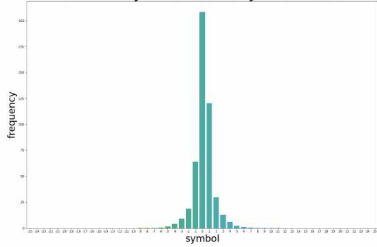
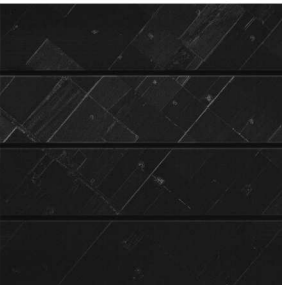
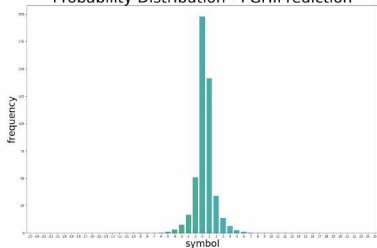

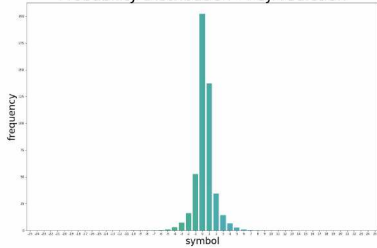

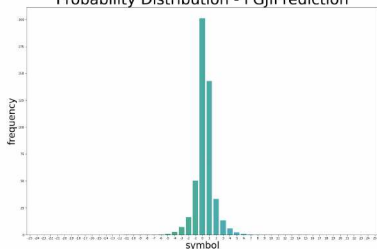
min: -206
max: 206
Avg: 8.8043
| Σ |: 209
H: 3.3985



min: -206
max: 205
Avg: -6.0676
| Σ |: 179
H: 3.3640

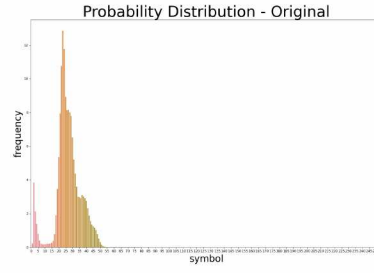
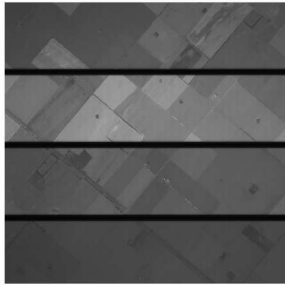


min: -154
max: 242
Avg: 24.9195
| Σ |: 216
H: 3.2522

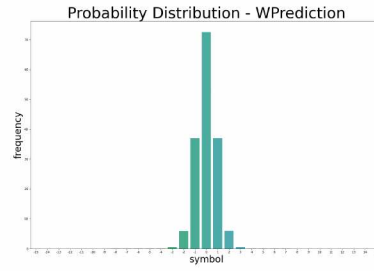
	<p>Probability Distribution - NWPrediction</p> 	<p>min: -206 max: 235 Avg: 19.0624 Σ: 231 H: 3.4582</p>
	<p>Probability Distribution - JGPrediction</p> 	<p>min: -137 max: 235 Avg: 34.8382 Σ: 203 H: 3.1607</p>
	<p>Probability Distribution - FGHPrediction</p> 	<p>min: -128 max: 242 Avg: 33.6968 Σ: 204 H: 3.1758</p>
	<p>Probability Distribution - FGJPrediction</p> 	<p>min: -106 max: 235 Avg: 37.3158 Σ: 196 H: 3.1264</p>
	<p>Probability Distribution - FGIPrediction</p> 	<p>min: -121 max: 242 Avg: 37.9797 Σ: 196 H: 3.1081</p>

Q=3, PAE=1

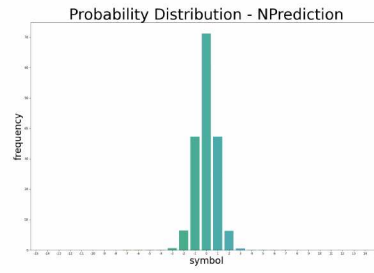
For visualization pixel value scaled by $\text{int}(\frac{255}{15}) = 17$



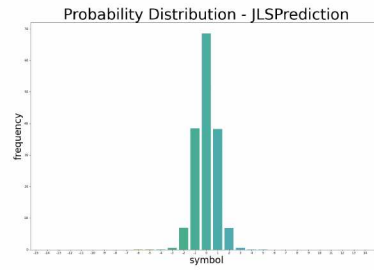
min: 0
max: 85
Avg: 42.0444
| Σ |: 85
H: 4.8057



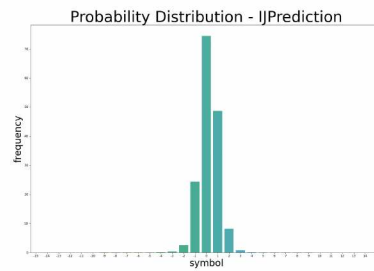
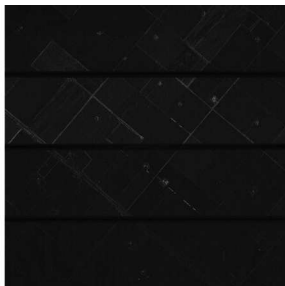
min: -69
max: 78
Avg: 4.4257
| Σ |: 86
H: 1.9257



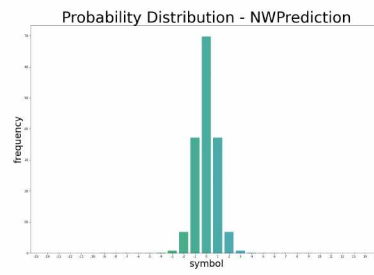
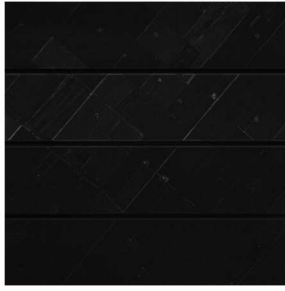
min: -69
max: 68
Avg: 1.4928
| Σ |: 78
H: 1.9517



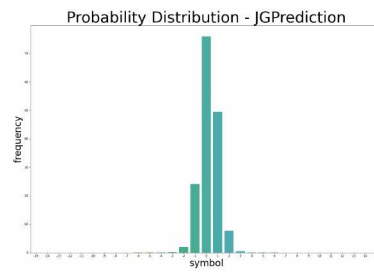
min: -69
max: 69
Avg: -2.5908
| Σ |: 76
H: 1.9611



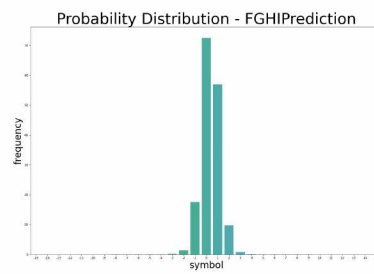
min: -52
max: 80
Avg: 8.4394
| Σ |: 38
H: 1.8572



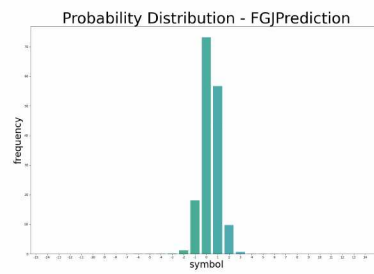
min: -69
max: 78
Avg: 4.2130
 $|\Sigma|$: 86
H: 2.004



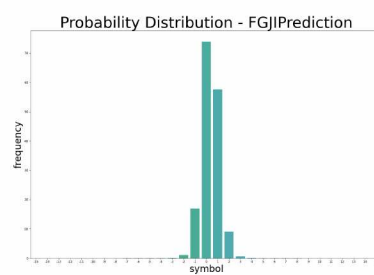
min: -46
max: 78
Avg: 10.5945
 $|\Sigma|$: 75
H: 1.7798



min: -43
max: 80
Avg: 12.0485
 $|\Sigma|$: 75
H: 1.7967



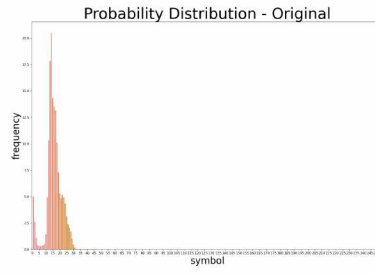
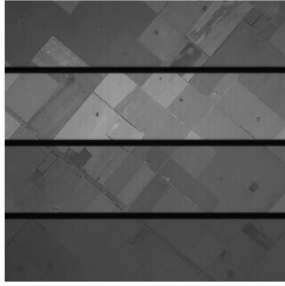
min: -35
max: 78
Avg: 12.4269
 $|\Sigma|$: 72
H: 1.7603



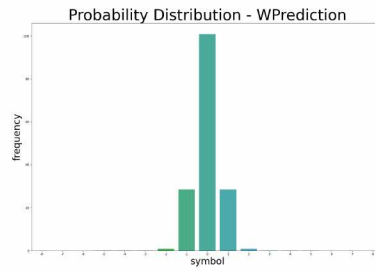
min: -40
max: 80
Avg: 13.3295
 $|\Sigma|$: 72
H: 1.7431

Q=5, PAE=2

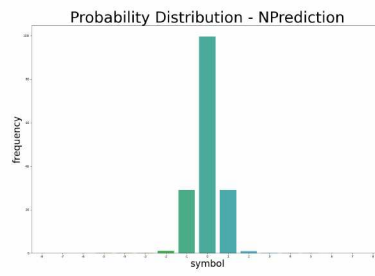
For visualization pixel value scaled by $\text{int}(\frac{255}{8}) = 31$



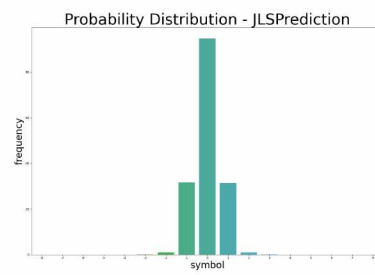
min: 0
max: 51
Avg: 25.1786
|Σ|: 52
H: 4.0873



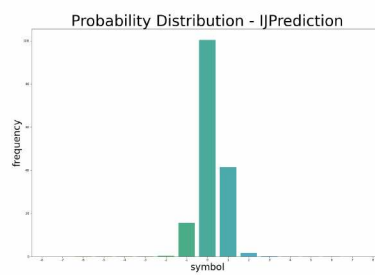
min: -41
max: 47
Avg: 1.8396
|Σ|: 53
H: 1.4031



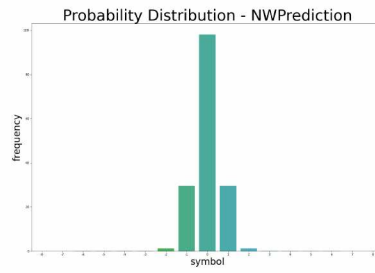
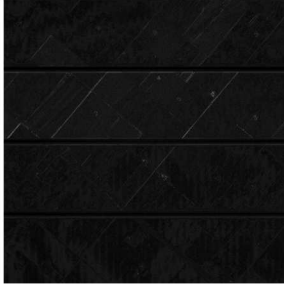
min: -42
max: 41
Avg: 0.4510
|Σ|: 52
H: 1.4225



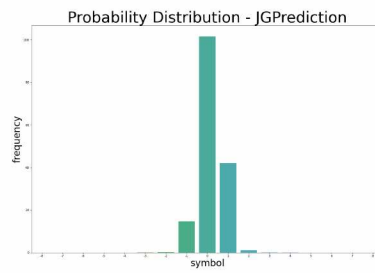
min: -42
max: 41
Avg: -1.5819
|Σ|: 49
H: 1.4674



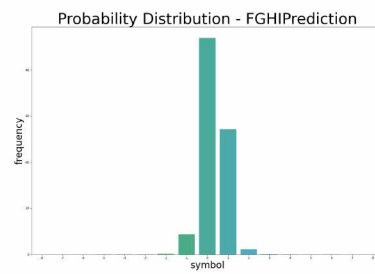
min: -31
max: 48
Avg: 5.4077
|Σ|: 48
H: 1.3743



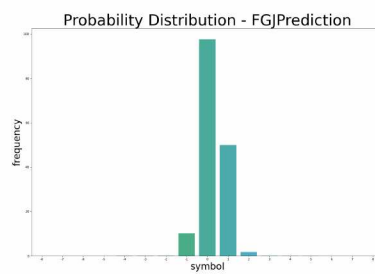
min: -42
max: 47
Avg: 1.6964
 $|\Sigma|$: 56
H: 1.4658



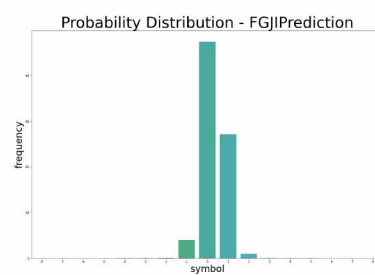
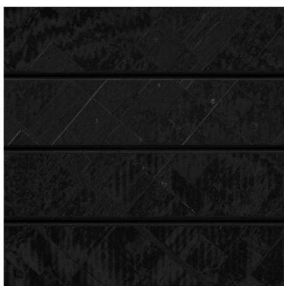
min: -28
max: 47
Avg: 6.3532
 $|\Sigma|$: 46
H: 1.3147



min: -25
max: 48
Avg: 7.7869
 $|\Sigma|$: 45
H: 1.3417



min: -21
max: 47
Avg: 7.8278
 $|\Sigma|$: 44
H: 1.3075



min: -24
max: 48
Avg: 8.4836
 $|\Sigma|$: 42
H: 1.3044