

Data set

- MC

[/data/scratch/userspace/pretz/daqsim-reconstruction/output/daqsim-baseline-take4](#)

- Background (one run of real data)

[/data/scratch/userspace/tcapistran/DATASET/Background.xcd](#)

it is a copy of [/data/scratch/userspace/pretz/scrappy-platypus-optimization/datafiles/energy.dec20.run005481.xcd](#)

- 2016 Crab Strip

[/data/archive/hawcroot/data/hawc/data/subsets/crab-strip](#)

Bin definition:

1. **fbin** in **nHitSP20/nChAvail** in step of 0.1 from 0.05 to 1.00
2. **ebin** is **logNenergyV2** in step of 0.25 from $10^{2.5}$ - $10^{5.25}$

Quality Cuts:

- `rec.angleFitStatus == 0`
- `rec.coreFitStatus == 0`
- `rec.nChAvail >= 700`
- `rec.coreFiduScale <= 100`
- `rec.zenithAngle < 0.785 rad`

Configuration of the Neural Network:

- Architecture: 7 : 10 : 10 : 1 | 11 : 10 : 10 : 1
- Target: Gamma = 1 and Hadron = 0.
- 3 networks were trained.
- One optimal cut per ebin (there are 12 cuts).

7 : 10 : 10 : 1

1. Log10(1/C)
2. rec.PINC
3. logNNEnergyV2
4. disMax
5. SFCFChi2
6. LDFAge
7. LDF Amp

11 : 10 : 10 : 1

1. Log10(1/C)
2. rec.PINC
3. rec.fAnnulusCharge# (0-8)

NN	name	Energy range (log10(E / 1 GeV))
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0	Low Ene	2.5 - 3.5
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1	Medium Ene	3.5 - 4.5
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2	High Ene	4.5 - 5.5
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Comparison

fbin	John		NN7Idata		NN7IMC		NN11Idata		NN11IMC	
	At Crab	Max Sig	At Crab	Max Sig	At Crab	Max Sig	At Crab	Max Sig	At Crab	Max Sig
0	-	-	11.93	12.22	12.09	12.55	10.75	12.26	9.67	10.03
1	26.52	27.02	29.73	30.23	29.94	30.45	29.93	30.40	28.24	28.63
2	33.29	33.29	37.65	37.65	37.32	37.32	34.53	34.53	33.38	33.38
3	35.07	35.07	37.76	37.81	37.77	37.77	36.70	36.85	34.86	35.13
4	31.01	31.17	33.29	33.29	32.00	32.00	31.62	31.62	29.50	30.20
5	25.53	25.53	25.91	25.91	25.98	25.98	26.26	26.26	24.33	24.33
6	19.72	19.72	20.22	20.22	22.81	22.81	21.93	22.03	20.28	20.28
7	14.05	14.06	13.00	13.00	16.27	16.29	15.70	15.72	15.35	15.39
8	7.21	7.84	5.36	5.65	6.47	6.94	7.49	7.99	9.09	9.66
9	4.34	4.41	1.96	2.43	7.16	7.48	5.29	5.51	5.43	5.96
all (1-9)	72.03	72.03	77.55	77.55	78.80	78.80	76.33	76.33	72.40	72.40

Ratio

fbin	NN7Idata / John		NN7IMC / John		NN11Idata / John		NN11IMC / John	
	At Crab	Max Sig	At Crab	Max Sig	At Crab	Max Sig	At Crab	Max Sig
0	-	-	-	-	-	-	-	-
1	1.12	1.12	1.13	1.13	1.13	1.13	1.06	1.06
2	1.13	1.13	1.12	1.12	1.04	1.04	1.00	1.00
3	1.08	1.08	1.08	1.08	1.05	1.05	0.99	1.00
4	1.07	1.07	1.03	1.03	1.02	1.01	0.95	0.97
5	1.01	1.01	1.02	1.02	1.03	1.03	0.95	0.95
6	1.03	1.03	1.16	1.16	1.11	1.12	1.03	1.03
7	0.93	0.92	1.16	1.16	1.12	1.12	1.09	1.09
8	0.74	0.72	0.90	0.89	1.04	1.02	1.26	1.23
9	0.45	0.55	1.65	1.70	1.22	1.25	1.25	1.35
all (1-9)	1.08	1.08	1.09	1.09	1.06	1.06	1.01	1.01

Ratio

fbin	NN7Idata / NN7IMC		NN11Idata / NN11IMC			
	At Crab	Max Sig	At Crab	Max Sig		
0	0.99	0.97	1.11	1.22		
1	0.99	0.99	1.06	1.06		
2	1.01	1.01	1.03	1.03		
3	1.00	1.00	1.05	1.05		
4	1.04	1.04	1.07	1.05		
5	1.00	1.00	1.08	1.08		
6	0.89	0.89	1.08	1.09		
7	0.80	0.80	1.02	1.02		
8	0.83	0.81	0.82	0.83		
9	0.27	0.32	0.97	0.92		
all (1-9)	0.98	0.98	1.05	1.05		

Comparison using different scripts

fbin	NN7IMC (aerie-apps-FastTopHatSkyMap)		NN7IMC (liff-HealpixSigFluxMap)	
	At Crab	Max Sig	At Crab	Max Sig
0	12.09	12.55	13.27	13.28
1	29.94	30.45	33.41	33.41
2	37.32	37.32	40.55	40.55
3	37.77	37.77	41.07	41.07
4	32.00	32.00	34.57	34.57
5	25.98	25.98	27.99	27.99
6	22.81	22.81	24.12	24.12
7	16.27	16.29	6.75	8.55
8	6.47	6.94	7.47	7.47
9	7.16	7.48	7.42	7.69
all (1-9)	78.80	78.80	-	-

Backslide

Bins:

1. fbin in nHitSP20/nChAvail in step of 0.1 from 0.05 to 1.00
2. ebin is logNNeenergyV2 in step of 0.25 from $10^{2.5}$ - $10^{5.25}$

ebin	min ebin	max ebin	min ebin (GeV)	max bin (Gev)
0	2.50	2.75	316.23	562.34
1	2.75	3.00	562.34	1000.00
2	3.00	3.25	1000.00	1778.28
3	3.25	3.50	1778.28	3162.28
4	3.50	3.75	3162.28	5623.41
5	3.75	4.00	5623.41	10000.00
6	4.00	4.25	10000.00	17782.79
7	4.25	4.50	17782.79	31622.78
8	4.50	4.75	31622.78	56234.13
9	4.75	5.00	56234.13	100000.00
10	5.00	5.25	100000.00	177827.94
11	5.25	5.50	177827.94	316227.77

fbin	min fbin	max bin
0	0.05	0.1
1	0.1	0.2
2	0.2	0.3
3	0.3	0.4
4	0.4	0.5
5	0.5	0.6
6	0.6	0.7
7	0.7	0.8
8	0.8	0.9
9	0.9	1.0