

# Histogram Equalization using Threads

Rahul Rudradevan  
UCI Student ID: 28688203  
[rrudrade@uci.edu](mailto:rrudrade@uci.edu)

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# Project Goal

# From this



# To This



# Approach

# Algorithm Steps

- Step 1 - Count Intensities
- Step 2 - Cumulative distribution function
- Step 3 - Do Equalization

# Histogram + CDF

Input Image

52	55	61	66	70	61	64	73
63	59	55	90	109	85	69	72
62	59	68	113	144	104	66	73
63	58	71	122	154	106	70	69
67	61	68	104	126	88	68	70
79	65	60	70	77	68	58	75
85	71	64	59	55	61	65	83
87	79	69	68	65	76	78	94

Histogram

52	1	64	2	72	1	85	2	113	1
55	3	65	3	73	2	87	1	122	1
58	2	66	2	75	1	88	1	126	1
59	3	67	1	76	1	90	1	144	1
60	1	68	5	77	1	94	1	154	1
61	4	69	3	78	1	104	2		
62	1	70	4	79	2	106	1		
63	2	71	2	83	1	109	1		

CDF

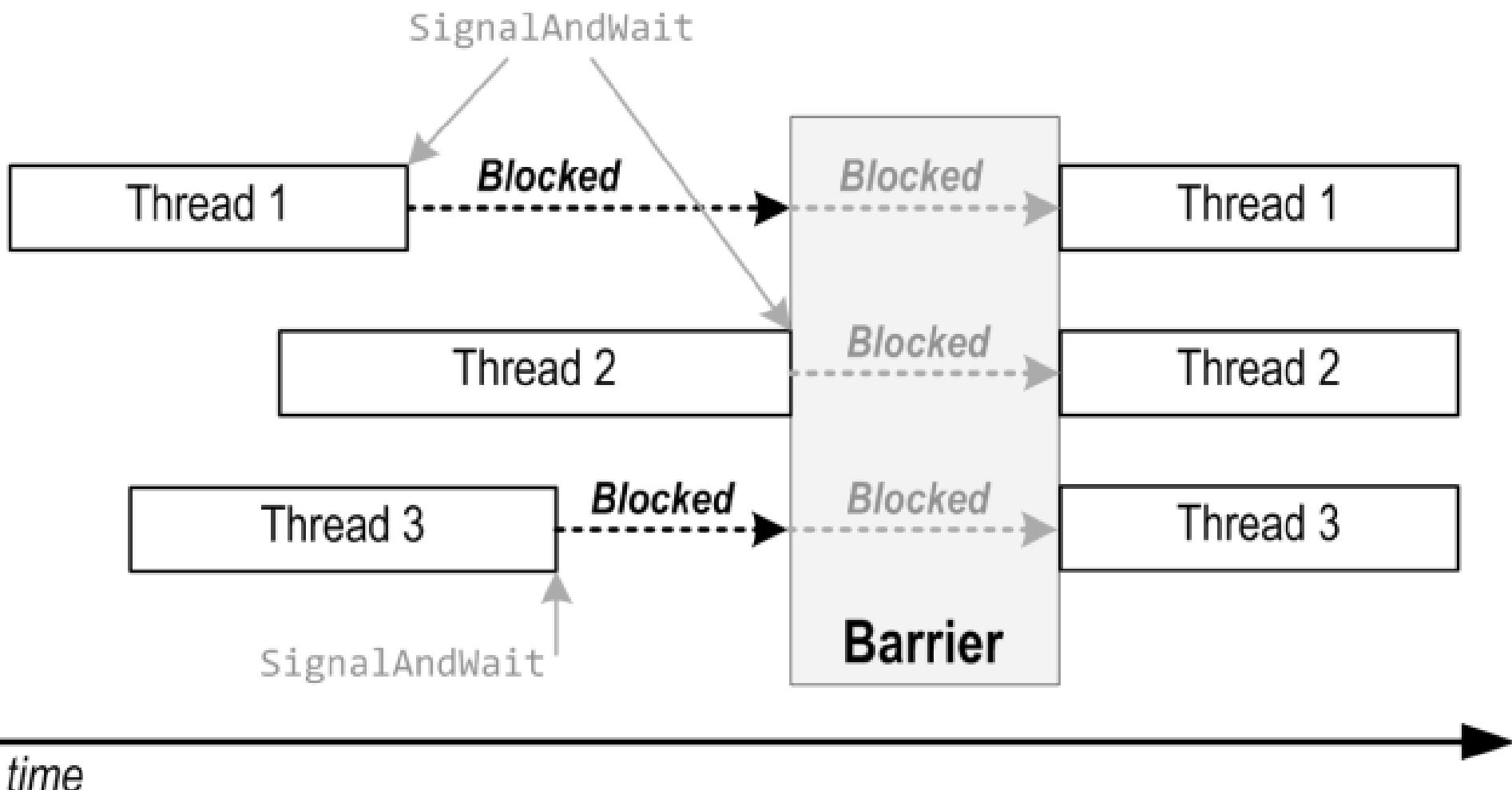
52	1	64	19	72	40	85	51	113	60
55	4	65	22	73	42	87	52	122	61
58	6	66	24	75	43	88	53	126	62
59	9	67	25	76	44	90	54	144	63
60	10	68	30	77	45	94	55	154	64
61	14	69	33	78	46	104	57		
62	15	70	37	79	48	106	58		
63	17	71	39	83	49	109	59		

# Equalization

0	12	53	93	146	53	73	166
65	32	12	215	235	202	130	158
57	32	117	239	251	227	93	166
65	20	154	243	255	231	146	130
97	53	117	227	247	210	117	146
190	85	36	146	178	117	20	170
202	154	73	32	12	53	85	194
206	190	130	117	85	174	182	219

$$h(v) = \text{round} \left( \frac{cdf(v) - cdf_{min}}{(M \times N) - cdf_{min}} \times (L - 1) \right)$$

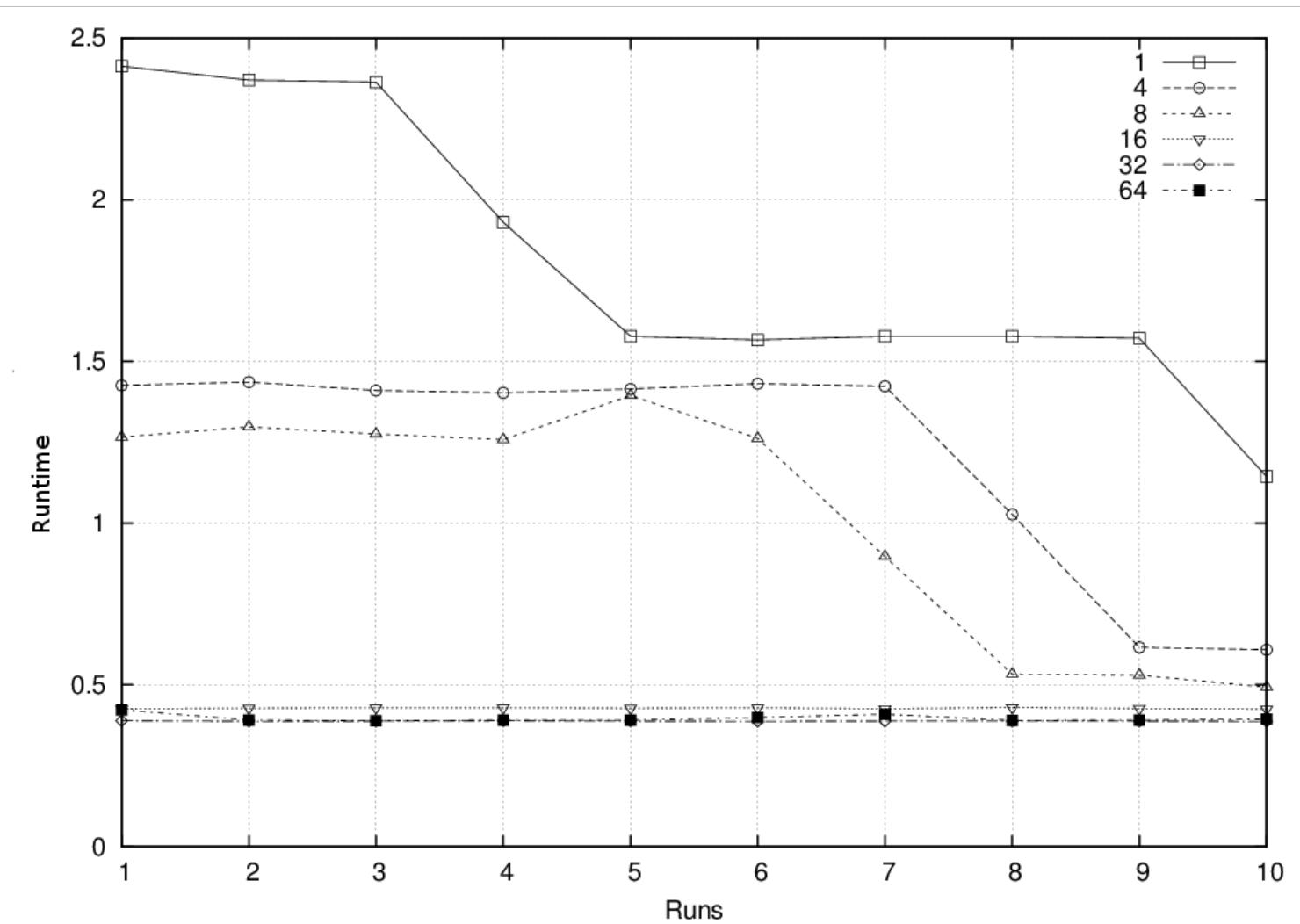
# Barriers



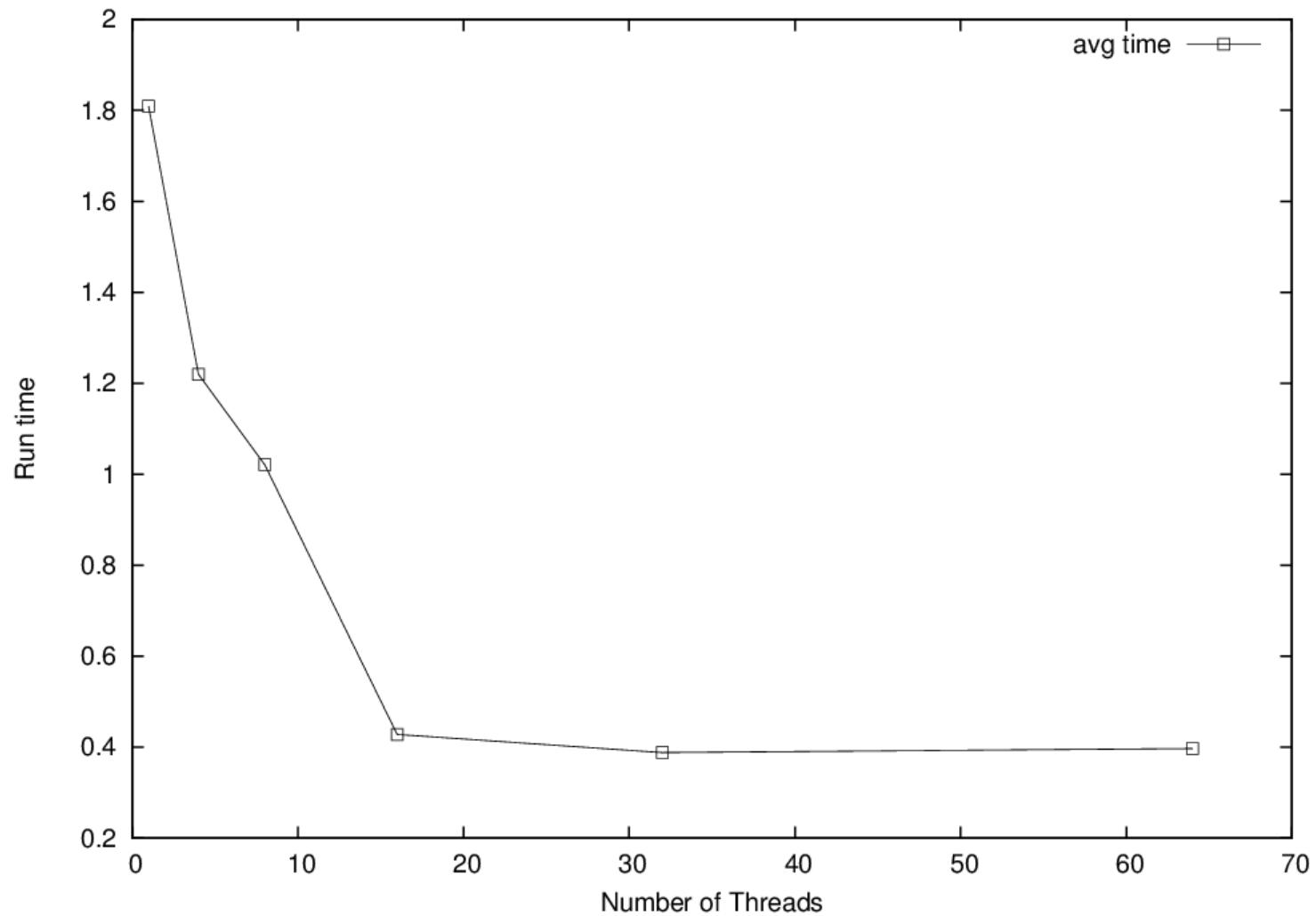
Source: <http://www.albahari.com/threading/part4.aspx>

# Evaluation

# The Runs



# Average



# Conclusion

# To sum up

- In order to extract maximum performance from lido.eecs.uci.edu we have set the number of threads to 16 or more.
  - The program was tested for 3 other images too and the same trend was observed.