

**Correlation and Aliasing in Dynamic Branch Predictors - Full  
Simulation Results**

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# **Correlation and Aliasing in Dynamic Branch Predictors**

## **— Full Simulation Results**

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### **Abstract**

The accompanying paper, "Correlation and Aliasing in Dynamic Branch Predictors," presents simulation results for a variety of branch prediction schemes using traces of the integer programs of SPEC92 and the IBS-Ultrix. However, due to space limitations and the need for clarity, only a subset of our simulation results were included. This technical report presents the full results for all of the benchmarks for each prediction scheme studied.

# 1 Introduction

In a recent paper [SechrestLeeMudge96], we discuss the role of aliasing in dynamic branch predictors. We discuss the GAs, gshare, path, and PAs approaches to branch prediction and the effects on each scheme of the aliasing resulting from limits on the sizes of hardware structures. Our investigations have involved trace-driven simulations using both CINT92 (integer programs of SPEC92) [SPEC92] and IBS-Ultrix [Uhlig95] benchmarks. In [SechrestLeeMudge96] we present results for representative examples of these benchmark programs. In this report we present the results for all of the CINT92 and IBS-Ultrix benchmarks.

## 2 The Benchmarks

The CINT92 benchmark traces were gathered on a DEC MIPS R3000 processor by using code instrumented by *pixie*. The input file for each case used in our experiments is listed in Table 1. In

Benchmarks	Input data set
compress	in
eqntott	int_pri_3.eqn
espresso	bca
gcc	stmt.l
xdisp	queen8
sc	loada1

Table 1: Input data set for CINT92

our simulations, the programs were run to completion, except eqntott, where we limited our simulations to the first 100,000,000 dynamic branches. Statistics on the CINT92 benchmarks are given in Table 2.

The IBS-Ultrix benchmarks were gathered from a DEC Station 3100 with a MIPS R2000 processor using hardware monitoring. The source code and input data for these benchmarks are available [Uhlig95]. Statistics on the IBS-Ultrix benchmarks are also given in Table 2.

## 3 Simulation Results

This section is to present all of our simulation results for wide ranges of branch predictor configurations. The metric used is the misprediction rate, which is the ratio of number of mispredicted branches to the number of branches to predict. In the case of GAs, gshare, path, and PAs with unbounded first-level branch history tables, we ignore the warm-up branches to get the lower bound of their misprediction rates.

### 3.1 The GAs scheme

Appendix A presents the results for GAs simulations for IBS-Ultrix and CINT92. For each program we simulated configurations containing tables of  $2^4$  to  $2^{15}$  predictors. A table of  $2^n$  predictors has  $n+1$  possible configurations. On the top of each page we graph the misprediction rates of these configurations for each size. The rectangular columns for a given configuration size form a tier, which is colored either grey or white. On the bottom of each page we present the

Benchmarks	Dynamic Instructions	Dynamic Conditional Branches (Percent of Total Instructions)	Static Conditional Branches	# of Static Branches Constituting 90% of Total Dynamic Conditional Branches
compress	83,947,354	11,739,532 (14.0%)	236	13
eqntott	1,395,165,044	342,595,193 (24.6%)	494	5
espresso	521,130,798	76,466,489 (14.7%)	1,784	110
gcc	142,359,130	21,579,307 (15.2%)	9,531	2,020
xisp	1,307,000,716	147,425,333 (11.3%)	489	48
sc	889,057,008	150,381,340 (16.9%)	1,269	157
groff	104,943,750	11,901,481 (11.3%)	8,333	459
gs	118,090,975	16,308,247 (13.8%)	12,852	1,160
jpeg_play	151,072,393	22,273,930 (14.7%)	7,886	58
mpeg_play	99,430,055	9,566,290 (9.6%)	5,598	532
nroff	130,249,374	22,574,884 (17.3%)	5,249	228
real_gcc	107,374,368	14,309,867 (13.3%)	17,361	3,214
sdet	42,051,812	5,514,439 (13.1%)	5,310	508
verilog	47,055,243	6,212,381 (13.2%)	4,636	850
video_play	52,508,058	5,759,231 (11.0%)	4,608	757

**Table 2: Characterization of the CINT92 and IBS-Ultrix benchmarks**

misprediction rates in tabular form, where the number of history bits varies horizontally and the number of address bits varies vertically from 0 to 15.

### 3.2 The gshare scheme

Appendix B presents the results for gshare simulations for IBS-Ultrix and CINT92. As before, the misprediction rates for each benchmark program are shown in both graphical and tabular form.

### 3.3 The path-based correlation scheme

Appendix C presents the results for path-based branch correlation simulations, proposed by Nair [Nair95], for IBS-Ultrix and CINT92. For this scheme, we used the last two bits of the word address of each branch to form the path. As before, the misprediction rates for each benchmark program are shown in both graphical and tabular form.

### 3.4 The PAs scheme

For per-address two-level predictors, the results depend not only upon the size and configuration of the predictor table, but also on the size of the first-level branch history table (BHT) as well. We present results for first-level tables of unbounded size, and for 4-way set associative tables of 128 entries, of 1024 entries, and for IBS-Ultrix, of 2048 entries. These results are shown in Appendix D. The reason of choosing the BTB sizes in our experiments is simply to represent different levels of miss rates of BHT, and the miss rate of each BHT configuration can be found in Table 3.

In the cases of bounded BHTs, we presumed all missing branches as taken branches, because with profiling our traces, we found that assuming them all taken can give the best performance.

Benchmarks	Branch history table sizes (4-way)		
	2048 entries	1024 entries	128 entries
compress	-	0.00%	0.00%
eqntott	-	0.00%	0.01%
espresso	-	0.01%	0.44%
gcc	-	2.81%	28.31%
xlisp	-	0.00%	2.51%
sc	-	0.07%	6.17%
groff	0.58%	1.72%	17.96%
gs	0.89%	2.78%	24.34%
jpeg_play	0.12%	0.47%	3.13%
mpeg_play	0.97%	2.68%	17.90%
nroff	0.27%	0.63%	8.28%
real_gcc	1.89%	3.88%	22.28%
sdet	1.86%	5.19%	21.04%
verilog	1.26%	2.86%	31.64%
video_play	2.19%	6.73%	30.48%

**Table 3: Miss rates of BHTs for CINT92 and IBS-Ultrix**

Furthermore, for those missing branches in the BHT, we set their initial values of histories as c3ff in hexadecimal, where the left bit is the most recent history bit. The reason of setting c3ff instead of ffff or 0000 is to avoid serious conflicts in these two particular patterns which we found are strongly biased and occur most often.

## References

- [SechrestLeeMudge96] Sechrest, S., Lee, C-C., and Mudge, T., "Correlation and Aliasing in Dynamic Branch Predictors," *Proceedings of the 23th International Symposium on Computer Architecture*, Phil., May, 1996.
- [SPEC92] SPEC CINT92, Release V1.1, Dec. 1992.
- [Uhlig95] Uhlig, R., Nagle, D, Mudge, T., Sechrest, S., and Emer, J. "Instruction Fetching: Coping with Code Bloat," *Proceedings of the 22nd International Symposium on Computer Architecture*, Italy, Jun. 1995.

## Appendices

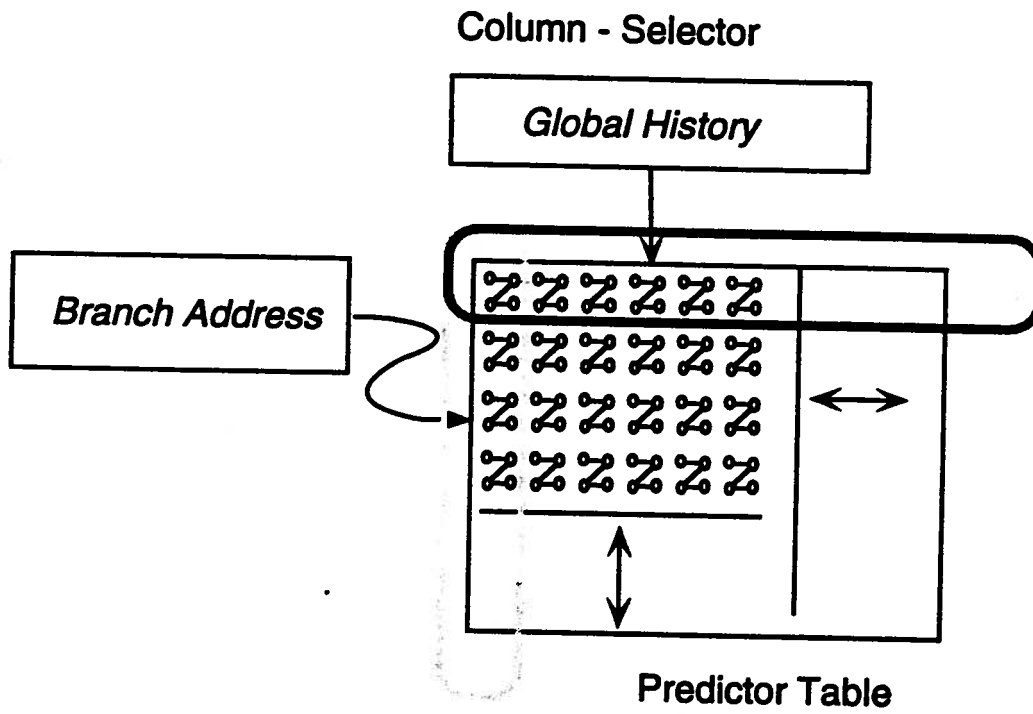
**A: The GAs scheme**

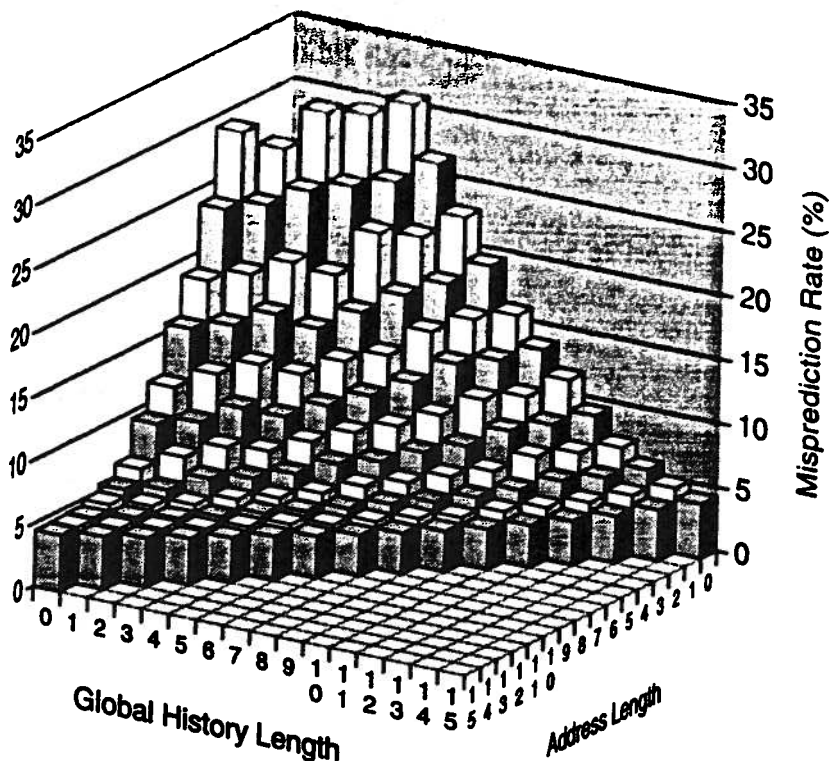
**B: The gshare scheme**

**C: The path-based correlation scheme**

**D: The PAs scheme**

# Appendix A: The GAs scheme

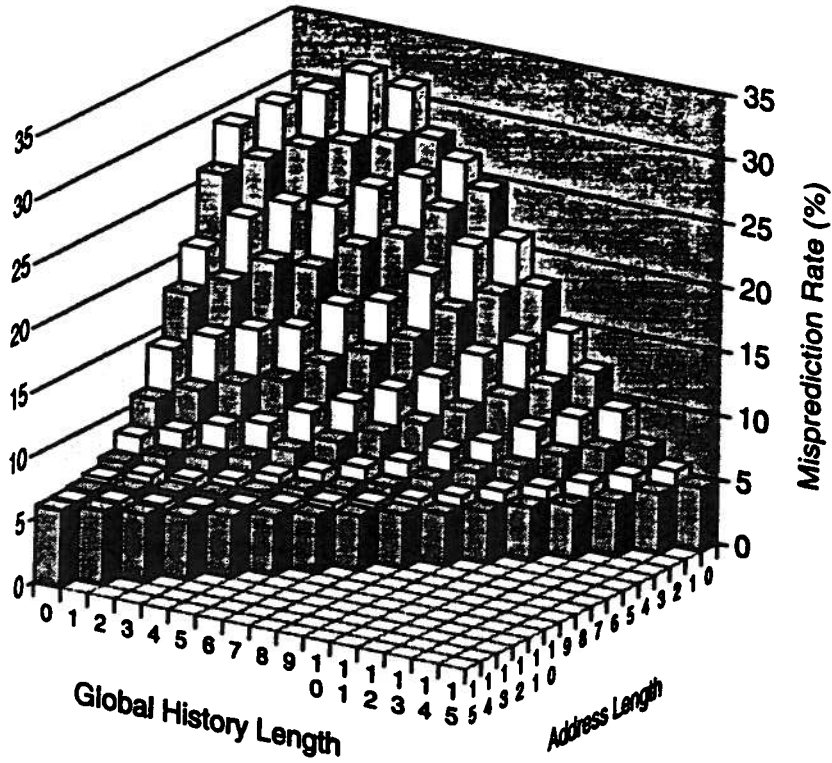




				30.63	26.48	22.75	19.38	15.95	13.72	11.78	9.43	7.38	6.11	5.09	4.30
			29.98	25.19	21.37	18.16	15.80	13.05	10.66	8.91	7.15	5.64	4.71	4.00	
		30.32	25.00	21.82	17.42	15.03	12.97	10.60	8.59	7.03	5.56	4.32	3.68		
	27.69	24.82	18.73	16.26	13.34	11.62	9.55	7.60	6.07	5.04	4.09	3.47			
29.13	23.92	19.87	15.15	13.03	10.78	8.85	7.26	5.82	4.63	3.95	3.30				
23.78	19.12	16.47	12.19	10.19	8.51	6.71	5.51	4.44	3.68	3.17					
18.78	15.74	13.14	9.51	7.98	6.71	5.40	4.44	3.76	3.20						
15.66	12.57	10.35	7.42	6.10	5.01	4.26	3.68	3.23							
11.71	9.41	7.92	5.93	4.81	4.21	3.60	3.21								
9.45	7.33	6.08	4.89	4.22	3.80	3.32									
6.57	5.37	4.65	4.12	3.78	3.46										
5.57	4.72	4.16	3.79	3.49											
5.02	4.42	3.97	3.64												
4.54	4.19	3.85													
4.47	4.13														
4.43															

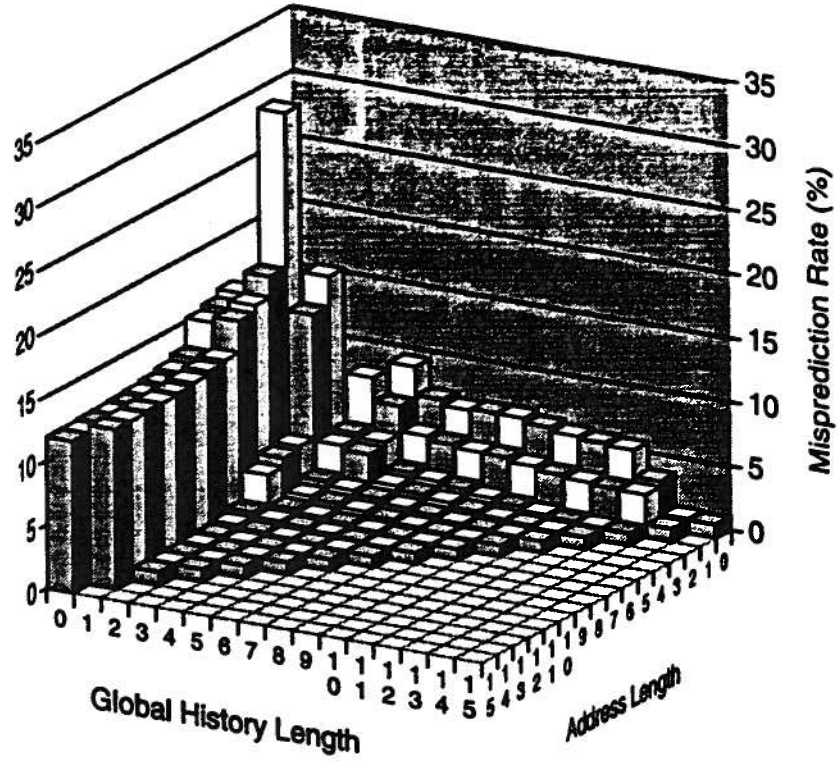
Misprediction Rates: GAs — IBS.Ultrix.groff





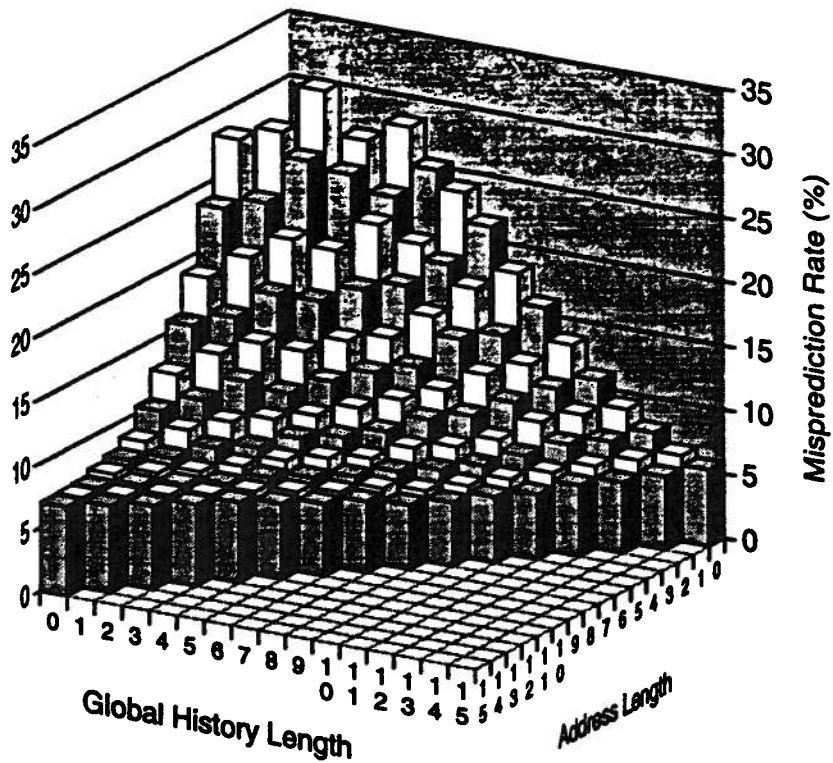
				31.29	27.83	26.48	24.63	21.20	17.93	14.84	12.16	9.61	7.15	5.82	4.92
			32.60	27.89	25.41	23.25	20.86	17.59	14.16	11.48	9.30	7.18	5.59	4.64	
		31.38	27.78	24.80	21.33	18.86	16.52	13.46	10.60	8.62	6.98	5.23	4.22		
	30.61	27.73	23.57	20.80	16.88	14.49	11.94	9.77	7.71	6.18	5.05	4.06			
29.14	26.94	23.93	19.35	16.84	13.60	11.12	8.95	7.33	6.05	4.98	4.13				
25.99	23.03	19.98	15.26	12.97	10.36	8.33	6.56	5.63	4.77	3.99					
20.82	18.65	15.32	11.80	9.76	7.89	6.35	5.30	4.66	3.98						
17.91	14.98	11.73	9.04	7.38	6.18	5.26	4.57	4.15							
14.18	11.43	9.10	7.01	6.08	5.39	4.77	4.20								
10.86	8.84	7.23	5.93	5.37	4.82	4.39									
8.63	7.44	6.16	5.38	5.00	4.58										
7.25	6.64	5.74	5.05	4.73											
6.59	6.08	5.41	4.88												
6.22	5.83	5.26													
6.05	5.72														
5.99															

Misprediction Rates: GAs — IBS.Ultrix.gs



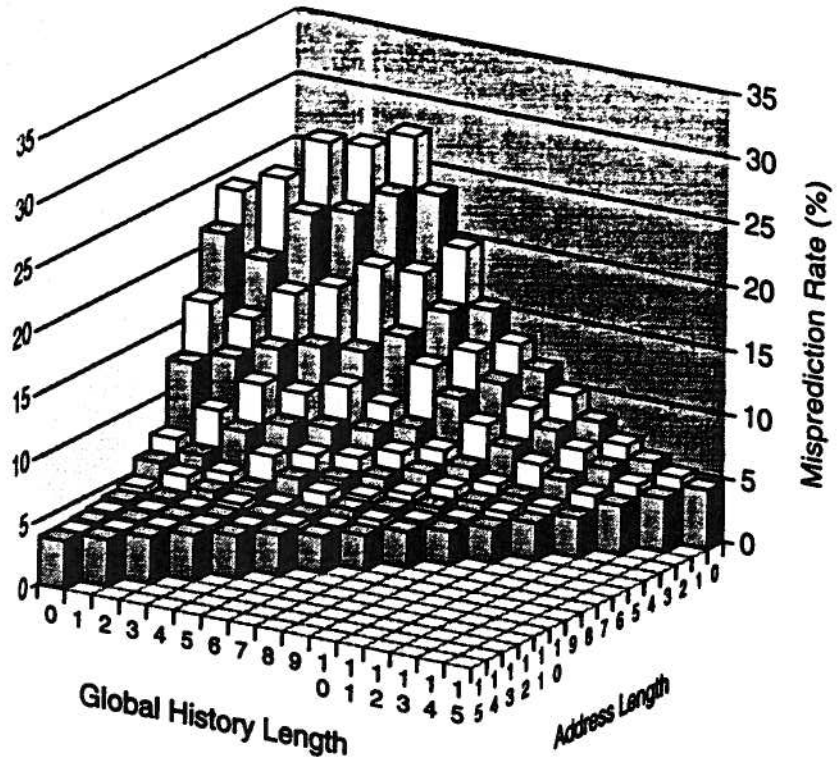
				9.38	7.17	6.69	6.83	6.80	6.46	6.13	5.97	5.80	3.72	1.19	1.09
			8.82	6.94	4.98	4.67	4.43	4.39	4.07	3.77	3.55	3.40	3.33	1.03	
		16.95	5.10	4.79	2.77	2.47	2.21	1.88	1.61	1.36	1.18	1.06	0.97		
	29.97	14.62	4.82	4.48	2.42	2.10	1.83	1.52	1.29	1.14	1.03	0.96			
16.22	17.89	5.04	2.66	2.34	2.02	1.70	1.47	1.23	1.08	0.98	0.91				
15.65	16.30	4.76	2.18	1.95	1.71	1.42	1.22	1.06	0.96	0.90					
15.27	15.73	4.10	1.80	1.57	1.38	1.18	1.03	0.92	0.87						
13.09	13.33	1.85	1.53	1.36	1.21	1.05	0.93	0.86							
12.67	13.12	1.52	1.28	1.18	1.07	0.96	0.88								
12.35	12.85	1.30	1.13	1.07	0.99	0.92									
12.22	12.70	1.21	1.07	1.02	0.96										
12.06	12.60	1.13	1.03	0.99											
12.01	12.55	1.10	1.00												
11.95	12.50	1.07													
11.92	12.48														
11.92															

Misprediction Rates: GAs — IBS.Ultrix.jpeg\_play



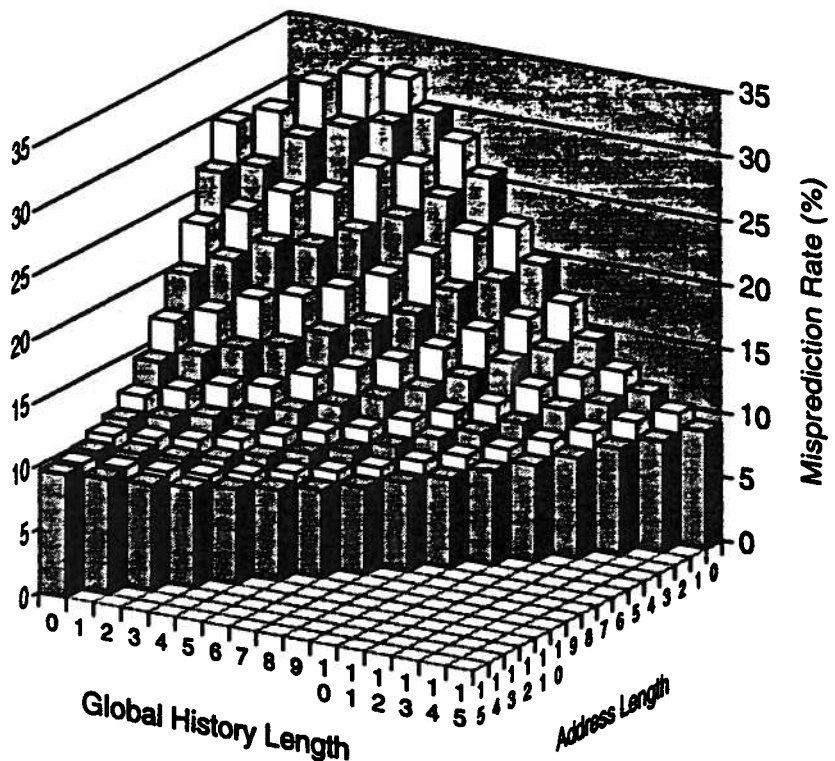
				28.45	25.49	24.13	21.88	18.59	16.27	13.77	11.42	9.54	8.09	6.68	5.96
			27.65	23.67	20.36	19.17	17.65	14.39	12.47	11.01	9.35	7.64	6.58	5.69	
		31.78	25.65	22.13	17.73	15.75	14.36	11.95	10.19	9.02	7.70	6.38	5.51		
	28.85	26.99	20.38	17.72	14.32	12.42	11.01	9.42	7.92	7.08	6.12	5.53			
28.52	23.98	21.51	17.06	14.35	12.24	10.51	9.37	7.63	6.55	5.89	5.08				
23.80	20.35	17.83	13.79	11.83	10.15	8.67	7.79	6.46	5.62	5.13					
19.03	16.33	14.67	11.17	9.82	8.50	7.23	6.61	5.49	4.95						
15.95	14.11	12.37	9.79	8.69	7.50	6.47	5.94	5.02							
12.79	11.16	9.85	8.21	7.60	6.64	5.90	5.56								
10.61	9.47	8.45	7.42	6.92	6.18	5.61									
8.81	7.93	7.25	6.70	6.46	5.89										
8.01	7.42	6.90	6.47	6.26											
7.59	7.14	6.71	6.34												
7.15	6.85	6.50													
7.04	6.77														
6.99															

Misprediction Rates: GAs — IBS.Ultrix.mpeg\_play



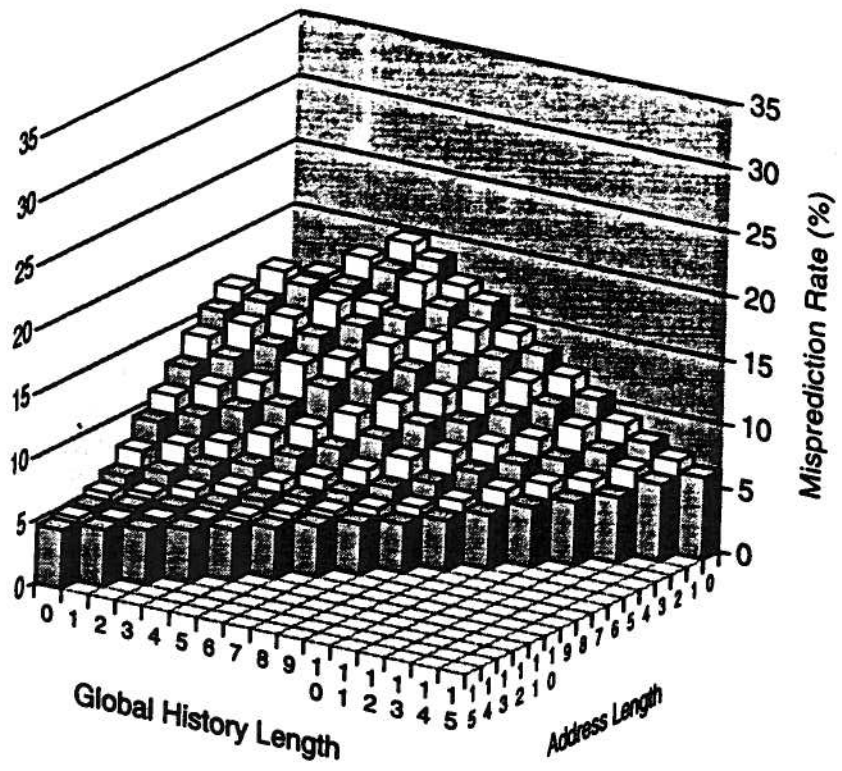
				27.56	23.44	19.72	15.35	13.09	11.48	9.97	8.31	6.93	5.99	5.21	4.63
			26.95	23.62	17.95	15.38	12.71	10.68	9.13	7.86	6.72	5.70	4.84	4.21	
		27.51	22.45	18.68	13.66	11.75	9.72	8.08	6.71	5.82	4.98	4.21	3.83		
	24.95	22.59	17.31	12.72	9.04	7.63	6.29	5.34	4.44	3.90	3.42	3.07			
24.18	19.21	17.00	13.29	10.63	7.59	6.31	5.16	4.34	3.80	3.25	2.88				
21.50	15.27	13.34	10.29	8.03	6.12	4.94	4.09	3.48	2.90	2.67					
16.75	12.88	11.22	8.40	6.53	5.01	4.07	3.50	2.98	2.64						
12.64	9.40	8.13	6.63	5.29	4.55	3.71	3.25	2.80							
7.41	6.51	5.50	4.65	3.85	3.49	2.98	2.74								
6.16	5.49	4.71	4.14	3.81	3.30	2.85									
4.82	4.26	4.00	3.74	3.39	3.17										
4.37	4.00	3.86	3.64	3.31											
4.12	3.85	3.72	3.58												
3.96	3.73	3.65													
3.79	3.69														
3.78															

Misprediction Rates: GAs — IBS.Ultrix.nroff



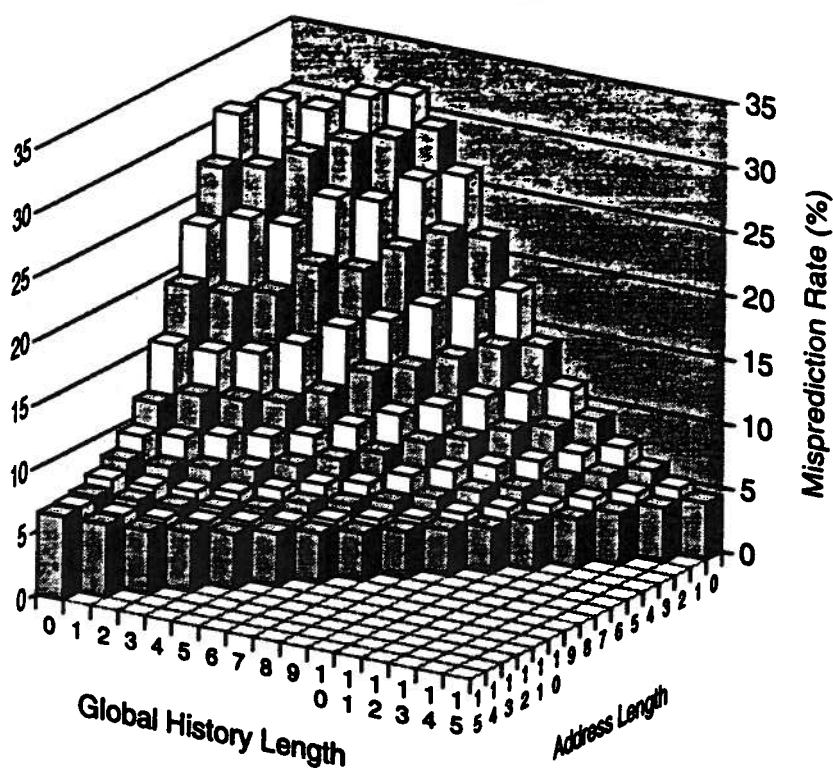
				32.36	30.01	28.18	25.81	22.35	19.80	17.15	14.69	12.62	11.34	10.18	9.13
			32.84	29.50	26.62	24.50	22.11	18.77	16.27	14.10	12.38	10.74	9.75	8.63	
		32.43	29.51	26.76	23.16	20.67	18.28	15.56	13.43	11.86	10.60	9.22	8.29		
	30.55	28.90	25.01	22.39	19.32	16.72	14.44	12.50	10.84	9.74	8.77	7.83			
29.92	26.93	25.29	21.50	18.60	16.14	13.73	11.84	10.45	9.25	8.38	7.51				
26.72	24.17	21.90	18.24	15.66	13.37	11.45	10.09	9.09	8.08	7.26					
23.30	20.96	18.31	14.98	13.03	11.19	9.71	8.73	7.90	6.96						
20.06	17.54	15.06	12.43	10.98	9.68	8.54	7.69	6.88							
17.03	14.80	12.77	10.79	9.68	8.67	7.63	6.82								
14.45	12.65	11.04	9.59	8.67	7.78	6.79									
12.46	11.06	9.80	8.73	7.92	7.09										
11.29	10.18	9.06	8.10	7.35											
10.66	9.68	8.63	7.70												
10.09	9.22	8.26													
9.79	8.96														
9.62															

Misprediction Rates: GAs — IBS.Ultrix.real\_gcc



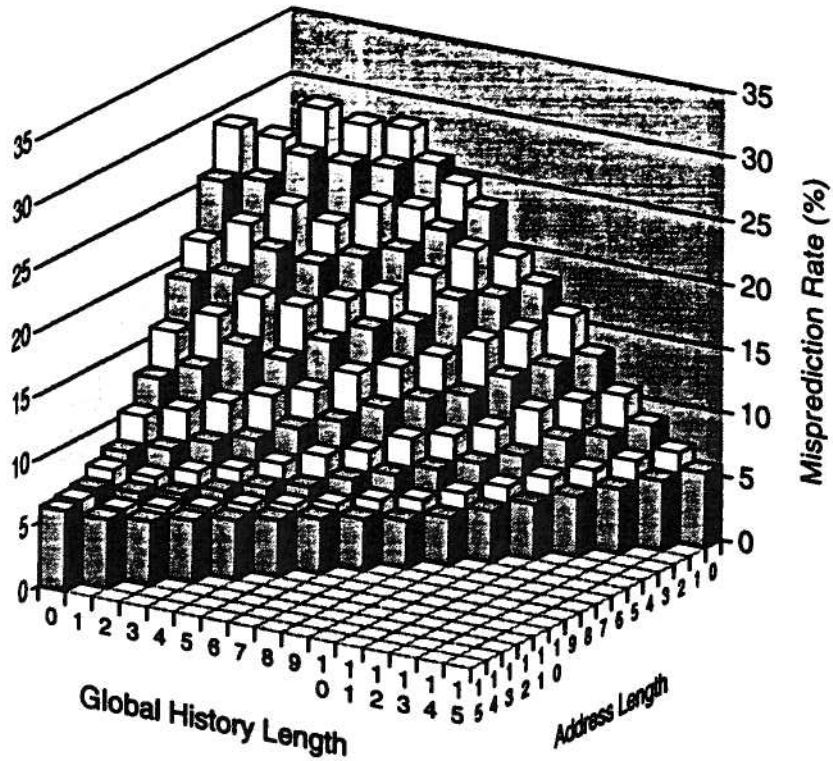
				19.68	18.72	17.23	16.32	14.41	13.22	11.96	10.68	9.21	8.14	7.23	6.36
			18.68	18.08	17.68	16.09	14.82	13.05	11.73	10.32	9.06	7.61	6.68	5.99	
		17.48	16.98	16.18	15.54	14.13	12.91	11.17	9.72	8.37	7.12	5.93	5.11		
	17.97	17.23	16.39	15.00	13.97	12.46	11.12	9.29	8.04	6.95	5.84	4.90			
16.78	16.13	15.40	14.35	13.05	11.86	10.57	9.30	7.60	6.47	5.51	4.65				
15.60	14.98	13.78	12.86	11.45	9.79	8.38	7.24	5.80	4.83	4.19					
14.19	12.96	11.52	10.13	8.93	7.75	6.56	5.53	4.50	3.93						
12.42	11.40	10.02	8.46	7.23	6.06	5.28	4.56	3.81							
10.86	9.64	8.05	6.71	5.87	5.02	4.44	3.95								
9.43	8.03	6.73	5.63	5.02	4.41	3.98									
7.72	6.44	5.57	4.83	4.38	3.93										
6.35	5.40	4.76	4.27	3.99											
5.59	4.95	4.46	4.07												
5.09	4.58	4.24													
4.91	4.44														
4.58															

Misprediction Rates: GAs — IBS.Ultrix.sdet



				31.50	29.29	26.11	21.61	17.96	14.05	11.19	9.20	7.45	6.10	5.12	4.40
			31.56	28.82	26.00	22.26	17.66	14.20	11.14	8.76	7.19	5.93	4.90	4.22	
		30.80	28.75	24.55	21.22	17.20	13.82	10.96	8.74	6.81	5.67	4.70	4.01		
	31.70	27.95	25.01	19.79	16.29	13.00	10.44	8.31	6.65	5.29	4.41	3.75			
30.91	27.17	23.11	20.48	15.98	12.88	10.05	8.25	6.57	5.32	4.34	3.69				
27.43	23.85	18.43	14.90	11.46	9.37	7.64	6.30	4.97	4.18	3.48					
23.49	18.58	14.40	11.02	8.82	7.36	5.90	4.87	3.99	3.51						
19.36	14.70	11.42	8.92	7.18	6.07	4.88	4.11	3.57							
15.47	11.96	9.17	7.13	5.90	5.15	4.26	3.65								
11.64	9.28	7.33	5.86	4.97	4.37	3.88									
9.63	7.63	6.15	5.24	4.55	4.09										
8.37	6.74	5.56	4.78	4.25											
7.52	6.24	5.23	4.58												
6.81	5.75	4.92													
6.58	5.65														
6.48															

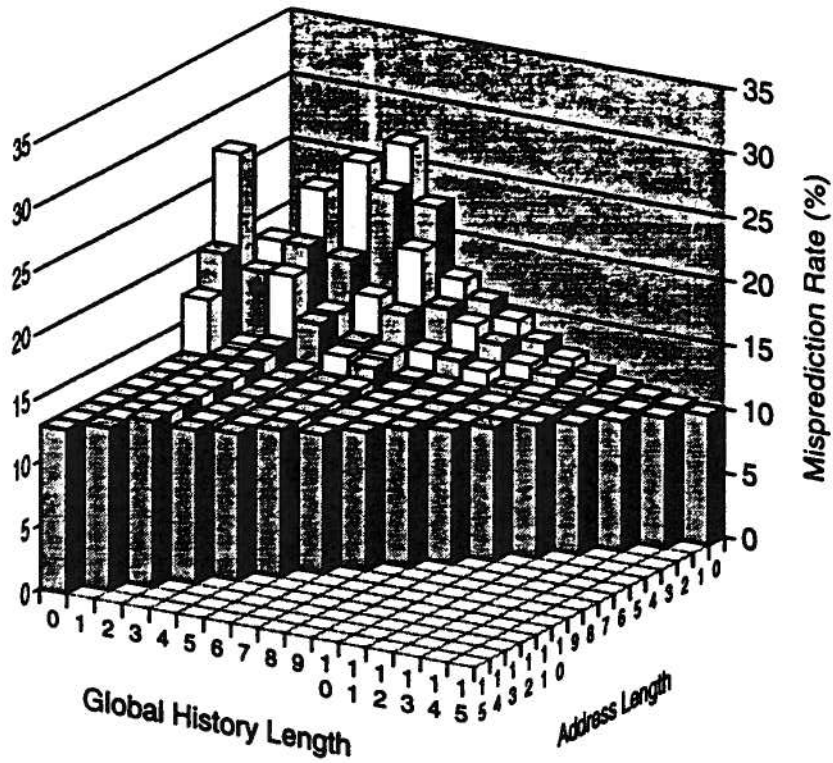
Misprediction Rates: GAs — IBS.Ultrix.verilog



				28.23	25.91	24.66	23.20	19.79	18.03	16.03	13.30	10.69	8.78	7.05	5.83
			28.70	25.83	23.03	21.73	20.63	17.35	15.10	12.75	10.40	8.04	6.61	5.44	
		30.21	26.32	23.52	20.37	18.79	17.40	14.58	12.11	9.97	8.13	6.13	5.02		
	28.14	27.15	22.32	20.10	17.66	15.72	13.57	10.98	8.82	7.09	5.72	4.66			
29.19	25.45	23.91	19.80	17.41	15.53	12.98	10.81	8.42	6.70	5.28	4.32				
25.64	22.71	21.05	17.10	14.79	12.70	10.44	8.44	6.45	4.96	3.97					
21.53	19.38	18.05	13.59	11.58	9.60	7.67	6.23	4.66	3.70						
19.16	16.84	14.90	11.38	9.28	7.54	6.06	4.86	3.68							
15.80	13.38	11.11	8.61	7.15	5.72	4.79	4.01								
12.75	10.70	8.60	6.88	5.89	4.90	4.27									
10.48	8.32	6.94	5.84	5.11	4.40										
8.34	6.75	5.81	5.12	4.59											
7.57	6.16	5.38	4.80												
6.67	5.51	4.94													
6.44	5.34														
6.25															

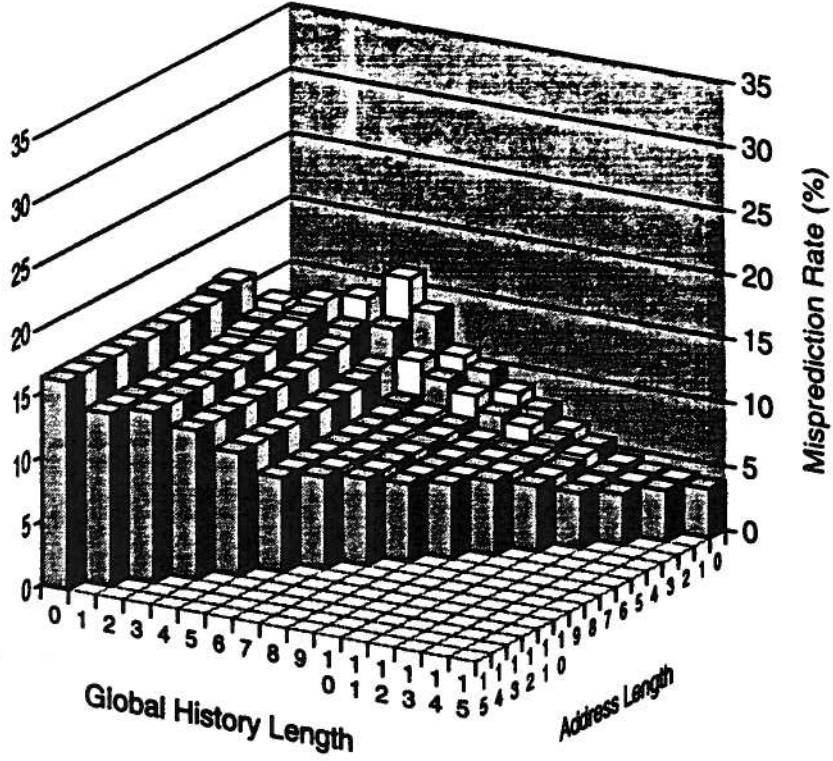
Misprediction Rates: GAs — IBS.Ultrix.video\_play





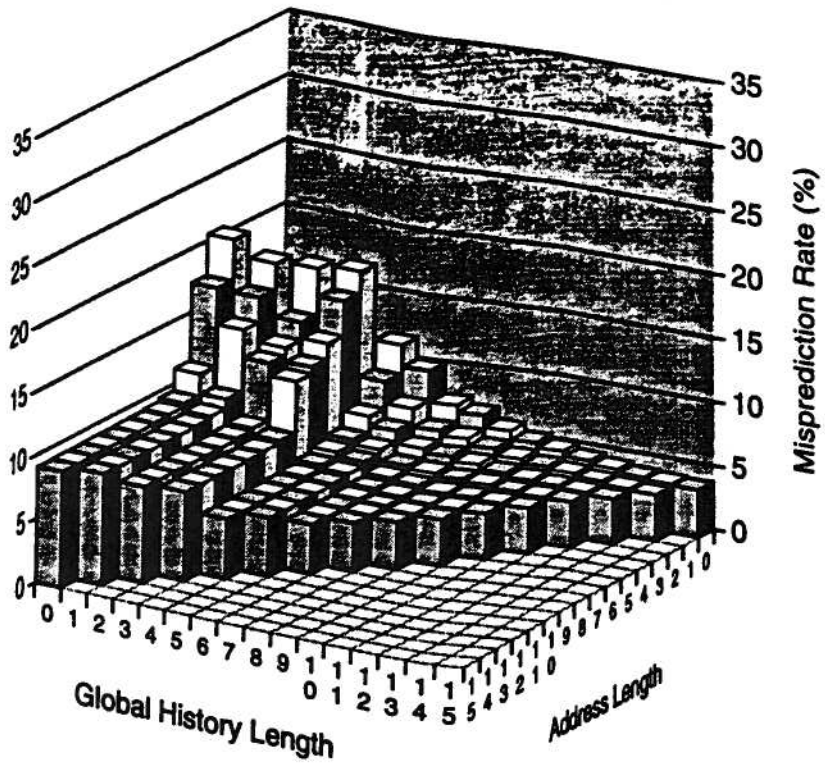
				26.84	22.42	17.15	15.85	14.77	13.43	12.49	11.72	10.94	10.67	10.38	10.11
			25.71	23.78	19.66	15.53	14.66	13.54	12.37	11.84	11.19	10.53	10.34	10.17	
		23.86	18.82	16.33	15.29	12.76	12.50	12.08	11.13	10.97	10.79	10.24	10.14		
	20.17	20.16	15.34	13.30	12.81	11.31	11.12	10.92	10.55	10.49	10.43	10.10			
27.22	18.35	18.41	15.10	12.96	12.45	10.98	10.86	10.82	10.45	10.40	10.38				
20.08	13.29	13.53	11.95	11.42	11.46	10.84	10.76	10.74	10.39	10.35					
17.12	12.94	13.19	11.95	11.42	11.46	10.84	10.76	10.74	10.39						
12.80	12.67	12.93	11.95	11.42	11.46	10.84	10.76	10.74							
12.80	12.67	12.93	11.95	11.42	11.46	10.84	10.76								
12.80	12.66	12.92	11.95	11.42	11.46	10.84									
12.80	12.66	12.92	11.95	11.42	11.46										
12.80	12.66	12.92	11.95	11.42											
12.80	12.66	12.92													
12.80	12.66														
12.80															

Misprediction Rates: GAs — CINT92.compress



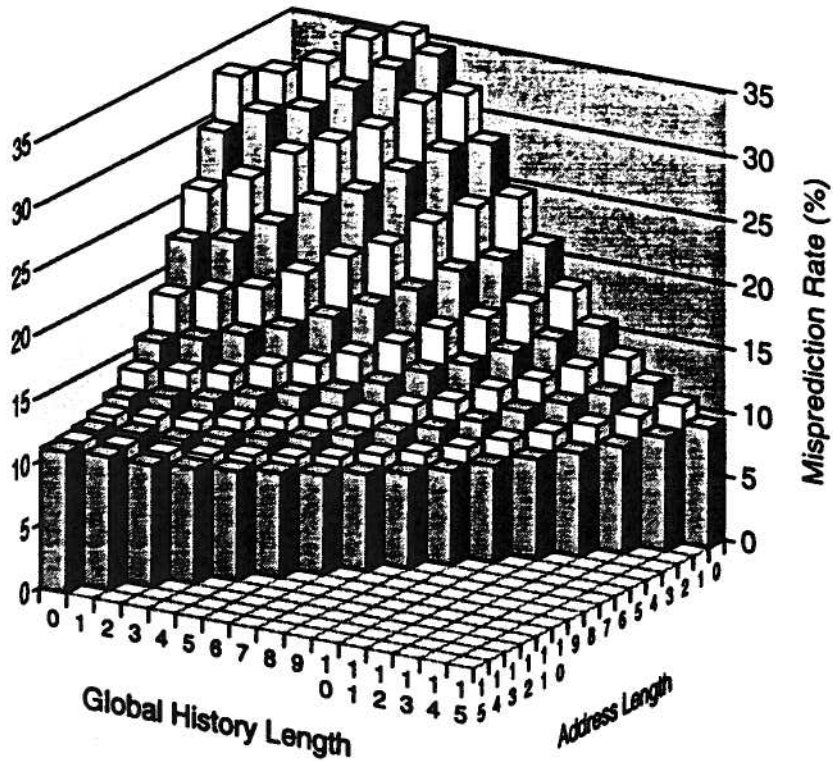
				16.10	13.74	10.78	9.96	8.69	7.69	6.51	5.65	4.58	4.23	4.07	3.82
			14.80	12.82	10.69	9.57	8.75	7.63	7.06	6.20	5.53	4.47	4.14	3.98	
		14.92	13.05	10.41	7.99	7.44	6.97	6.26	5.83	5.79	5.16	4.29	3.95		
	15.01	14.40	12.19	10.01	7.64	7.28	6.83	6.14	5.80	5.76	5.13	4.26			
16.88	14.24	13.91	11.80	9.74	7.47	7.23	6.79	6.10	5.78	5.74	5.11				
16.66	14.05	13.82	11.74	9.69	7.44	7.22	6.78	6.10	5.77	5.73					
16.36	13.57	13.33	11.65	9.62	7.38	7.17	6.74	6.09	5.76						
16.30	13.49	13.29	11.61	9.60	7.38	7.17	6.73	6.09							
16.26	13.48	13.28	11.61	9.59	7.38	7.16	6.73								
16.26	13.48	13.28	11.60	9.59	7.37	7.16									
16.26	13.48	13.28	11.60	9.59	7.37										
16.26	13.48	13.28	11.60	9.59											
16.26	13.48	13.28	11.60												
16.26	13.48	13.28													
16.26	13.48														
16.26															

Misprediction Rates: GAs — CINT92.eqntott



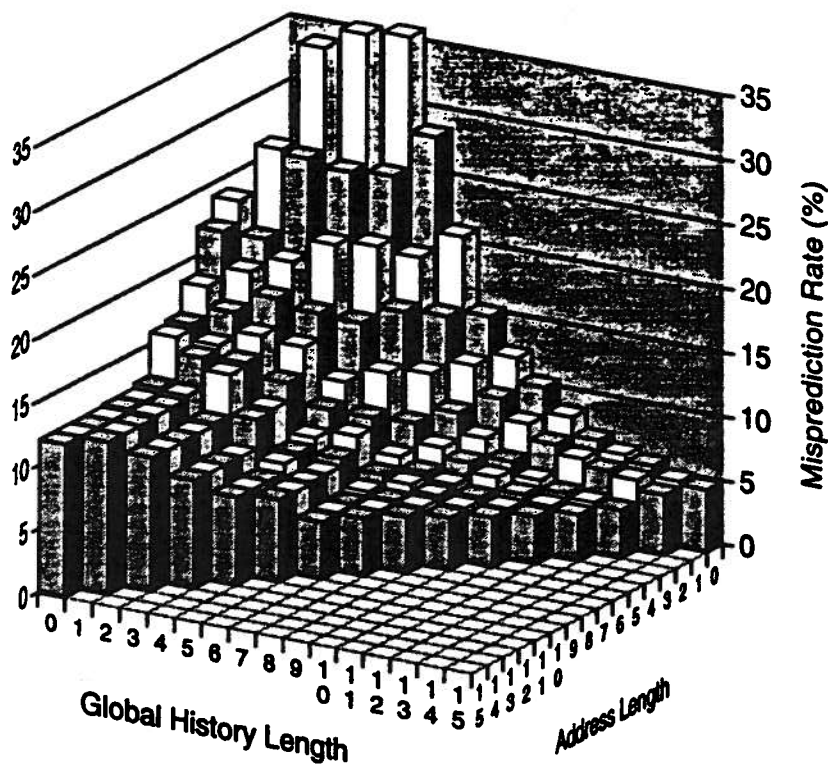
				11.54	9.88	7.48	6.91	5.95	5.31	4.88	4.50	4.20	3.95	3.81	3.72
			17.47	9.32	7.62	6.23	5.83	5.27	4.74	4.38	4.12	3.91	3.71	3.59	
		17.89	15.76	7.21	6.50	5.51	5.20	4.77	4.36	4.05	3.83	3.68	3.52		
	18.47	14.30	13.06	5.98	5.65	4.79	4.58	4.31	4.13	3.87	3.68	3.57			
20.52	16.41	12.91	11.85	5.63	5.29	4.47	4.27	3.99	3.86	3.67	3.52				
17.32	14.49	12.32	11.32	5.21	4.98	4.23	4.06	3.83	3.72	3.56					
11.20	9.69	7.86	7.32	4.94	4.79	4.05	3.93	3.73	3.64						
9.52	8.97	7.67	7.10	4.80	4.67	3.95	3.85	3.67							
9.26	8.79	7.58	7.01	4.72	4.62	3.89	3.80								
9.18	8.72	7.53	6.97	4.68	4.58	3.87									
9.13	8.69	7.51	6.95	4.67	4.57										
9.11	8.68	7.50	6.95	4.67											
9.10	8.67	7.49	6.94												
9.08	8.67	7.49													
9.08	8.67														
9.07															

Misprediction Rates: GAs — CINT92.espresso



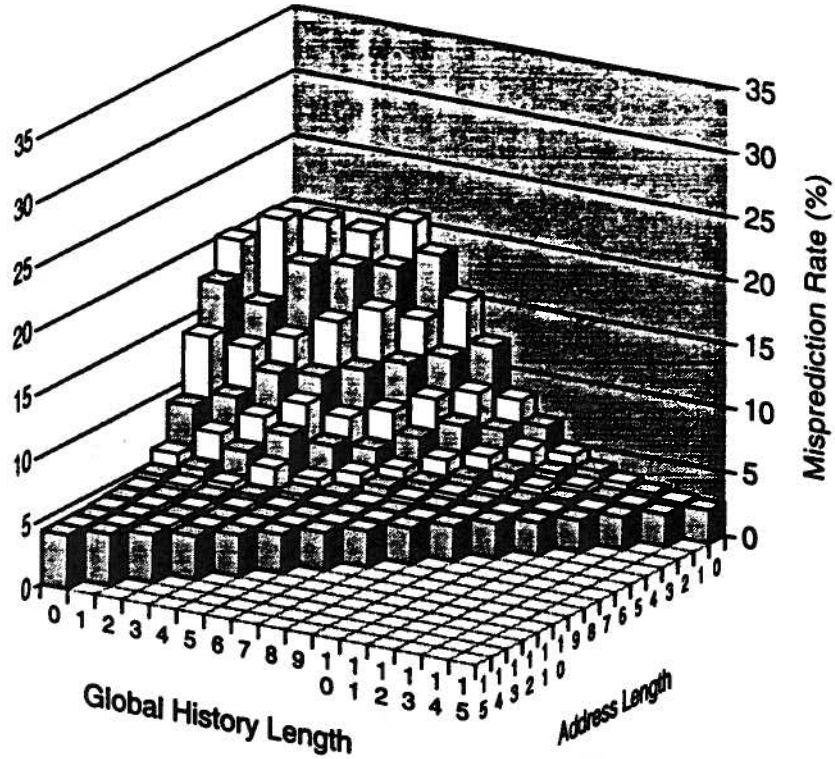
				35.61	34.38	31.71	28.32	24.51	21.16	18.10	15.59	13.55	12.02	10.71	9.35
			35.46	33.59	31.33	27.91	24.03	20.29	17.25	14.87	13.04	11.42	10.08	8.85	
		33.85	32.18	29.59	26.67	23.01	19.65	16.38	14.11	12.33	10.94	9.61	8.36		
	33.29	30.82	28.76	25.23	21.56	18.40	15.81	13.39	11.86	10.53	9.26	8.09			
33.28	30.82	28.09	24.59	20.79	17.46	14.90	13.03	11.21	10.01	8.90	7.84				
29.59	26.41	23.23	19.76	16.74	14.25	12.41	11.05	9.67	8.58	7.57					
25.70	22.12	18.83	16.05	13.76	12.00	10.67	9.59	8.37	7.38						
22.37	18.80	15.86	13.80	12.02	10.66	9.48	8.47	7.39							
18.69	15.74	13.45	12.03	10.73	9.58	8.47	7.60								
15.78	13.79	12.04	10.94	9.81	8.74	7.77									
14.08	12.48	11.06	10.09	9.09	8.15										
12.68	11.53	10.21	9.37	8.54											
11.89	10.93	9.77	9.02												
11.38	10.58	9.50													
11.14	10.40														
11.02															

Misprediction Rates: GAs — CINT92.gcc



				35.78	28.40	21.05	15.24	12.40	10.50	8.58	7.15	6.43	5.98	5.16	4.89
			36.18	25.61	19.67	15.50	12.07	9.86	8.29	7.08	6.35	5.81	5.49	4.71	
		35.37	26.17	20.76	16.09	11.62	9.00	7.40	5.96	4.93	4.27	3.95	3.73		
	27.76	27.44	21.14	15.45	11.92	8.39	6.91	6.13	5.36	4.42	3.90	3.61			
24.00	21.43	20.04	16.43	11.47	9.08	6.44	5.58	5.05	4.42	3.95	3.68				
22.25	19.50	17.82	14.45	9.95	8.27	5.67	5.29	4.82	4.24	3.85					
18.59	16.99	15.57	12.29	8.38	7.15	4.97	4.65	4.53	4.10						
16.28	15.07	14.09	10.88	7.83	6.61	4.61	4.52	4.41							
15.94	14.71	13.81	10.69	7.63	6.54	4.58	4.51								
12.59	12.40	10.64	8.44	6.90	6.45	4.44									
12.22	12.12	10.47	8.44	6.90	6.45										
12.22	12.12	10.47	8.44	6.90											
12.05	11.95	10.47	8.44												
12.03	11.95	10.47													
12.03	11.95														
12.03															

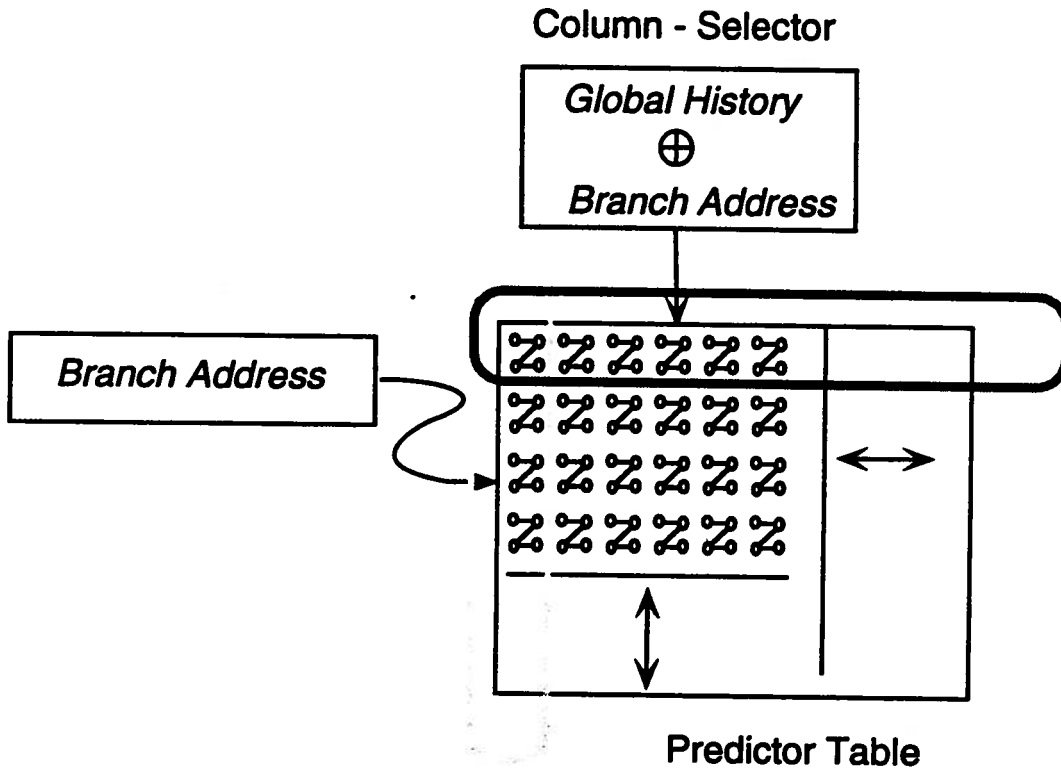
Misprediction Rates: GAs — CINT92.li

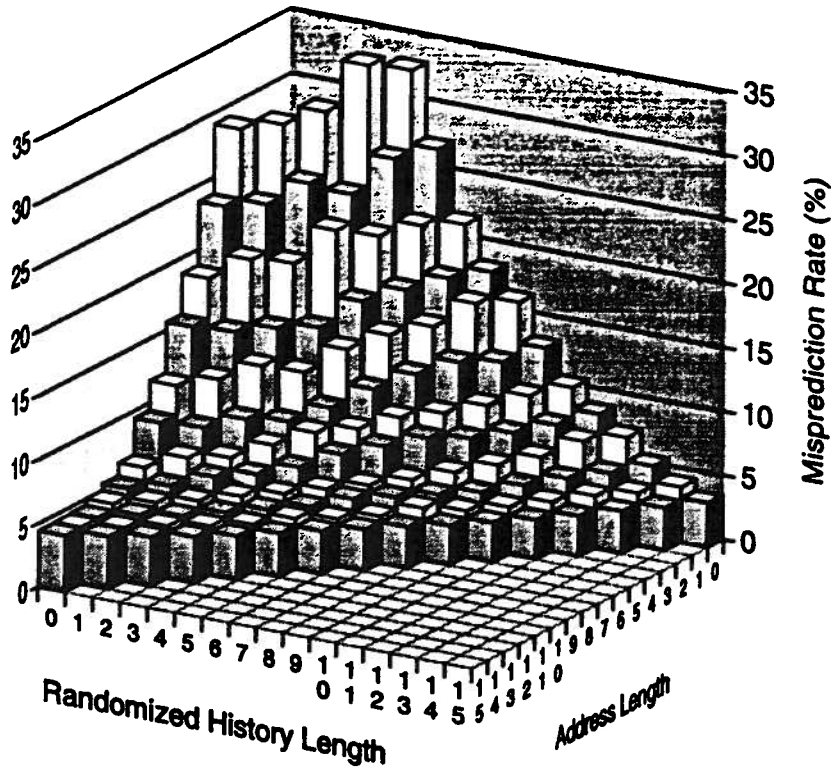


				20.70	18.51	15.37	12.16	8.39	6.74	4.94	4.03	3.45	3.05	2.73	2.56
			20.10	17.75	14.08	11.58	9.17	6.64	5.56	4.12	3.42	2.94	2.74	2.49	
		21.28	18.07	15.02	11.29	8.94	7.28	5.24	4.43	3.59	3.03	2.65	2.51		
	21.64	18.48	14.39	11.01	8.21	6.53	5.21	4.15	3.55	3.10	2.72	2.48			
20.19	15.57	13.41	10.81	7.95	5.89	4.70	3.98	3.53	3.17	2.82	2.56				
17.50	12.87	11.28	9.27	6.40	4.59	3.94	3.39	3.15	2.90	2.75					
13.93	9.66	8.51	7.47	4.38	3.62	3.24	3.03	2.87	2.75						
9.20	7.46	6.45	5.54	3.83	3.37	3.13	2.97	2.83							
6.12	5.28	4.52	3.99	3.43	3.13	2.97	2.84								
5.07	4.61	4.10	3.64	3.29	3.09	2.93									
4.57	4.30	3.88	3.46	3.25	3.06										
4.48	4.24	3.85	3.44	3.25											
4.35	4.16	3.80	3.40												
4.23	4.05	3.74													
4.22	4.04														
4.22															

Misprediction Rates: GAs — CINT92.sc

# Appendix B: The gshare scheme

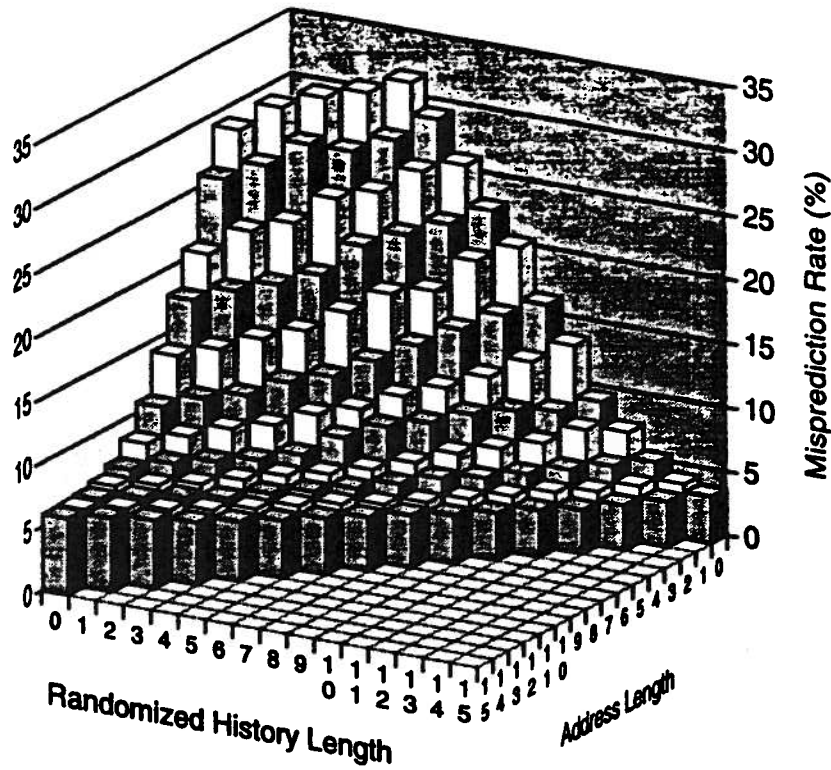




				32.79	27.06	21.60	18.30	16.36	13.18	10.52	8.84	7.40	5.57	4.32	3.47
			33.38	26.55	21.74	18.03	16.48	12.31	10.09	8.22	7.35	5.24	4.07	3.33	
		30.02	24.01	21.14	17.37	14.92	12.54	9.58	7.83	6.32	5.06	4.09	3.30		
	29.26	25.08	21.82	16.70	14.49	11.83	9.20	7.82	5.94	4.74	3.84	3.16			
29.13	23.69	19.48	14.87	13.60	10.90	9.09	7.90	5.59	4.42	3.70	3.09				
23.78	19.99	15.07	12.04	9.66	8.42	7.44	5.24	4.48	3.62	3.11					
18.78	15.02	12.76	8.85	8.37	7.05	5.03	4.51	4.05	3.09						
15.66	11.96	9.27	7.63	6.27	4.96	4.59	3.65	3.23							
11.71	8.83	6.87	5.95	4.83	4.23	3.67	3.25								
9.45	7.11	6.00	4.87	4.23	3.94	3.35									
6.57	5.54	4.75	4.24	3.71	3.42										
5.57	4.85	4.20	3.83	3.44											
5.02	4.51	4.07	3.61												
4.54	4.17	3.83													
4.47	4.13														
4.43															

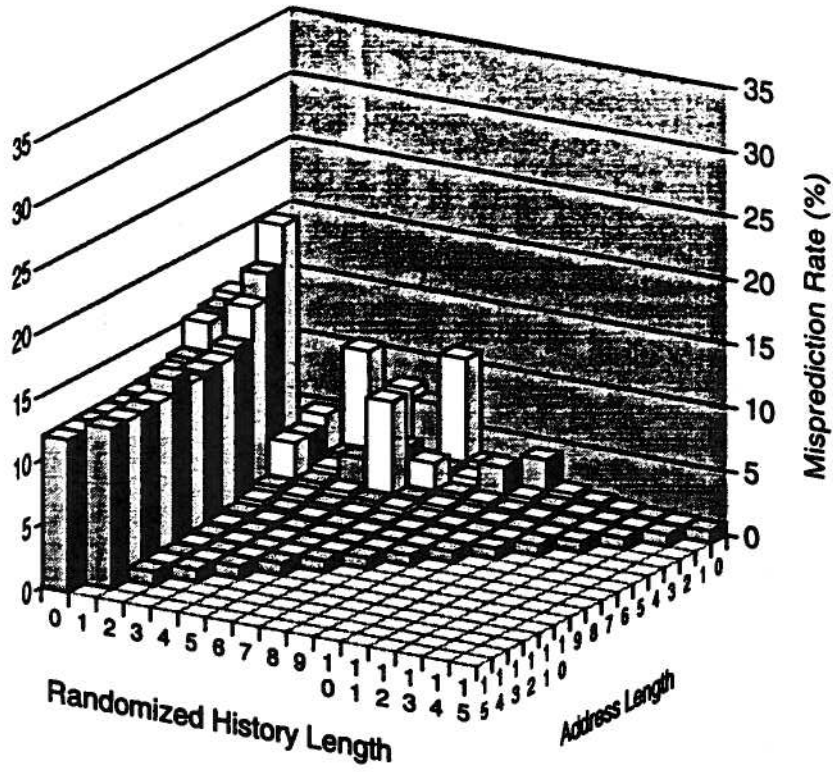
Misprediction Rates: gshare — IBS.Ultrix.groff





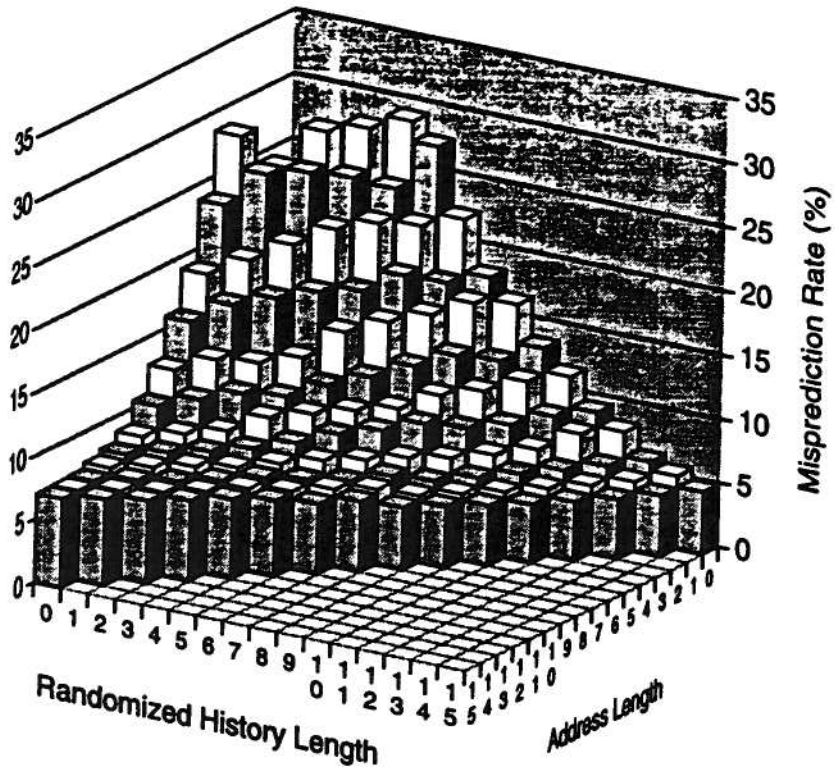
				31.75	29.27	26.08	22.94	20.44	18.39	13.57	9.56	7.56	5.58	4.26	3.64
			31.22	27.93	25.87	22.16	19.68	15.82	12.57	9.05	8.02	5.55	4.34	3.52	
		31.10	27.31	24.51	21.60	17.60	14.98	11.66	9.36	7.22	5.55	4.19	3.51		
	30.60	28.14	24.31	21.02	17.65	14.01	11.06	9.38	7.08	5.45	4.41	3.42			
29.14	26.76	22.69	19.01	16.48	13.05	10.68	8.98	6.97	5.42	4.39	3.64				
25.99	22.31	18.53	15.31	12.12	9.97	8.95	6.52	5.66	4.42	3.70					
20.82	18.34	14.95	11.94	9.81	8.38	6.26	5.49	4.43	3.78						
17.91	14.42	11.19	9.24	7.33	6.17	5.41	4.55	4.07							
14.18	11.23	9.25	7.17	6.32	5.44	4.84	4.19								
10.86	8.91	7.34	6.26	5.55	4.98	4.35									
8.63	7.45	6.21	5.46	5.00	4.47										
7.25	6.40	5.79	5.18	4.65											
6.59	6.04	5.48	4.88												
6.22	5.82	5.31													
6.05	5.73														
5.99															

Misprediction Rates: gshare — IBS.Ultrix.gs



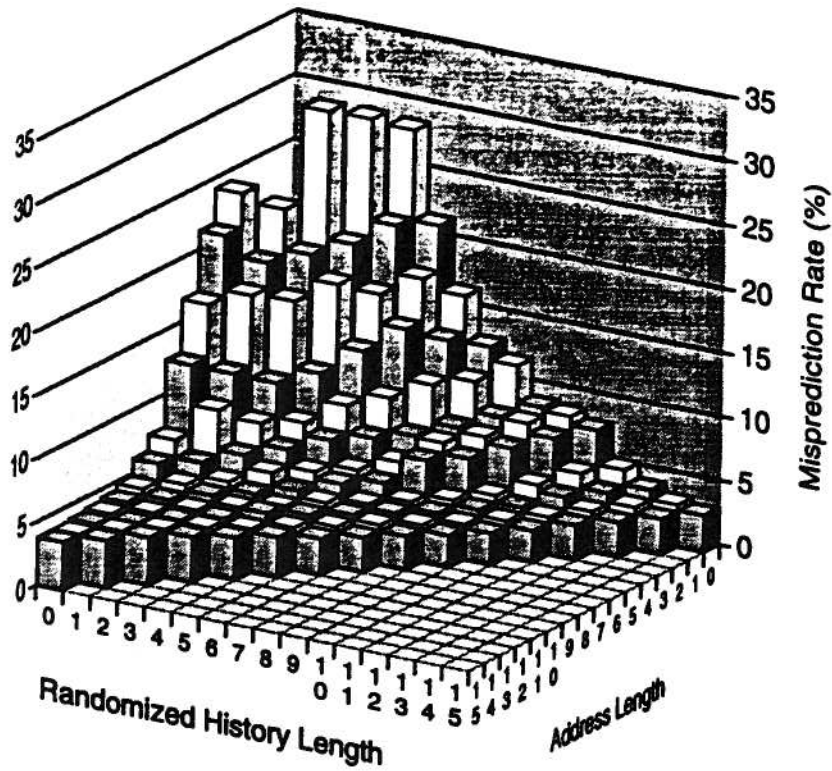
				7.79	7.01	10.95	3.08	2.67	4.17	1.90	1.55	1.29	1.13	1.02	0.94
			11.00	3.50	3.30	2.89	2.55	3.84	1.82	1.50	1.27	1.10	0.99	0.92	
		6.25	3.45	3.14	4.91	4.04	2.02	1.70	1.44	1.23	1.05	0.95	0.88		
	21.36	5.36	3.09	4.26	9.08	1.96	1.65	1.40	1.19	1.02	0.94	0.88			
16.22	18.19	5.36	2.62	2.28	1.93	1.78	1.32	1.16	0.99	0.92	0.87				
15.65	16.23	2.56	2.16	1.86	1.56	1.31	1.12	0.96	0.91	0.86					
15.27	13.67	2.10	1.75	1.52	1.31	1.14	0.99	0.90	0.85						
13.09	13.10	1.73	1.47	1.30	1.14	1.00	0.90	0.85							
12.67	13.08	1.49	1.27	1.14	1.03	0.94	0.86								
12.35	12.85	1.31	1.13	1.05	0.97	0.92									
12.22	13.86	1.21	1.07	1.00	0.96										
12.06	12.60	1.12	1.01	0.97											
12.01	12.53	1.08	0.98												
11.95	12.50	1.06													
11.92	12.49														
11.92															

Misprediction Rates: gshare — IBS.Ultrix.jpeg\_play



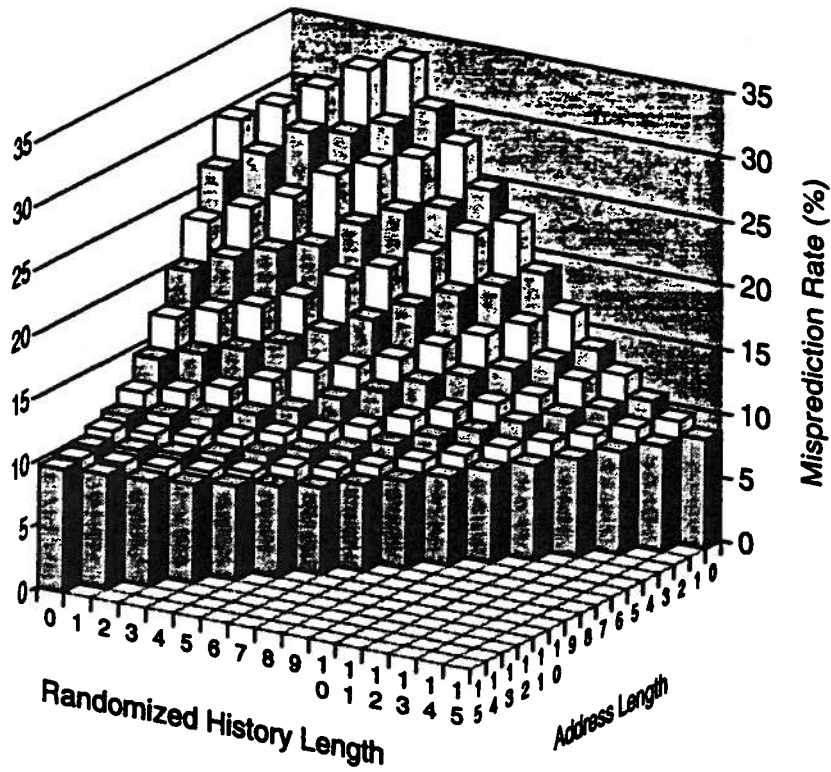
				28.99	27.44	22.23	18.14	16.47	13.49	11.72	9.38	8.29	6.39	5.71	4.88
			28.59	24.34	21.90	17.88	16.75	12.69	11.51	9.24	8.30	6.19	5.42	4.78	
		28.51	25.36	22.26	18.64	16.00	13.29	10.92	8.76	7.26	6.04	5.30	4.62		
	25.87	25.92	21.97	17.61	15.62	12.64	10.78	8.64	7.00	5.94	5.23	4.63			
28.52	25.98	20.96	17.70	15.01	11.95	9.93	9.19	6.90	5.82	5.13	4.58				
23.80	19.92	17.39	13.19	11.49	9.93	8.81	7.10	5.73	5.15	4.69					
19.03	17.05	12.97	10.79	9.85	8.69	7.09	6.30	5.18	4.77						
15.95	13.41	11.22	9.75	8.17	7.23	6.05	5.85	4.87							
12.79	10.92	8.88	7.92	7.18	6.34	6.04	5.53								
10.61	8.82	7.88	7.06	6.69	6.06	5.50									
8.81	7.96	7.32	6.63	6.46	5.94										
8.01	7.45	6.75	6.40	6.22											
7.59	7.04	6.54	6.30												
7.15	6.83	6.47													
7.04	6.76														
6.99															

Misprediction Rates: gshare — IBS.Ultrix.mpeg\_play



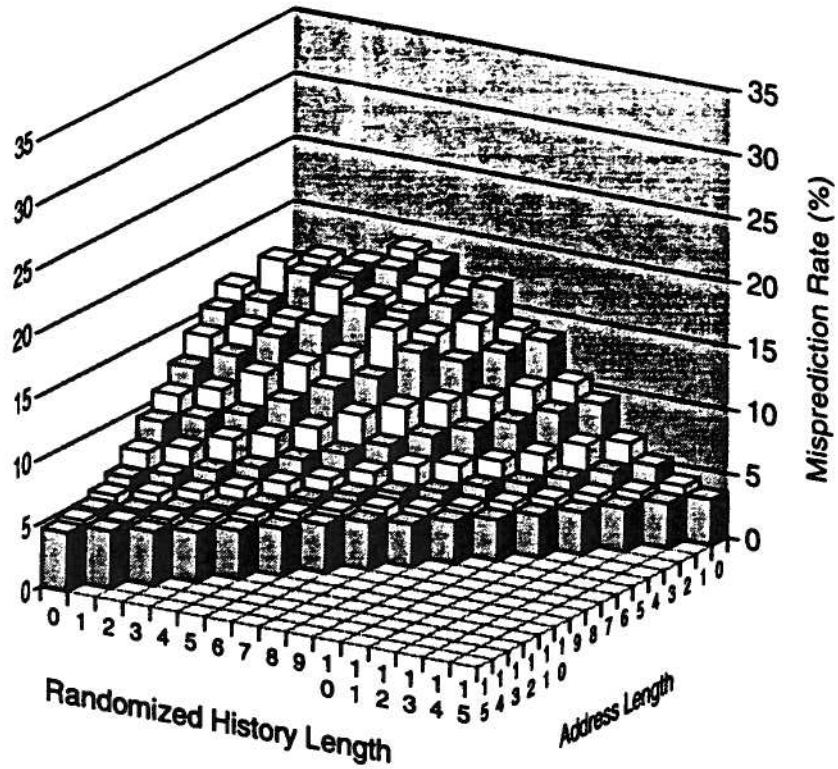
				28.31	21.31	16.21	12.66	11.63	8.78	8.51	7.84	5.16	4.00	3.27	2.85
			29.35	21.51	17.74	13.36	10.58	8.24	8.16	7.41	5.08	3.96	3.27	2.78	
		30.15	20.22	16.73	14.44	10.53	7.60	7.30	6.83	4.38	3.86	3.15	2.71		
	22.75	19.62	17.70	12.93	9.69	7.13	7.03	6.21	3.75	3.24	2.91	2.71			
24.18	19.17	16.60	11.39	9.29	7.17	5.72	6.27	3.59	3.24	2.82	2.49				
21.50	17.25	10.85	8.15	7.21	5.29	4.69	3.65	3.19	2.76	2.47					
16.75	11.76	8.30	6.68	5.35	4.82	3.68	3.39	2.90	2.51						
12.64	9.53	6.44	5.47	4.49	3.99	3.44	3.11	2.65							
7.41	6.04	4.97	4.45	3.84	3.63	3.16	2.73								
6.16	4.94	4.51	4.01	3.99	3.30	2.84									
4.82	4.35	4.00	3.75	3.38	3.16										
4.37	3.99	3.81	3.67	3.31											
4.12	3.79	3.75	3.56												
3.96	3.83	3.76													
3.79	3.69														
3.78															

Misprediction Rates: gshare — IBS.Ulrix.nroff



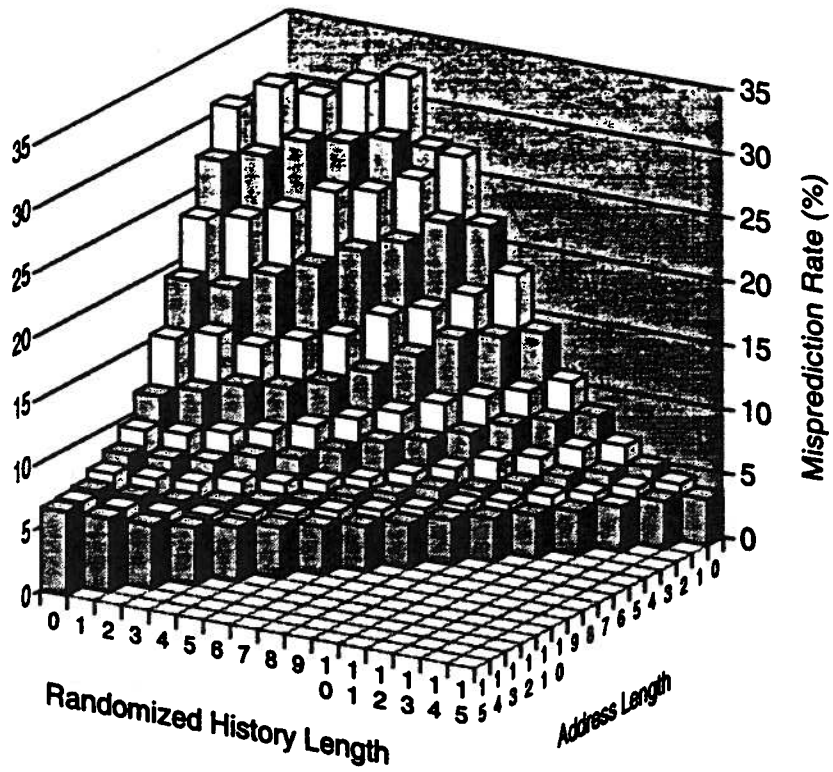
				33.52	30.18	27.86	24.74	22.59	19.02	16.37	13.90	12.36	10.72	9.58	8.54
			33.08	29.19	27.06	23.59	22.00	18.32	15.72	13.29	12.17	10.29	9.25	8.24	
		31.88	28.72	26.69	23.52	20.70	17.92	15.07	12.81	11.18	10.02	8.90	8.02		
	30.74	29.11	26.24	22.78	19.77	17.19	14.52	12.53	10.78	9.69	8.59	7.66			
29.92	27.64	24.75	21.33	19.26	16.38	13.75	12.25	10.46	9.23	8.37	7.39				
26.72	24.14	21.19	17.95	15.65	13.38	11.77	10.10	9.01	8.01	7.17					
23.30	20.81	17.48	14.96	13.16	11.43	9.84	8.68	7.77	6.92						
20.06	17.33	14.69	12.71	10.81	9.56	8.47	7.60	6.84							
17.03	14.62	12.33	10.71	9.52	8.61	7.52	6.77								
14.45	12.32	10.79	9.52	8.63	7.94	6.76									
12.46	11.05	9.74	8.75	7.82	7.14										
11.29	10.21	9.06	8.09	7.35											
10.66	9.62	8.63	7.71												
10.09	9.19	8.23													
9.79	8.95														
9.62															

Misprediction Rates: gshare — IBS.Ultrix.real\_gcc



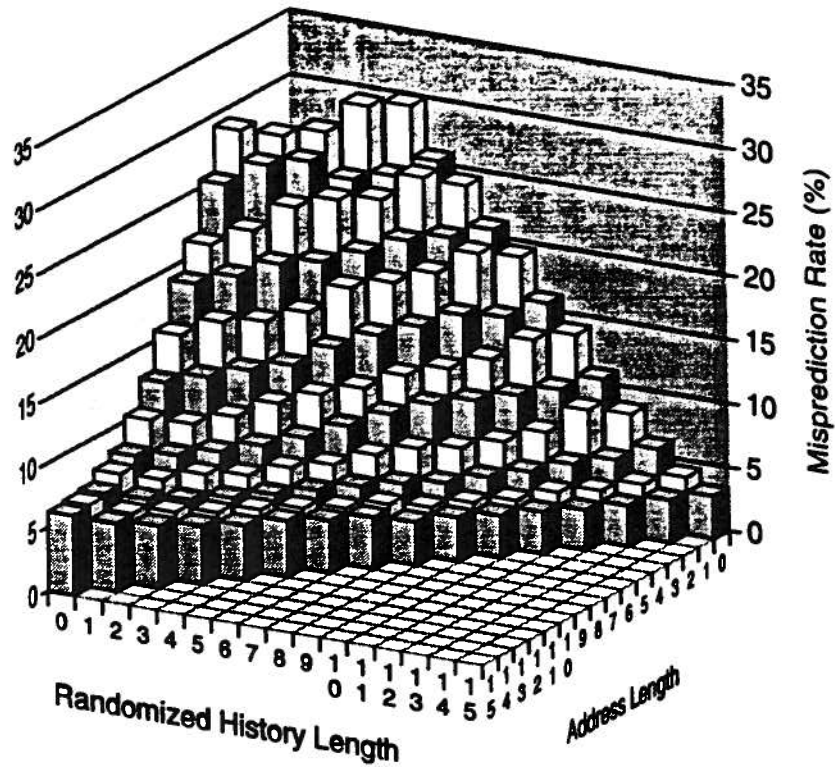
				18.65	18.13	16.43	16.83	14.05	13.54	10.67	9.44	6.81	5.42	4.23	3.58
			17.87	17.81	16.89	15.76	14.76	12.90	10.52	9.02	6.88	5.13	3.96	3.50	
		18.51	17.66	16.29	15.48	14.17	12.44	9.96	8.47	6.37	4.86	3.96	3.36		
	18.58	17.88	17.25	16.17	14.75	13.38	9.89	8.11	6.08	4.70	3.90	3.30			
16.78	15.99	15.07	14.99	12.97	11.65	9.72	7.85	6.03	4.72	3.79	3.29				
15.60	14.63	14.26	12.53	11.07	9.35	7.39	6.19	4.54	3.72	3.17					
14.19	13.07	12.00	10.21	8.58	6.99	5.91	4.69	3.81	3.27						
12.42	11.04	9.49	8.21	6.76	5.62	4.80	4.18	3.29							
10.86	9.45	8.20	6.38	5.55	4.63	4.17	3.69								
9.43	7.71	6.38	5.40	4.46	4.23	3.75									
7.72	6.28	5.36	4.53	4.24	3.68										
6.35	5.40	4.60	4.24	3.77											
5.59	4.78	4.47	3.89												
5.09	4.55	4.18													
4.91	4.47														
4.58															

Misprediction Rates: gshare — IBS.Ultrix.sdet



				32.23	27.07	28.81	21.76	18.35	14.22	10.79	8.54	6.59	5.25	4.36	3.56
			32.03	28.02	25.32	22.30	17.04	14.17	10.29	8.38	6.60	5.04	4.32	3.65	
		31.32	28.09	24.58	21.02	16.21	14.32	10.10	8.29	6.13	5.02	4.10	3.49		
	32.31	28.42	24.86	20.61	15.96	13.25	9.88	7.87	6.24	4.69	4.17	3.35			
30.91	27.57	23.65	19.72	14.66	12.19	9.45	7.61	5.83	4.54	3.91	3.32				
27.43	23.28	19.28	14.55	11.56	9.21	7.77	5.63	4.85	3.97	3.30					
23.49	18.51	14.35	11.48	8.90	7.33	5.47	4.71	3.94	3.48						
19.36	15.51	11.90	8.72	6.99	5.52	4.76	4.07	3.41							
15.47	11.78	8.90	7.43	5.69	4.64	4.27	3.52								
11.64	9.05	7.29	6.20	4.83	4.33	3.72									
9.63	7.76	6.26	5.08	4.56	3.94										
8.37	6.84	5.45	4.73	4.19											
7.52	6.07	5.16	4.45												
6.81	5.82	4.93													
6.58	5.70														
6.48															

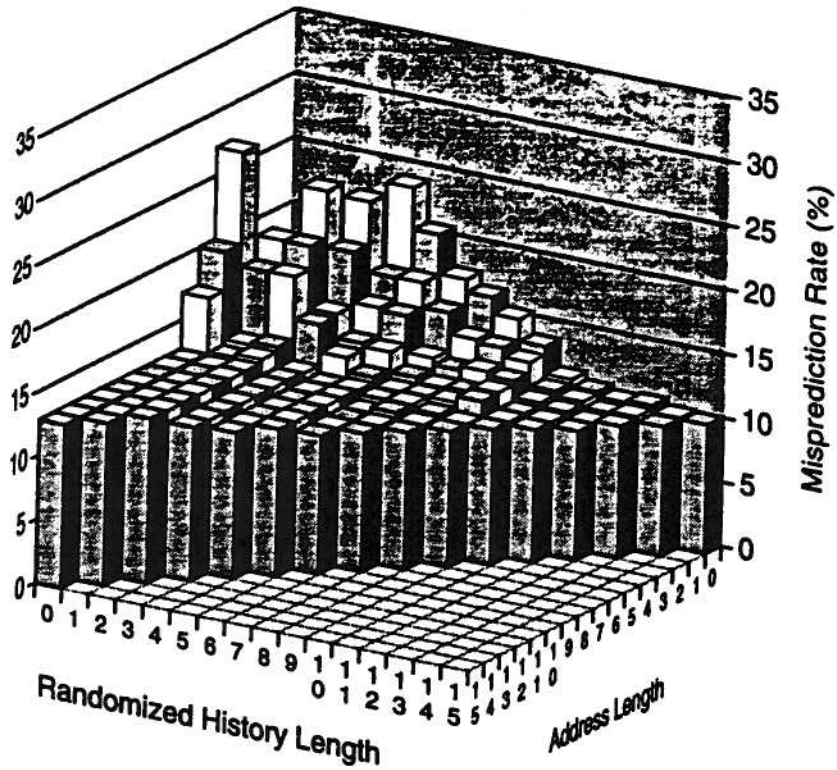
Misprediction Rates: gshare — IBS.Ultrix.verilog



				29.92	25.97	24.43	21.33	19.53	16.29	14.19	11.06	8.70	6.36	4.48	3.36
			30.18	25.09	25.35	21.01	20.10	15.49	14.08	10.57	9.32	5.79	4.21	3.33	
		28.47	25.10	23.91	21.02	18.87	15.97	12.86	10.40	7.88	5.74	4.02	3.20		
	28.47	26.81	24.18	20.37	18.41	15.34	12.42	10.29	7.43	5.44	4.18	3.15			
29.19	26.84	23.91	19.94	18.28	14.98	12.17	10.29	7.24	5.31	3.84	3.30				
25.64	22.35	20.08	16.69	14.25	11.48	9.81	7.47	5.13	3.96	3.31					
21.53	19.44	16.26	13.21	11.28	9.15	7.27	5.38	3.88	3.44						
19.16	16.51	13.11	10.87	8.56	6.80	5.45	4.42	3.39							
15.80	12.87	10.14	8.24	6.86	5.42	4.38	4.03								
12.75	9.86	8.06	6.57	5.41	4.69	4.09									
10.48	8.08	6.94	5.44	4.88	4.35										
8.34	6.81	5.58	4.94	4.30											
7.57	5.95	5.28	4.55												
6.67	5.46	4.85													
6.44	5.36														
6.25															

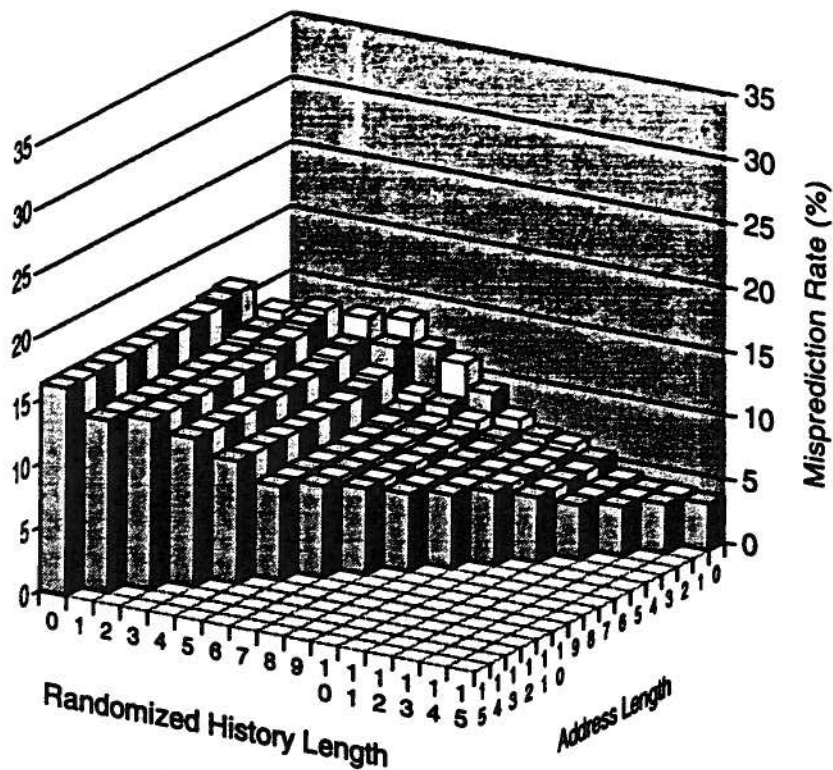
Misprediction Rates: gshare — IBS.Ultrix.video\_play





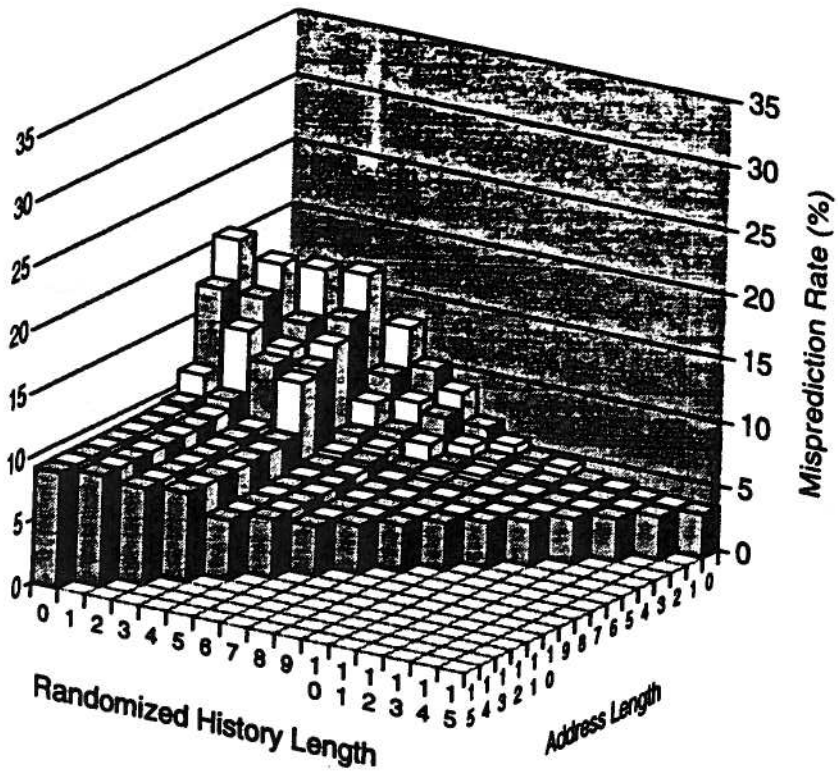
				23.76	20.53	17.49	16.52	15.25	13.57	11.42	10.88	10.52	10.70	10.18	10.08
			22.84	17.37	17.41	15.50	13.84	13.62	12.93	11.13	10.75	10.30	10.45	10.10	
		23.86	19.49	15.63	15.43	12.58	12.07	12.39	12.09	10.84	10.55	10.11	10.31		
	20.17	20.16	15.34	13.46	13.22	11.69	11.32	11.41	11.81	10.58	10.38	10.09			
27.22	18.35	18.41	15.10	12.96	11.86	11.19	11.26	11.23	11.74	10.58	10.38				
20.08	13.29	13.53	11.95	11.42	11.46	11.19	11.24	10.88	10.59	10.58					
17.12	12.94	13.19	11.95	11.42	11.46	10.84	11.23	10.74	10.56						
12.80	12.67	12.93	11.95	11.42	11.46	10.84	10.76	10.74							
12.80	12.67	12.93	11.95	11.42	11.46	10.84	10.76								
12.80	12.66	12.92	11.95	11.42	11.46	10.84									
12.80	12.66	12.92	11.95	11.42	11.46										
12.80	12.66	12.92	11.95	11.42											
12.80	12.66	12.92													
12.80	12.66														
12.80															

Misprediction Rates: gshare — CINT92.compress



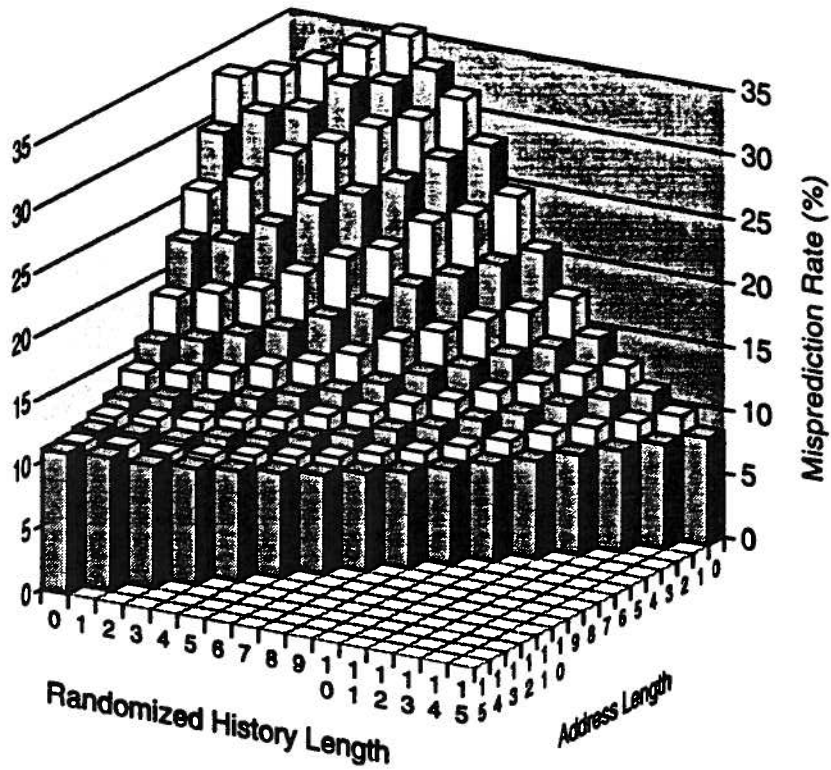
				13.61	11.80	11.06	9.14	7.50	6.52	6.27	5.50	4.29	3.92	3.87	3.67
			14.06	12.22	8.83	8.38	7.56	6.65	5.89	5.79	5.21	4.26	3.91	3.86	
		14.92	12.46	10.47	8.09	7.50	6.93	6.24	5.83	5.77	5.13	4.24	3.90		
	15.01	14.40	12.19	10.04	7.79	7.24	6.81	6.17	5.81	5.76	5.12	4.24			
16.88	14.24	13.91	11.80	9.74	7.50	7.21	6.76	6.14	5.77	5.73	5.11				
16.66	14.05	13.82	11.74	9.69	7.44	7.17	6.75	6.10	5.77	5.73					
16.36	13.57	13.33	11.65	9.62	7.38	7.17	6.74	6.09	5.77						
16.30	13.49	13.29	11.61	9.60	7.38	7.17	6.73	6.08							
16.26	13.48	13.28	11.61	9.59	7.38	7.16	6.73								
16.26	13.48	13.28	11.60	9.59	7.37	7.16									
16.26	13.48	13.28	11.60	9.59	7.37										
16.26	13.48	13.28	11.60	9.59											
16.26	13.48	13.28	11.60												
16.26	13.48														
16.26															

Misprediction Rates: gshare — CINT92.eqntott



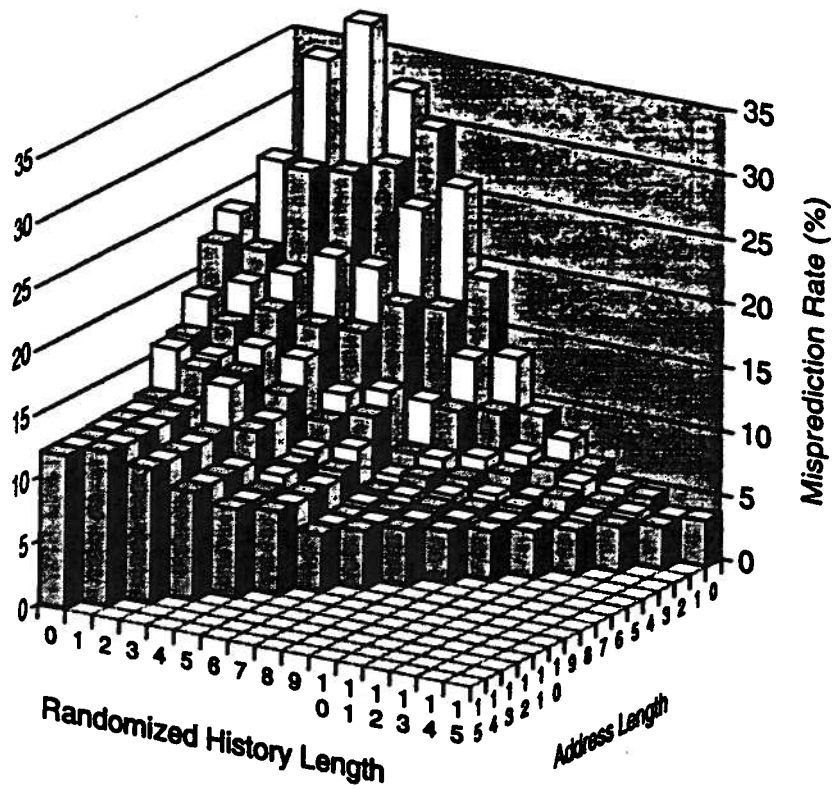
				13.02	10.22	8.84	6.59	5.61	4.88	4.73	4.11	3.87	3.61	3.46	3.38
			17.32	9.87	8.26	7.52	5.69	4.95	4.41	4.13	3.81	3.68	3.43	3.35	
		17.89	14.38	8.35	6.54	6.04	4.87	4.45	4.09	3.85	3.62	3.56	3.33		
	18.47	14.30	13.06	6.44	5.81	4.67	4.51	4.05	3.90	3.68	3.50	3.48			
20.52	16.41	12.91	11.85	5.63	5.33	4.39	4.15	3.88	3.77	3.57	3.43				
17.32	14.49	12.32	11.32	5.21	4.98	4.15	4.00	3.74	3.68	3.52					
11.20	9.69	7.86	7.32	4.94	4.79	4.05	3.90	3.68	3.63						
9.52	8.97	7.67	7.10	4.80	4.67	3.95	3.85	3.65							
9.26	8.79	7.58	7.01	4.72	4.62	3.89	3.80								
9.18	8.72	7.53	6.97	4.68	4.58	3.87									
9.13	8.69	7.51	6.95	4.67	4.57										
9.11	8.68	7.50	6.95	4.67											
9.10	8.67	7.49	6.94												
9.08	8.67	7.49													
9.08	8.67														
9.07															

Misprediction Rates: gshare — CINT92.espresso



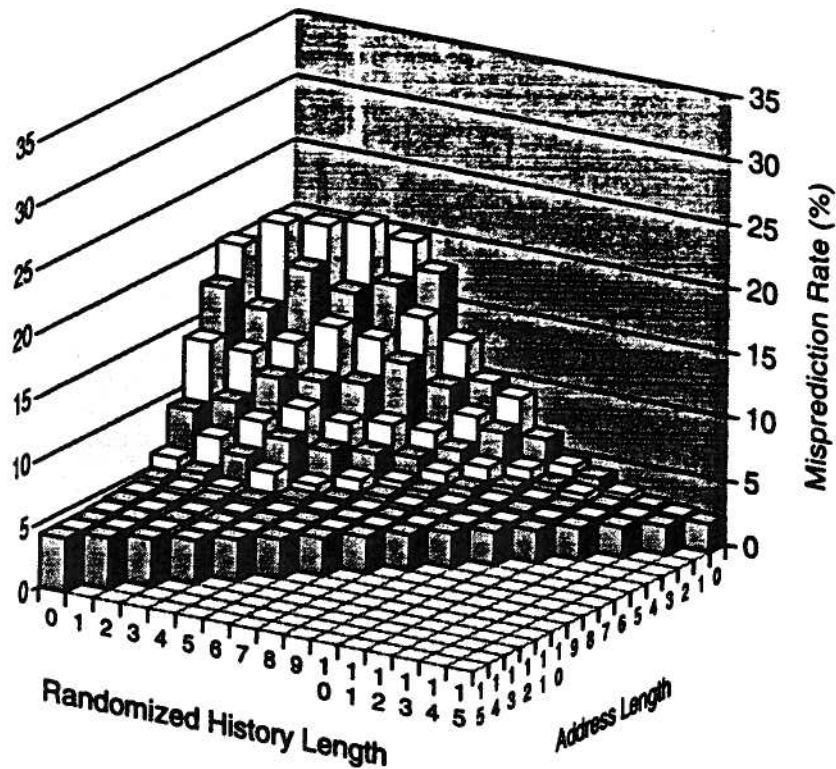
				35.43	33.17	31.34	28.09	24.54	20.62	17.35	14.68	12.76	11.13	9.73	8.38
			34.87	32.34	30.03	27.27	23.43	19.90	16.82	14.15	12.45	10.92	9.44	8.14	
		33.85	32.51	29.67	25.82	23.02	19.23	18.17	13.72	11.95	10.86	9.33	7.86		
	33.29	30.82	28.76	25.06	21.21	18.71	15.50	13.10	11.60	10.24	9.05	7.81			
33.28	30.82	28.09	24.59	20.79	17.39	15.07	12.83	11.14	10.01	8.77	7.58				
29.59	26.41	23.23	19.76	16.74	14.25	12.36	11.15	9.67	8.55	7.55					
25.70	22.12	18.83	16.05	13.76	12.00	10.67	9.70	8.39	7.41						
22.37	18.80	15.86	13.80	12.02	10.66	9.48	8.47	7.40							
18.69	15.74	13.45	12.03	10.73	9.58	8.47	7.60								
15.78	13.79	12.04	10.94	9.81	8.74	7.77									
14.08	12.48	11.06	10.09	9.09	8.15										
12.68	11.53	10.21	9.37	8.54											
11.89	10.93	9.77	9.02												
11.38	10.58	9.50													
11.14	10.40														
11.02															

Misprediction Rates: gshare — CINT92.gcc



				32.47	29.94	25.86	19.09	13.41	9.35	7.83	6.09	4.96	4.53	3.41	3.56
			37.95	27.34	24.42	17.02	13.57	9.80	6.97	6.16	5.49	4.32	3.91	3.30	
		35.37	27.00	20.05	17.58	10.46	10.14	6.87	6.00	4.61	4.92	3.91	3.51		
	27.76	27.44	21.14	15.70	11.47	7.02	7.03	5.85	5.02	4.42	3.79	3.44			
24.00	21.43	20.04	16.43	11.47	10.15	5.88	6.18	5.21	4.48	3.98	3.61				
22.25	19.50	17.82	14.45	9.95	8.27	5.29	5.33	4.85	4.28	3.85					
18.59	16.99	15.57	12.29	8.38	7.15	4.97	4.76	4.48	4.05						
16.28	15.07	14.09	10.88	7.83	6.61	4.61	4.52	4.41							
15.94	14.71	13.81	10.69	7.63	6.54	4.58	4.51								
12.59	12.40	10.64	8.44	6.90	6.45	4.44									
12.22	12.12	10.47	8.44	6.90	6.45										
12.22	12.12	10.47	8.44	6.90											
12.05	11.95	10.47	8.44												
12.03	11.95	10.47													
12.03	11.95														
12.03															

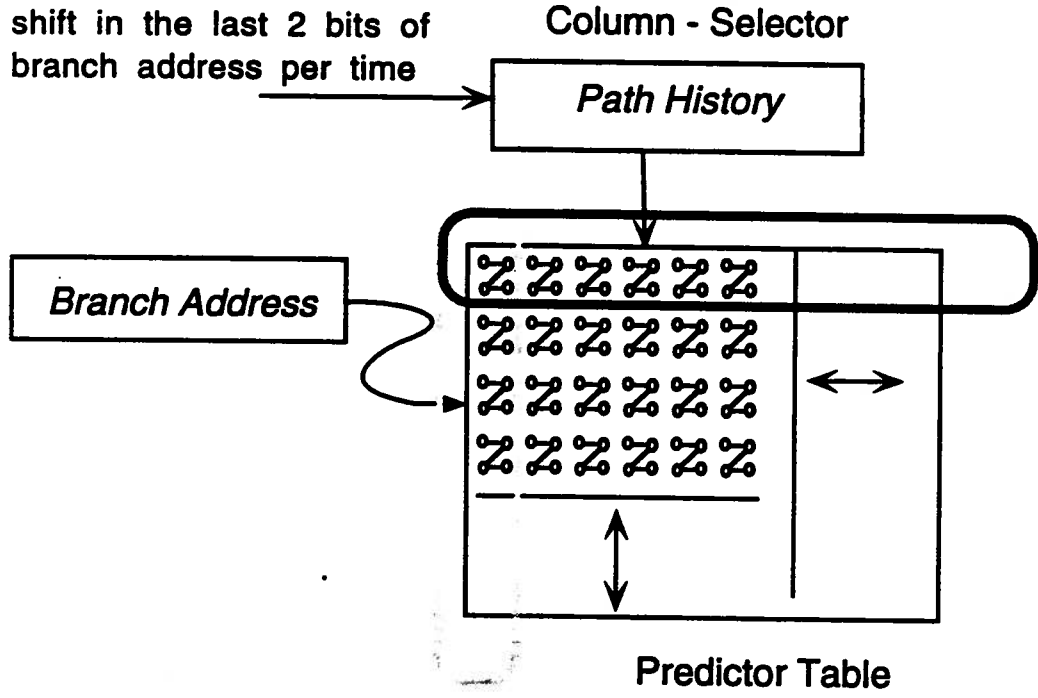
Misprediction Rates: gshare — CINT92.li

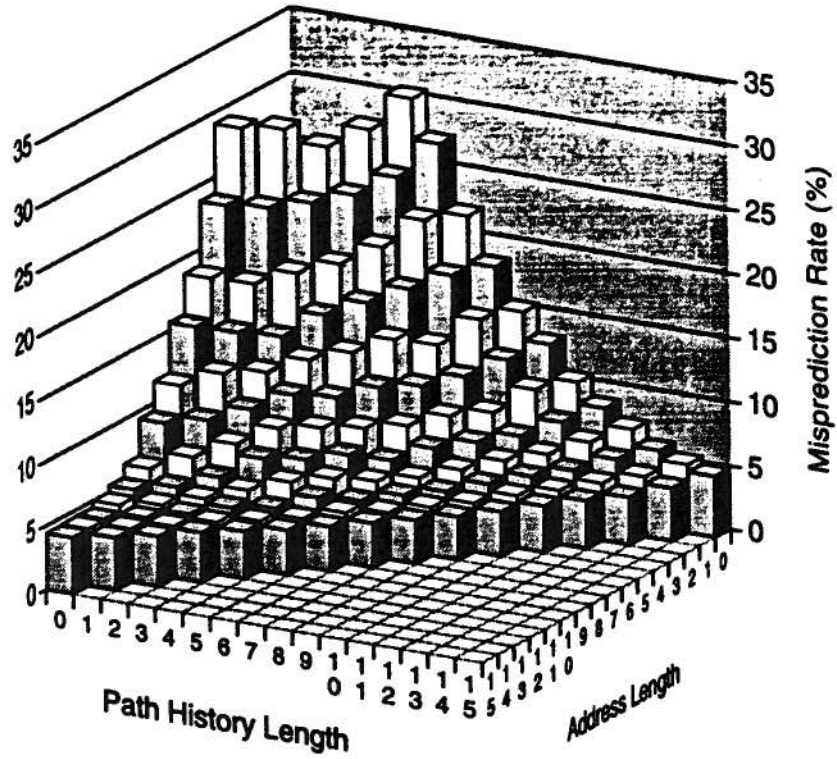


				19.61	17.58	12.57	9.88	9.09	6.30	4.63	4.07	3.22	2.69	2.41	2.21
			21.15	16.83	14.71	9.75	7.86	7.03	4.60	3.77	3.46	2.89	2.47	2.24	
		21.28	16.44	13.23	11.79	6.86	5.84	4.96	3.75	3.20	2.95	2.66	2.35		
	21.64	18.48	14.39	10.39	7.67	5.48	4.71	3.86	3.22	2.92	2.73	2.50			
20.19	15.57	13.41	10.81	7.95	6.00	4.20	3.85	3.22	2.97	2.72	2.51				
17.50	12.87	11.28	9.27	6.40	4.59	3.71	3.32	2.97	2.80	2.60					
13.93	9.66	8.51	7.47	4.38	3.62	3.24	3.05	2.85	2.72						
9.20	7.46	6.45	5.54	3.83	3.37	3.13	2.97	2.80							
6.12	5.28	4.52	3.99	3.43	3.13	2.97	2.84								
5.07	4.61	4.10	3.64	3.29	3.09	2.93									
4.57	4.30	3.88	3.46	3.25	3.06										
4.48	4.24	3.85	3.44	3.25											
4.35	4.16	3.80	3.40												
4.23	4.05	3.74													
4.22	4.04														
4.22															

Misprediction Rates: gshare — CINT92.sc

# Appendix C: The path-based correlation scheme

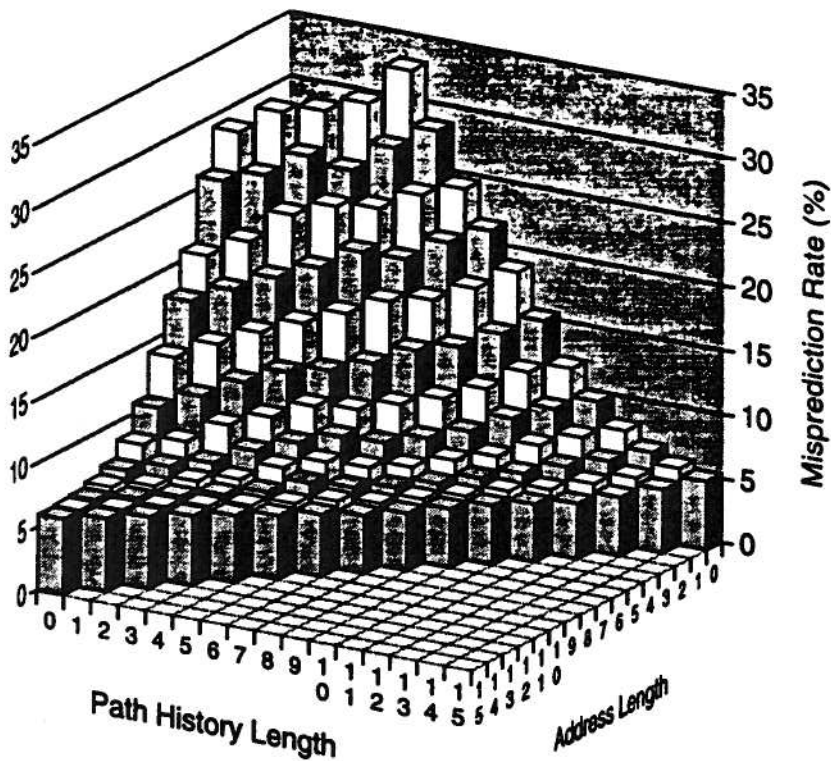




				30.27	27.12	21.86	18.25	15.13	12.94	10.34	8.68	7.39	6.10	5.37	4.81
			28.17	24.82	21.83	17.87	14.81	12.03	10.06	7.89	6.69	5.72	4.71	4.17	
		27.10	23.73	20.02	17.10	13.11	11.01	8.55	7.09	6.03	5.13	4.49	3.75		
	28.76	23.40	19.00	16.35	13.84	10.57	8.59	6.91	5.83	4.96	4.23	3.77			
29.13	23.31	18.59	15.71	13.10	10.76	8.11	6.72	5.41	4.64	4.11	3.67				
23.78	18.03	14.31	12.83	10.25	8.20	6.08	5.07	4.36	3.81	3.52					
18.78	14.91	12.16	10.76	8.52	6.79	5.09	4.35	3.80	3.40						
15.66	12.35	9.92	8.80	6.72	5.60	4.21	3.67	3.42							
11.71	9.37	7.88	7.11	5.62	4.75	3.96	3.49								
9.45	7.16	5.94	5.27	4.23	3.77	3.52									
6.57	5.47	4.92	4.57	3.89	3.53										
5.57	4.73	4.37	4.10	3.71											
5.02	4.37	4.09	3.94												
4.54	4.18	3.94													
4.47	4.13														
4.43															

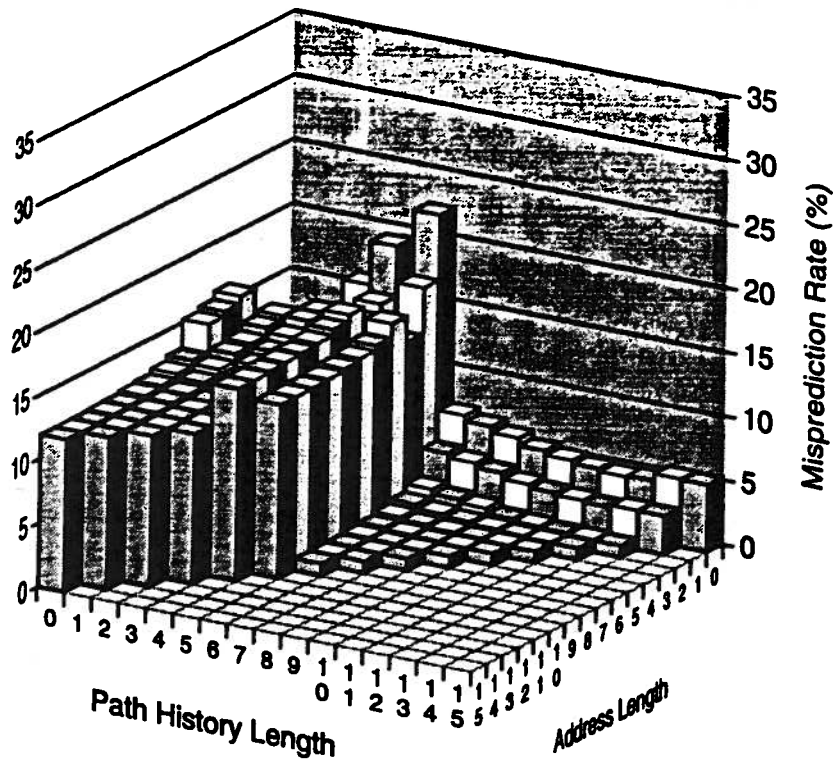
Misprediction Rates: path — IBS.Ultrix.groff





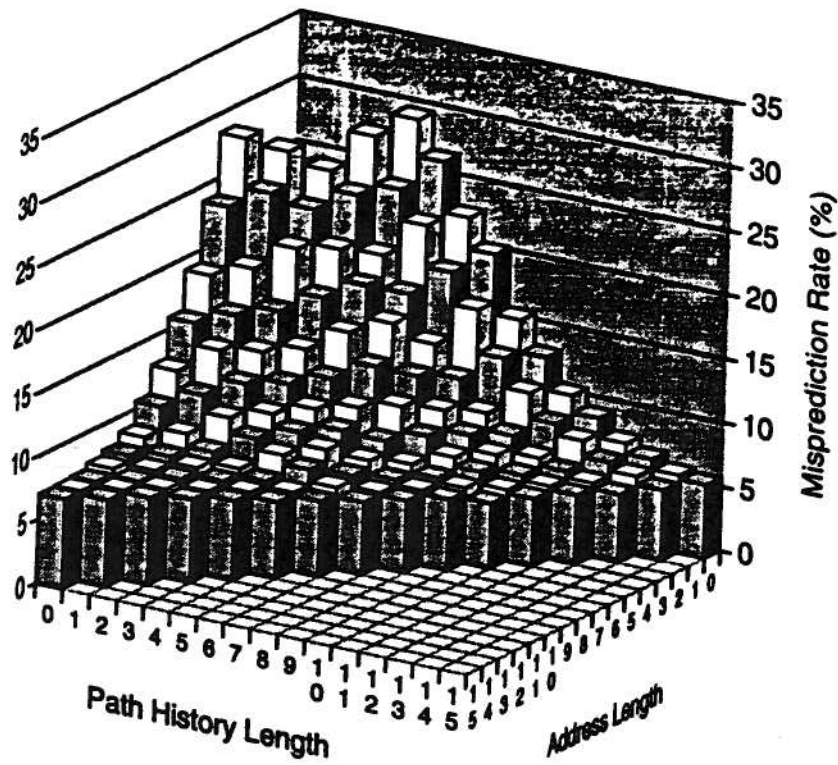
				32.96	28.66	24.57	21.73	18.89	15.51	12.20	10.04	8.14	6.86	6.00	5.37
			30.66	27.60	24.33	21.05	17.85	14.74	12.16	9.68	7.85	6.40	5.49	4.98	
		30.31	26.11	23.54	19.98	17.20	13.93	11.08	9.18	7.46	6.20	5.26	4.62		
	30.45	27.44	23.93	20.78	17.32	13.90	10.53	8.37	6.84	5.89	5.04	4.35			
29.14	26.18	23.49	19.76	16.62	13.13	10.32	8.10	6.78	5.76	5.15	4.53				
25.99	21.68	19.24	16.10	12.81	10.17	7.97	6.46	5.57	5.00	4.65					
20.82	18.53	15.63	12.93	10.65	8.68	6.87	5.52	5.00	4.63						
17.91	14.96	12.39	10.06	8.42	7.33	5.75	4.89	4.53							
14.18	11.53	9.67	8.05	7.13	6.32	5.31	4.60								
10.86	8.63	7.33	6.46	5.86	5.34	4.89									
8.63	7.32	6.56	5.91	5.43	5.04										
7.25	6.42	6.00	5.62	5.30											
6.59	6.07	5.82	5.51												
6.22	5.84	5.67													
6.05	5.76														
5.99															

Misprediction Rates: path — IBS.Ultrix.gs



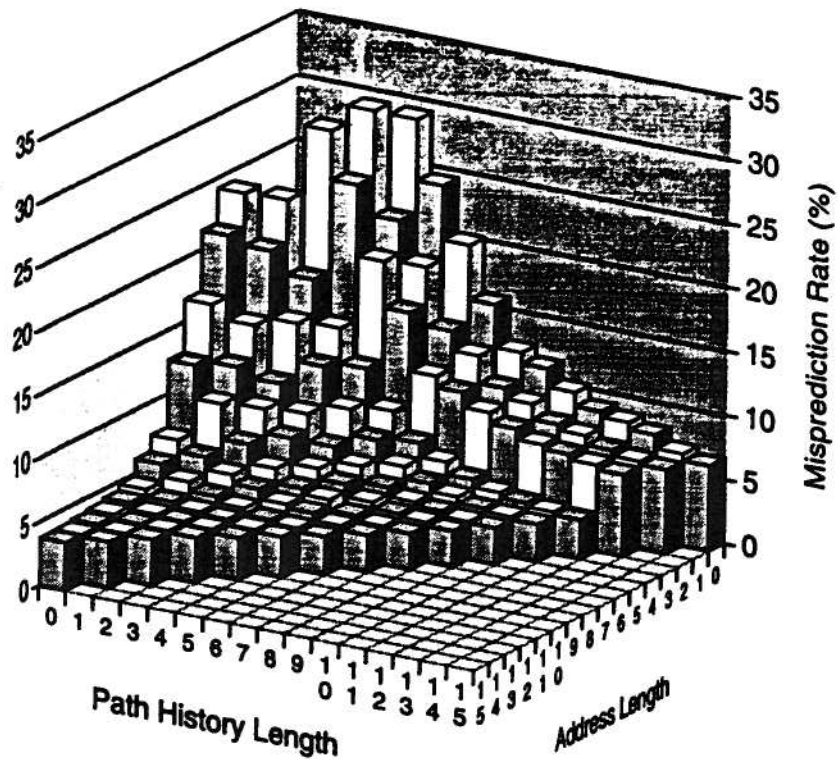
				19.17	22.14	6.92	6.48	5.99	5.41	5.08	4.85	4.64	4.75	5.29	5.23
			16.49	19.92	17.06	4.58	4.22	3.89	3.40	3.16	3.00	2.87	3.06	3.03	
		14.48	14.25	16.02	13.46	2.39	2.04	1.76	1.35	1.20	1.08	1.00	0.94		
	14.46	14.46	13.81	15.28	15.50	1.83	1.51	1.31	1.16	1.05	0.98	0.93			
16.22	14.15	13.80	13.33	16.40	14.43	1.50	1.28	1.13	1.04	0.97	0.91				
15.85	13.56	13.28	12.75	15.88	14.04	1.29	1.14	1.04	0.98	0.94					
15.27	13.36	12.81	12.34	15.43	13.85	1.14	1.04	0.98	0.94						
13.09	12.81	12.43	12.13	15.27	13.69	1.04	0.98	0.95							
12.67	12.37	12.02	11.83	15.19	13.60	0.99	0.95								
12.35	12.11	11.85	11.71	15.12	13.57	0.97									
12.22	12.04	11.85	11.78	15.05	13.55										
12.06	11.95	11.80	11.75	15.03											
12.01	11.90	11.77	11.70												
11.95	11.87	11.76													
11.92	11.86														
11.92															

Misprediction Rates: path — IBS.Ultrix.jpeg\_play



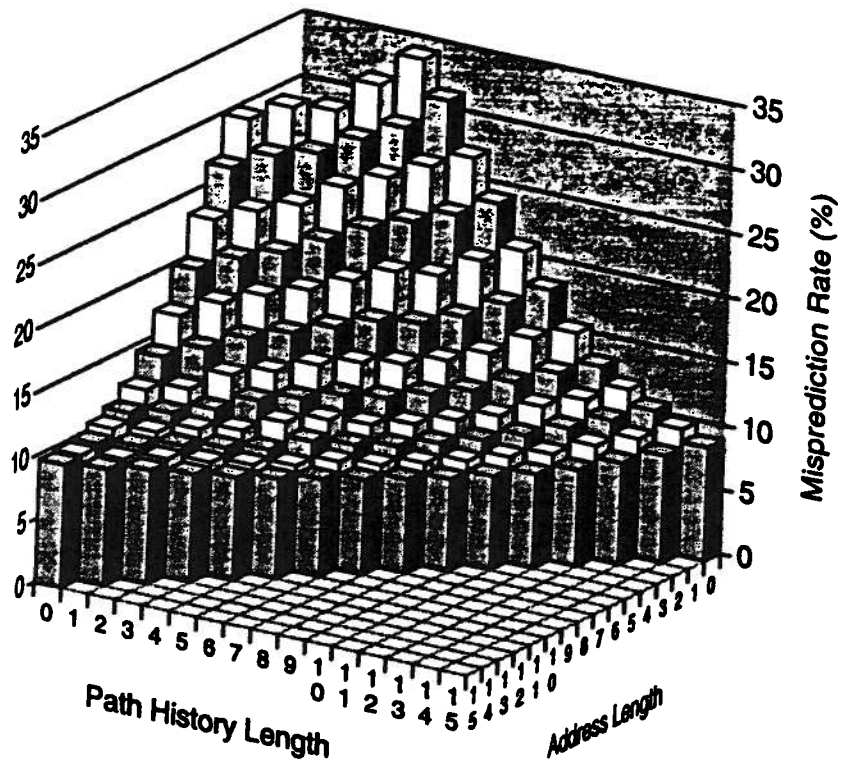
				29.35	26.51	22.60	20.18	15.49	12.98	10.48	9.16	7.65	6.85	6.05	5.75
			28.21	24.51	22.17	18.93	16.44	13.11	10.84	8.89	8.01	6.77	6.13	5.49	
		25.69	24.27	19.99	17.40	13.92	11.83	9.44	8.12	6.81	6.23	5.74	5.31		
	27.35	23.29	20.60	18.21	15.70	12.03	9.81	8.31	7.21	6.06	5.65	5.39			
28.52	24.71	20.82	17.42	15.14	12.94	10.28	8.39	7.20	6.48	5.52	5.26				
23.80	19.41	16.51	13.98	12.16	10.35	8.18	6.81	6.16	5.83	5.05					
19.03	16.36	13.92	11.88	10.38	9.17	7.25	6.18	5.81	5.54						
15.95	14.22	12.05	10.17	9.17	8.25	6.68	5.81	5.59							
12.79	11.35	10.03	8.82	7.99	7.30	6.34	5.82								
10.61	8.92	7.96	7.10	6.54	6.11	5.84									
8.81	7.76	7.31	6.70	6.28	5.94										
8.01	7.27	7.04	6.53	6.20											
7.59	7.00	6.85	6.45												
7.15	6.92	6.76													
7.04	6.78														
6.99															

Misprediction Rates: path — IBS.Ultrix.mpeg\_play



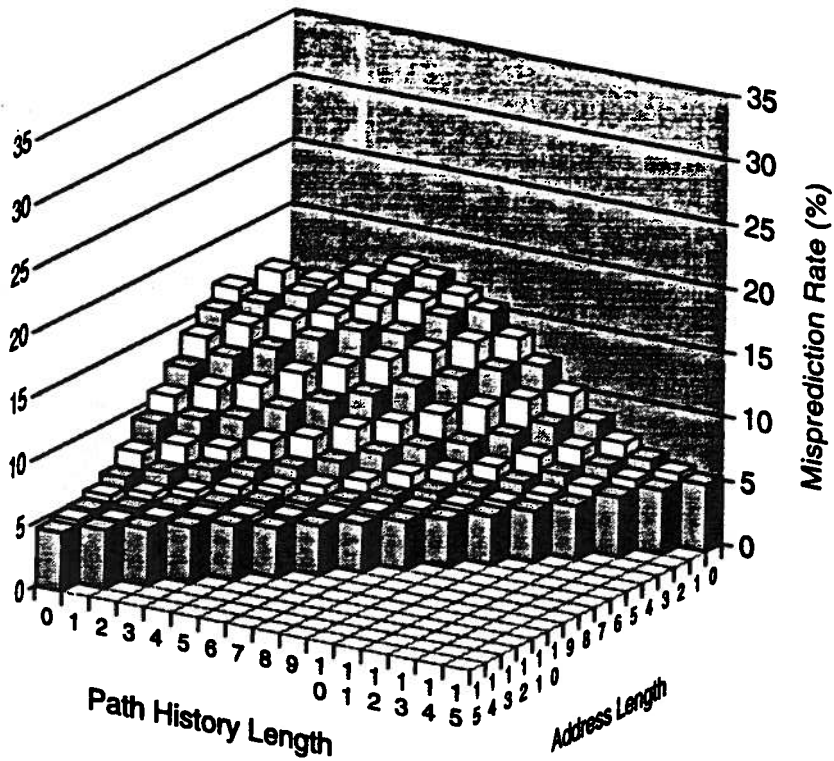
				29.18	24.40	20.15	15.93	12.61	11.75	10.34	9.26	8.82	8.26	7.21	6.68
			30.04	21.86	18.64	14.06	12.55	10.44	9.64	8.47	8.01	7.28	6.83	6.58	
		28.68	24.85	19.28	15.69	11.17	10.32	9.18	8.33	7.49	7.18	6.75	6.39		
	23.46	17.65	14.28	11.54	8.63	6.56	5.51	4.56	3.95	3.57	3.28	3.07			
24.18	20.11	14.87	11.92	8.99	6.99	5.36	4.46	3.82	3.32	3.11	2.94				
21.50	14.91	10.78	8.83	6.68	5.57	4.35	3.64	3.33	2.96	2.85					
16.75	12.29	9.42	7.55	5.60	4.81	3.82	3.32	3.09	2.81						
12.64	10.03	7.31	5.81	4.67	4.23	3.40	2.99	2.82							
7.41	6.50	5.55	4.84	4.06	3.79	3.23	2.88								
6.16	5.19	4.49	3.97	3.47	3.26	2.99									
4.82	4.23	3.91	3.71	3.34	3.18										
4.37	3.89	3.73	3.57	3.30											
4.12	3.74	3.67	3.53												
3.96	3.66	3.59													
3.79	3.62														
3.78															

Misprediction Rates: path — IBS.Ultrix.nroff



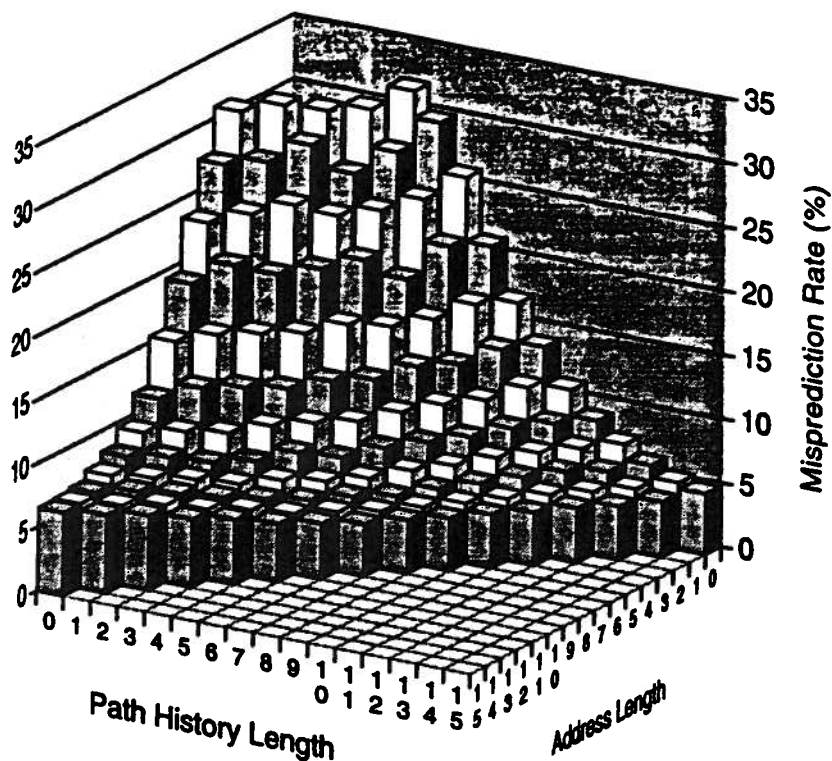
				34.02	31.27	27.26	24.19	20.95	18.37	15.49	13.32	12.01	10.82	9.86	8.91
			32.18	29.31	26.74	23.46	20.34	17.43	15.20	12.96	11.34	10.23	9.23	8.40	
		30.31	28.52	25.99	23.04	19.30	16.57	14.17	12.36	10.97	9.73	8.85	7.95		
	30.71	27.59	25.40	22.61	19.75	16.14	13.75	11.85	10.39	9.32	8.31	7.51			
29.92	27.54	24.16	21.83	19.16	16.50	13.60	11.71	10.18	9.08	8.23	7.33				
26.72	23.81	21.04	18.59	16.16	13.85	11.53	10.00	8.97	8.06	7.31					
23.30	20.74	18.32	15.85	13.82	11.93	10.10	8.87	8.03	7.22						
20.06	17.86	15.61	13.46	11.82	10.63	9.13	8.00	7.31							
17.03	14.93	13.33	11.82	10.56	9.54	8.41	7.41								
14.45	12.39	11.27	10.09	9.05	8.24	7.60									
12.46	11.13	10.33	9.33	8.43	7.75										
11.29	10.26	9.64	8.79	8.03											
10.66	9.75	9.20	8.42												
10.09	9.33	8.89													
9.79	9.12														
9.62															

Misprediction Rates: path — IBS.Ultrix.real\_gcc



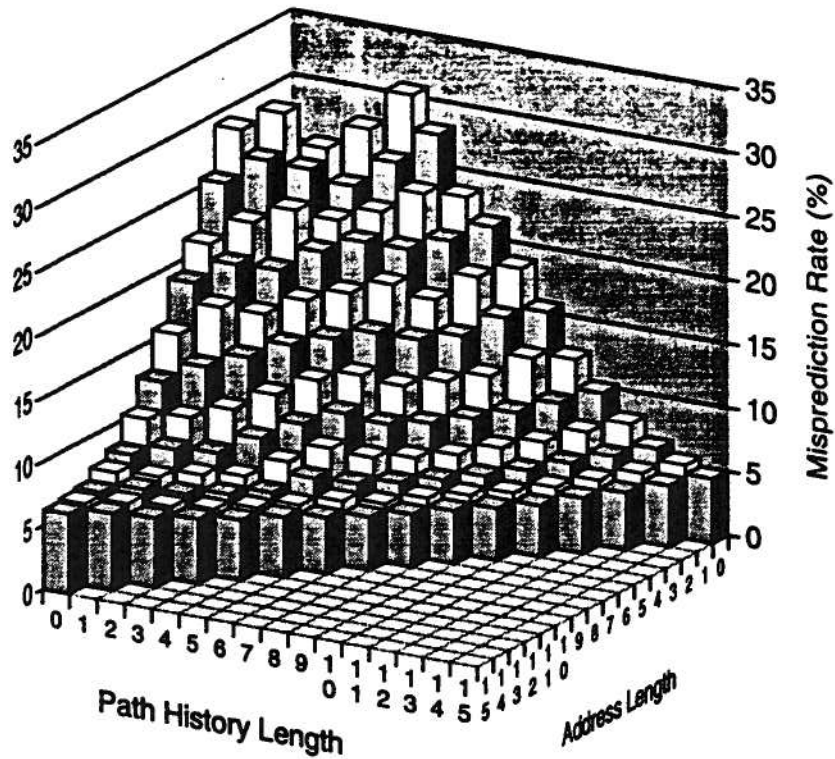
				17.68	17.20	16.24	15.40	13.71	11.96	10.21	8.43	7.26	6.31	5.69	5.23
			17.21	16.91	15.98	15.17	13.63	11.85	10.00	8.45	7.03	6.03	5.39	4.99	
		16.89	16.08	15.80	14.08	13.12	11.41	9.61	7.77	6.63	5.59	5.01	4.66		
	17.86	16.45	15.32	14.47	12.84	11.03	9.27	7.35	6.03	5.16	4.56	4.19			
16.78	16.04	15.18	14.04	12.32	10.54	8.82	7.31	5.84	4.82	4.23	3.97				
15.60	14.95	13.50	12.02	10.18	8.59	7.01	5.82	4.81	4.17	3.80					
14.19	13.06	11.27	9.88	8.02	6.58	5.48	4.66	4.08	3.75						
12.42	11.32	9.32	7.96	6.33	5.28	4.55	4.08	3.76							
10.86	9.46	7.61	6.41	5.38	4.52	4.10	3.78								
9.43	8.10	6.54	5.59	4.81	4.08	3.84									
7.72	6.53	5.48	4.91	4.40	3.87										
6.35	5.50	4.91	4.56	4.30											
5.59	4.96	4.64	4.37												
5.09	4.64	4.44													
4.91	4.58														
4.58															

Misprediction Rates: path — IBS.Ultrix.sdet



				31.66	29.59	25.75	20.80	16.78	13.75	10.82	8.80	7.38	6.17	5.21	4.75
			30.46	27.53	24.25	21.03	16.87	13.75	11.21	8.79	7.24	5.85	4.92	4.32	
		30.56	26.08	23.61	18.62	15.92	12.79	10.41	8.66	7.12	6.04	4.89	4.17		
	31.20	28.52	23.42	20.37	15.55	12.85	10.29	8.18	6.94	5.83	4.88	4.24			
30.91	27.39	24.45	19.86	15.96	12.04	9.89	7.96	6.54	5.54	4.76	4.10				
27.43	23.95	19.65	15.44	12.17	9.38	7.75	6.36	5.33	4.64	4.16					
23.49	20.58	15.64	11.77	9.48	7.19	5.99	5.00	4.53	4.06						
19.36	15.76	12.07	9.49	7.81	5.96	5.18	4.42	4.14							
15.47	12.25	9.13	7.33	6.26	5.10	4.60	4.06								
11.64	9.46	7.44	6.18	5.42	4.66	4.33									
9.63	8.08	6.74	5.75	5.20	4.51										
8.37	7.08	6.26	5.46	5.03											
7.52	6.66	6.01	5.30												
6.81	6.20	5.80													
6.58	6.08														
6.48															

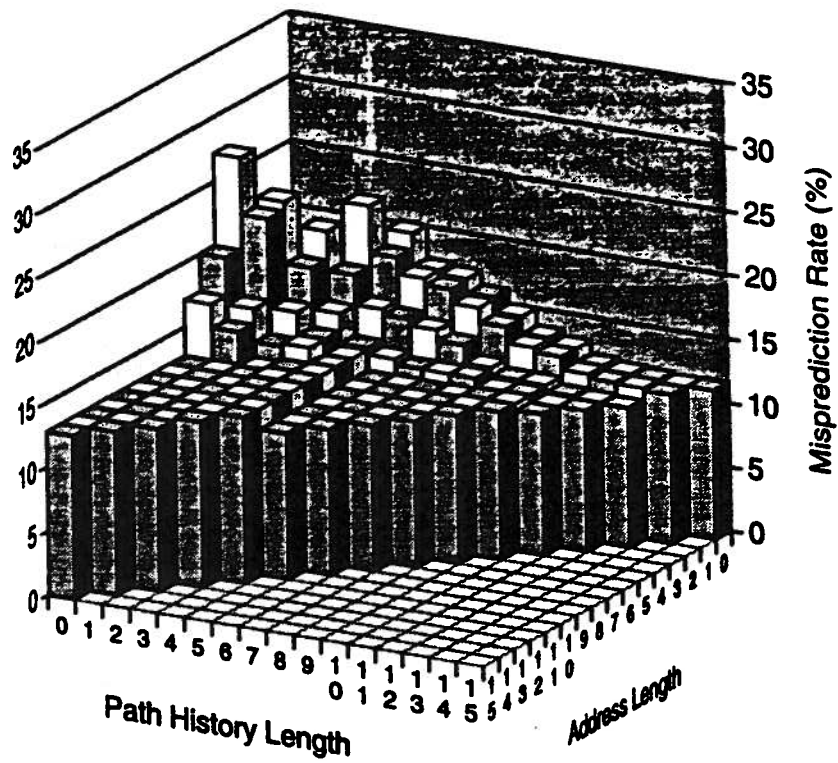
Misprediction Rates: path — IBS.Ultrix.verilog



				30.84	28.14	23.63	21.71	18.83	15.82	12.49	10.28	8.23	6.66	5.76	5.06
			28.46	26.24	24.18	20.86	18.44	15.64	12.86	9.72	7.86	6.33	5.38	4.79	
		27.20	24.66	23.01	20.49	16.93	14.48	11.73	9.26	7.31	6.05	5.09	4.49		
	30.20	26.21	22.62	21.28	18.36	14.45	11.56	9.07	7.14	5.75	4.80	4.33			
29.19	27.18	23.65	20.80	17.94	15.23	11.48	8.93	6.85	5.57	4.62	4.03				
25.64	22.95	19.61	17.63	15.03	12.57	9.14	6.88	5.54	4.70	4.07					
21.53	20.32	16.84	14.82	12.41	10.25	7.16	5.55	4.75	4.15						
19.16	17.63	14.10	11.59	9.67	8.14	5.74	4.56	4.13							
15.80	13.65	10.70	8.81	7.37	6.44	5.04	4.18								
12.75	10.33	7.95	6.49	5.58	4.99	4.39									
10.48	8.48	6.85	5.71	5.02	4.69										
8.34	6.97	5.99	5.21	4.73											
7.57	6.63	5.68	5.07												
6.67	6.17	5.42													
6.44	6.03														
6.25															

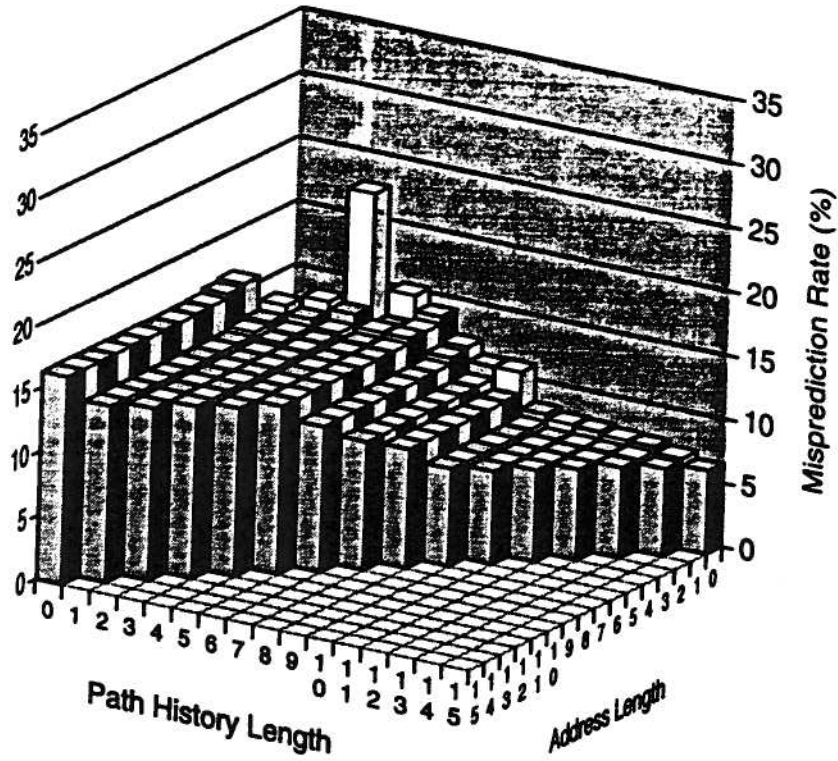
Misprediction Rates: path — IBS.Ultrix.video\_play





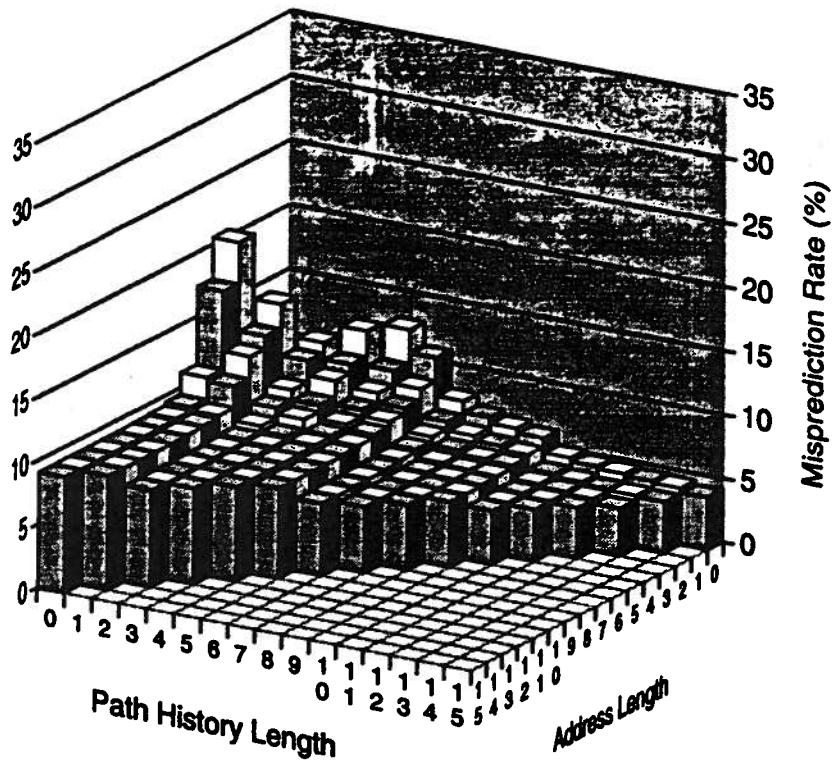
				20.08	17.55	17.25	16.16	15.01	13.68	13.19	12.17	11.88	11.77	11.60	11.64
			22.54	18.85	17.56	17.06	15.98	14.84	13.55	13.19	12.17	11.88	11.77	11.60	
		20.86	17.79	15.48	15.04	14.54	13.72	12.32	11.70	11.65	11.13	11.00	10.89		
	23.49	18.66	15.46	13.13	12.58	12.17	12.13	12.13	11.52	11.52	11.00	11.00			
27.22	22.81	15.86	14.10	12.94	11.39	11.39	11.38	11.38	11.52	11.52	11.00				
20.08	16.44	13.87	14.10	12.94	11.39	11.39	11.38	11.38	11.52	11.52					
17.12	15.28	12.70	12.94	12.94	11.39	11.39	11.38	11.38	11.52						
12.80	12.80	12.70	12.94	12.94	11.39	11.39	11.38	11.38							
12.80	12.80	12.70	12.94	12.94	11.39	11.39	11.38								
12.80	12.80	12.70	12.94	12.94	11.39	11.39									
12.80	12.80	12.70	12.94	12.94	11.39										
12.80	12.80	12.70	12.94												
12.80	12.80	12.70													
12.80	12.80														
12.80															

Misprediction Rates: path — CINT92.compress



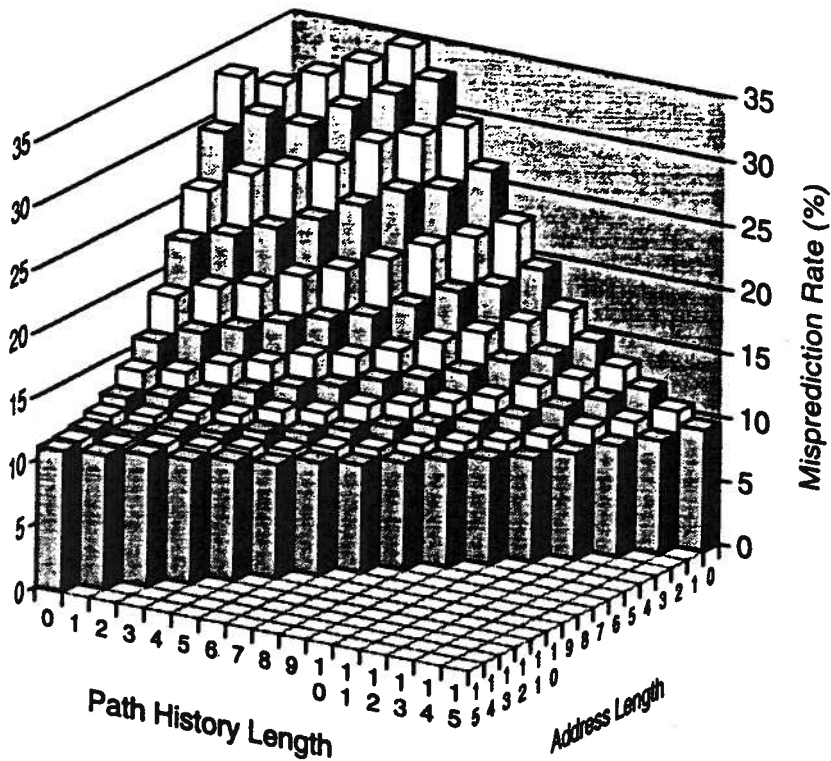
				15.32	14.11	12.19	11.10	11.11	8.28	7.91	7.82	7.58	7.52	7.09	6.55
			23.42	13.36	13.54	11.94	10.21	9.44	7.72	7.33	7.24	7.22	7.19	6.86	
		15.15	14.59	13.63	13.60	11.47	10.11	9.39	7.68	7.32	7.23	7.14	7.11		
	15.02	14.35	13.78	13.26	13.20	11.44	10.08	9.37	7.66	7.30	7.21	7.12			
16.88	14.30	13.82	13.57	13.18	13.17	11.42	10.06	9.35	7.65	7.29	7.21				
16.66	14.14	13.71	13.51	13.15	13.16	11.42	10.06	9.35	7.65	7.29					
16.36	13.83	13.47	13.47	13.14	13.15	11.42	10.06	9.35	7.65						
16.30	13.81	13.46	13.46	13.14	13.15	11.42	10.06	9.35							
16.26	13.80	13.46	13.46	13.14	13.15	11.42	10.06								
16.26	13.80	13.46	13.46	13.14	13.15	11.42									
16.26	13.80	13.46	13.46	13.14											
16.26	13.80	13.46	13.46												
16.26	13.80	13.46													
16.26	13.80														
16.26															

Misprediction Rates: path — CINT92.eqntott



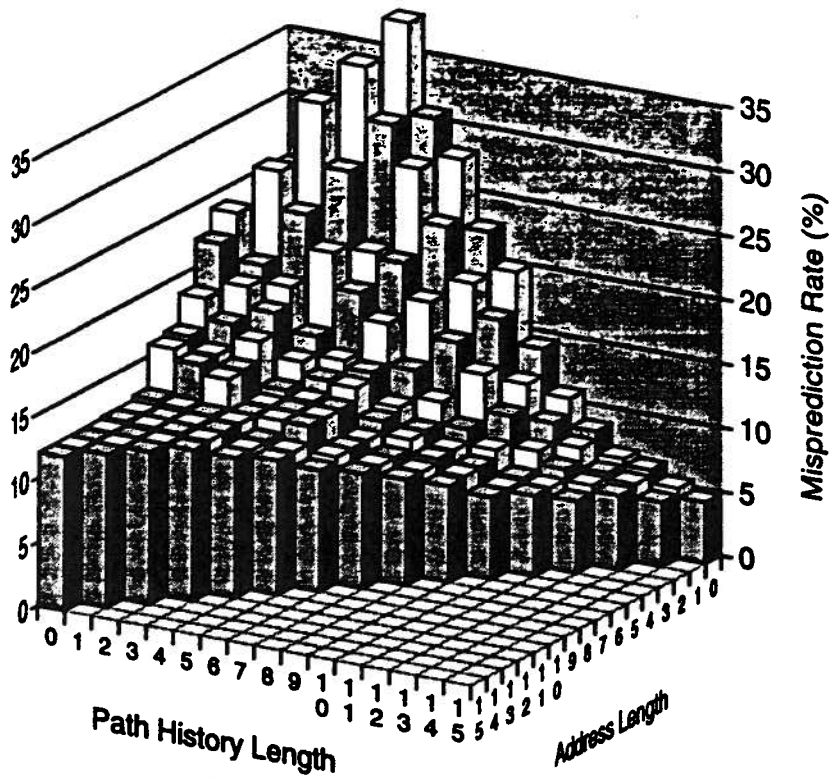
				12.81	11.01	8.02	7.17	6.70	6.35	5.20	4.93	4.72	4.60	4.46	4.12
			12.92	10.20	9.20	7.04	6.35	5.97	5.67	4.59	4.36	4.14	4.07	4.00	
		12.23	10.93	9.10	8.33	6.50	5.84	5.57	5.45	4.43	4.22	4.06	3.69		
	15.47	11.45	10.28	8.41	7.90	6.12	5.50	5.34	5.27	4.28	4.10	3.95			
20.52	13.61	9.79	9.00	7.92	7.50	5.94	5.36	5.24	5.19	4.21	4.05				
17.32	12.65	9.03	8.52	7.65	7.27	5.79	5.23	5.14	5.11	4.16					
11.20	10.91	8.24	7.82	7.55	7.18	5.72	5.18	5.10	5.09						
9.52	9.27	7.80	7.64	7.47	7.11	5.67	5.17	5.08							
9.26	9.08	7.66	7.55	7.43	7.07	5.64	5.15								
9.18	9.01	7.61	7.51	7.40	7.06	5.63									
9.13	8.96	7.57	7.50	7.39	7.05										
9.11	8.96	7.57	7.49	7.38											
9.10	8.94	7.56	7.49												
9.08	8.94	7.56													
9.08	8.93														
9.07															

Misprediction Rates: path — CINT92.espresso



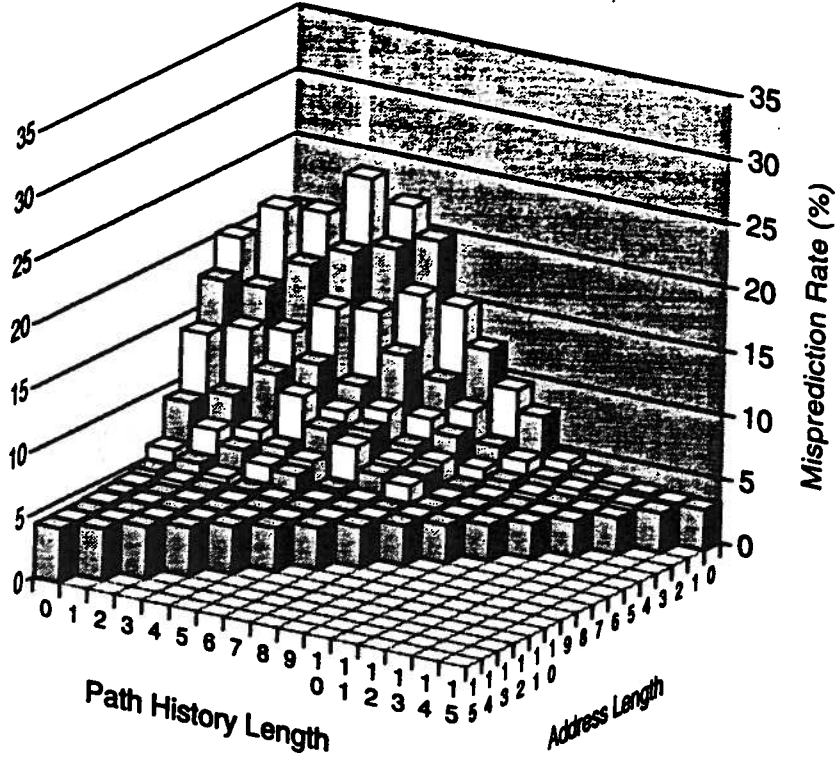
				34.74	32.57	29.38	26.40	22.68	19.50	16.76	14.75	13.16	11.81	10.59	9.52
			33.71	31.75	28.95	25.21	21.89	18.43	16.06	13.92	12.47	11.22	9.96	8.90	
		33.02	30.89	28.82	25.22	21.41	18.26	15.42	13.57	12.09	10.81	9.72	8.69		
	32.45	29.69	27.22	24.36	20.57	17.38	14.95	12.95	11.44	10.25	9.20	8.30			
33.28	30.70	26.99	23.48	19.97	16.76	14.46	12.70	11.30	10.12	9.00	8.11				
29.59	26.72	23.02	19.66	16.69	14.21	12.73	11.28	10.11	9.12	8.22					
25.70	22.62	19.14	16.61	14.48	12.51	11.42	10.13	9.14	8.33						
22.37	19.19	16.33	14.13	12.66	11.06	10.11	9.06	8.36							
18.69	16.27	14.20	12.56	11.41	10.06	9.33	8.44								
15.78	13.79	12.55	11.29	10.36	9.33	8.82									
14.08	12.52	11.61	10.51	9.69	8.88										
12.68	11.58	10.94	10.00	9.34											
11.89	10.95	10.46	9.63												
11.38	10.63	10.25													
11.14	10.46														
11.02															

Misprediction Rates: path — CINT92.gcc



				37.81	30.74	27.95	22.75	19.99	14.39	10.94	8.76	7.00	6.52	5.49	4.78
			34.63	30.51	27.47	23.38	19.35	16.88	12.29	9.64	8.10	6.50	6.06	5.02	
		32.01	27.13	21.21	20.78	18.11	15.39	13.29	10.44	8.09	7.06	6.20	5.80		
	26.99	24.06	21.45	18.71	16.69	13.46	11.38	9.66	8.43	6.62	6.28	5.59			
24.00	20.30	19.01	15.54	14.07	13.54	11.23	9.76	8.66	7.73	6.44	6.26				
22.25	19.27	17.61	14.22	13.16	12.97	10.77	9.71	8.60	7.66	6.39					
18.59	16.96	16.01	12.63	12.14	11.91	9.91	8.95	8.25	7.50						
16.28	15.24	14.46	12.05	11.98	11.91	9.91	8.95	8.25							
15.94	15.11	14.36	11.98	11.93	11.91	9.91	8.95								
12.59	12.36	12.17	11.97	10.99	10.55	9.45									
12.22	12.13	12.08	11.90	10.92	10.47										
12.22	12.13	12.07	11.89	10.92											
12.05	11.96	11.91	11.79												
12.03	11.96	11.91													
12.03	11.96														
12.03															

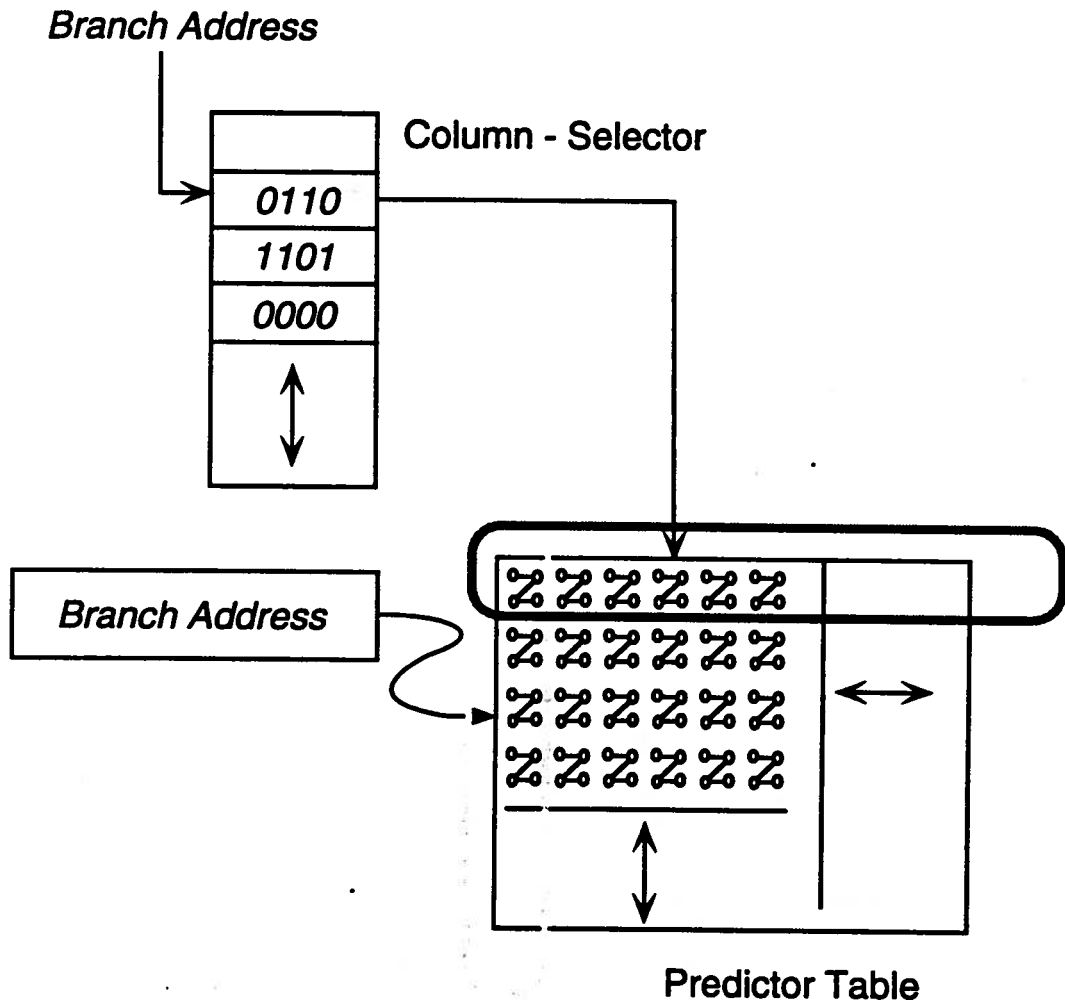
Misprediction Rates: path — CINT92.li

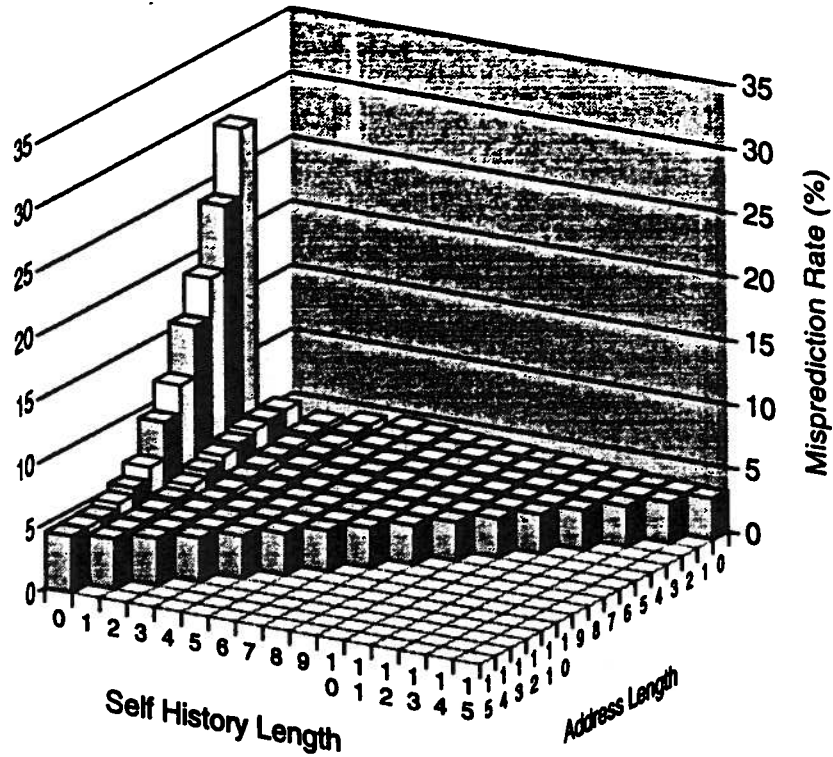


				21.94	19.71	15.04	12.09	9.42	7.77	4.69	4.14	3.73	3.48	3.23	3.15
			24.31	19.29	16.08	9.80	7.96	5.62	4.93	3.92	3.51	3.31	3.19	3.06	
		21.81	19.11	14.99	12.02	7.50	6.57	4.46	3.86	3.30	2.98	2.91	2.85		
	22.29	18.31	15.44	9.81	8.30	5.93	5.17	3.56	3.24	2.91	2.81	2.76			
20.19	16.74	13.75	11.67	8.41	7.31	5.34	4.75	3.34	3.11	2.80	2.72				
17.50	14.18	11.07	9.79	7.59	6.73	4.92	4.53	3.19	2.99	2.77					
13.93	9.56	7.26	6.36	5.72	3.96	3.51	3.25	3.13	2.95						
9.20	7.49	6.40	5.58	5.25	3.66	3.35	3.19	3.09							
6.12	5.49	4.82	4.18	3.94	3.55	3.30	3.17								
5.07	4.62	4.35	3.98	3.75	3.45	3.25									
4.57	4.23	4.17	3.89	3.71	3.41										
4.48	4.16	4.11	3.83	3.70											
4.35	4.07	4.05	3.79												
4.23	4.05	4.03													
4.22	4.04														
4.22															

Misprediction Rates: path — CINT92.sc

# Appendix D: The PAs scheme

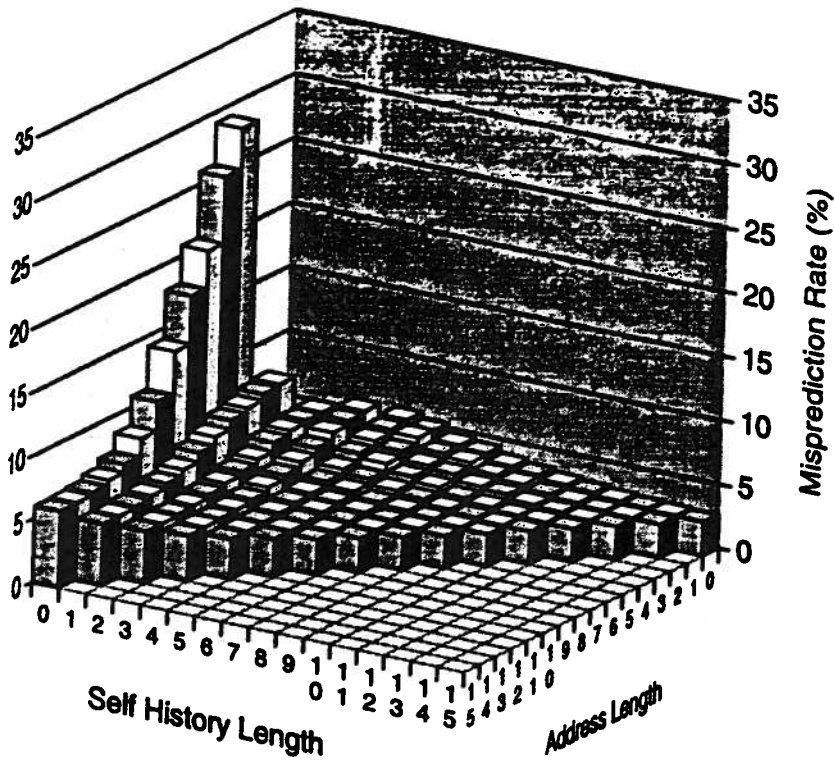




				4.59	4.48	4.24	4.16	4.02	3.89	3.80	3.67	3.52	3.40	3.29	3.21
			5.20	4.56	4.42	4.18	4.08	3.92	3.77	3.66	3.51	3.38	3.27	3.16	
		5.52	5.09	4.48	4.35	4.13	3.96	3.78	3.63	3.49	3.37	3.25	3.15		
	6.92	5.35	4.84	4.37	4.21	3.97	3.78	3.59	3.45	3.33	3.21	3.11			
29.13	6.77	5.04	4.69	4.24	4.05	3.79	3.60	3.42	3.28	3.17	3.07				
23.78	6.61	4.90	4.44	4.02	3.82	3.59	3.43	3.25	3.12	3.03					
18.78	6.18	4.75	4.19	3.80	3.62	3.42	3.28	3.13	3.03						
15.66	5.88	4.49	3.96	3.63	3.48	3.29	3.17	3.04							
11.71	5.36	4.24	3.76	3.50	3.37	3.22	3.12								
9.45	4.86	4.06	3.66	3.42	3.29	3.18									
6.57	4.41	3.90	3.57	3.36	3.24										
5.57	4.18	3.81	3.54	3.35											
5.02	4.05	3.73	3.45												
4.54	3.96	3.70													
4.47	3.94														
4.43															

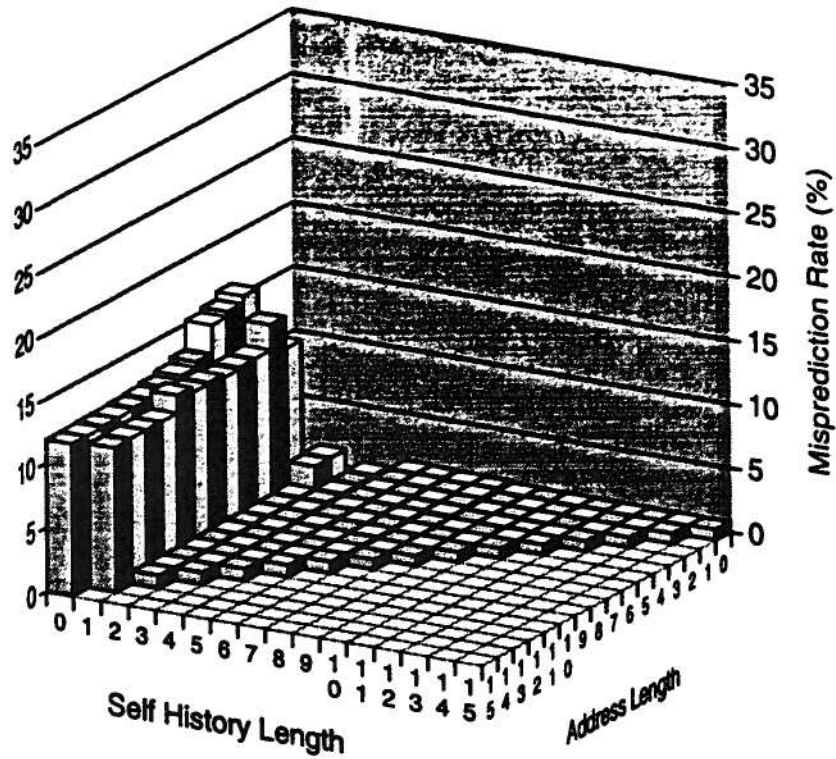
Misprediction Rates: PAs(inf) — IBS.Ultrix.groff





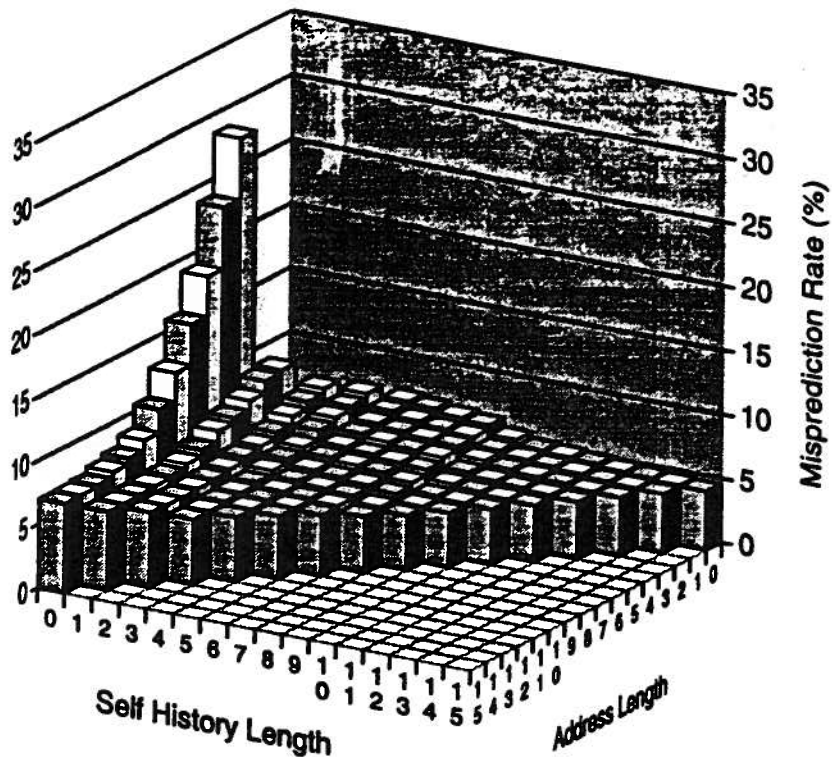
				5.78	5.35	4.68	4.46	3.91	3.66	3.35	3.17	2.96	2.84	2.73	2.67
			6.63	5.59	5.41	4.82	4.37	3.82	3.54	3.18	3.01	2.81	2.72	2.63	
		6.70	6.44	5.33	4.96	4.30	4.06	3.54	3.34	3.00	2.84	2.67	2.62		
	9.06	6.64	6.13	4.95	4.81	4.02	3.64	3.23	2.98	2.76	2.68	2.57			
29.14	8.87	6.47	5.55	4.35	4.02	3.55	3.30	2.97	2.77	2.62	2.56				
25.99	8.40	6.14	5.08	3.98	3.65	3.25	3.05	2.82	2.64	2.51					
20.82	8.04	5.47	4.65	3.68	3.40	3.08	2.89	2.70	2.53						
17.91	7.37	5.08	4.31	3.54	3.27	2.92	2.77	2.59							
14.18	6.74	4.78	3.99	3.36	3.09	2.83	2.69								
10.86	6.03	4.50	3.78	3.24	3.03	2.75									
8.63	5.53	4.28	3.67	3.15	2.97										
7.25	5.21	4.17	3.64	3.12											
6.59	4.95	4.08	3.57												
6.22	4.85	4.07													
6.05	4.81														
5.99															

Misprediction Rates: PAs(inf) — IBS.Ultrix.gs



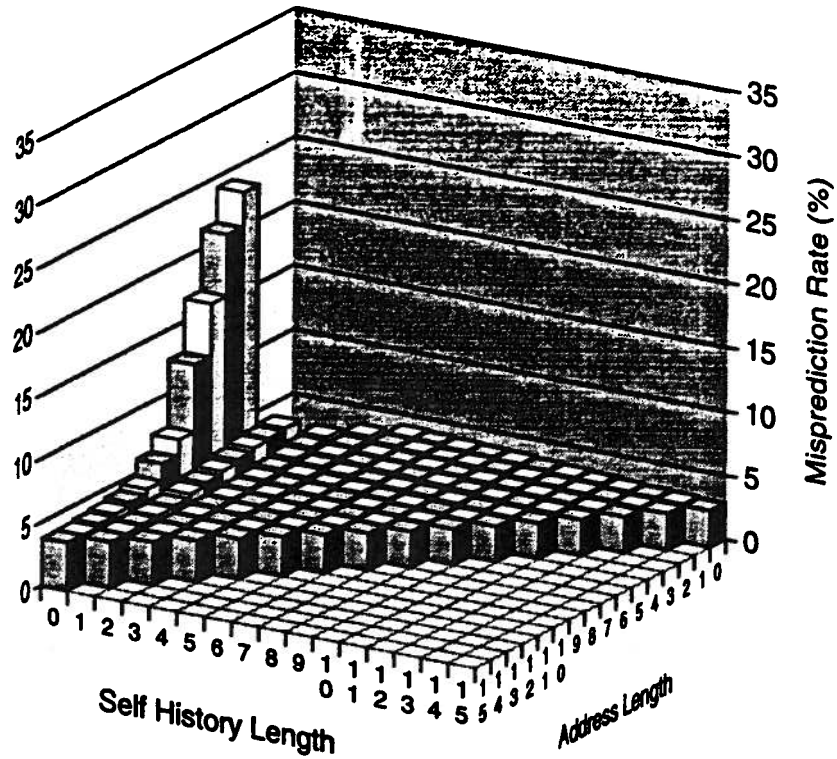
				1.27	1.24	1.15	1.14	0.95	0.93	0.91	0.90	0.87	0.86	0.85	0.85
			1.43	1.22	1.19	1.12	1.11	0.92	0.89	0.88	0.87	0.84	0.84	0.83	
		3.08	1.35	1.16	1.14	1.08	1.07	0.89	0.88	0.86	0.85	0.83	0.83		
	11.89	3.00	1.28	1.13	1.10	1.04	1.02	0.87	0.85	0.84	0.84	0.83			
16.22	14.34	1.30	1.22	1.08	1.06	1.01	0.88	0.84	0.84	0.83	0.83				
15.65	12.40	1.22	1.16	1.05	1.03	0.99	0.86	0.83	0.82	0.82					
15.27	12.34	1.17	1.11	1.02	1.00	0.97	0.83	0.81	0.81						
13.09	12.21	1.14	1.08	1.00	0.98	0.95	0.81	0.81							
12.67	12.47	1.10	1.05	0.98	0.96	0.96	0.80								
12.35	12.40	1.07	1.02	0.97	0.95	0.95									
12.22	12.77	1.05	1.01	0.98	0.96										
12.06	11.38	1.05	0.99	0.97											
12.01	11.35	1.05	0.98												
11.95	11.35	1.04													
11.92	11.34														
11.92															

Misprediction Rates: PAs(inf) — IBS.Ultrix.jpeg\_play



				7.17	6.99	6.73	6.54	5.82	5.41	5.26	5.13	4.93	4.82	4.69	4.59
			8.00	7.01	6.68	6.45	6.26	5.59	5.30	5.14	4.99	4.79	4.69	4.60	
		8.62	7.65	6.71	6.49	6.28	6.14	5.45	5.14	4.97	4.82	4.63	4.54		
	10.25	8.21	7.40	6.50	6.28	6.05	5.90	5.13	4.88	4.71	4.59	4.44			
28.52	10.06	7.71	7.02	6.14	5.94	5.74	5.57	4.84	4.64	4.48	4.39				
23.80	9.17	7.08	6.34	5.90	5.71	5.52	5.17	4.53	4.40	4.29					
19.03	8.46	6.65	6.02	5.57	5.40	5.21	4.89	4.34	4.22						
15.95	8.06	6.41	5.75	5.34	5.18	5.00	4.52	4.24							
12.79	7.19	6.11	5.43	5.15	4.99	4.84	4.38								
10.61	6.73	5.90	5.29	5.09	4.91	4.74									
8.81	6.41	5.83	5.21	5.03	4.88										
8.01	6.27	5.74	5.13	4.99											
7.59	6.18	5.80	5.08												
7.15	6.14	5.85													
7.04	6.12														
6.99															

Misprediction Rates: PAs(inf) — IBS.Ultrix.mpeg\_play



				4.14	4.07	3.92	3.84	3.72	3.60	3.46	3.35	3.18	3.07	2.98	2.86
			4.46	4.09	3.98	3.83	3.75	3.64	3.49	3.34	3.23	3.07	2.96	2.86	
		4.62	4.24	3.95	3.85	3.72	3.62	3.50	3.36	3.20	3.08	2.92	2.82		
	5.56	4.44	4.14	3.87	3.73	3.62	3.50	3.34	3.19	3.06	2.95	2.80			
24.18	5.39	4.23	3.97	3.71	3.54	3.40	3.27	3.12	3.00	2.89	2.78				
21.50	5.27	4.00	3.79	3.53	3.40	3.25	3.11	2.97	2.86	2.76					
16.75	4.97	3.81	3.64	3.41	3.30	3.15	3.02	2.89	2.78						
12.64	4.71	3.70	3.54	3.33	3.21	3.07	2.93	2.81							
7.41	4.42	3.59	3.45	3.26	3.15	3.02	2.90								
6.16	4.20	3.54	3.40	3.22	3.12	3.00									
4.82	3.87	3.45	3.33	3.19	3.08										
4.37	3.75	3.41	3.27	3.16											
4.12	3.68	3.36	3.23												
3.96	3.63	3.35													
3.79	3.60														
3.78															

Misprediction Rates: PAs(inf) — IBS.Ultrix.nroff