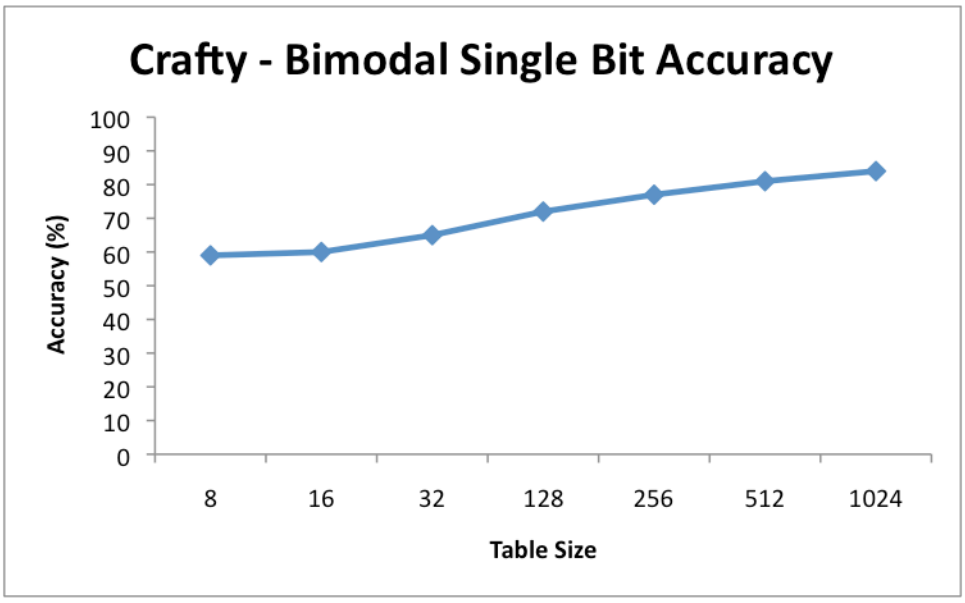
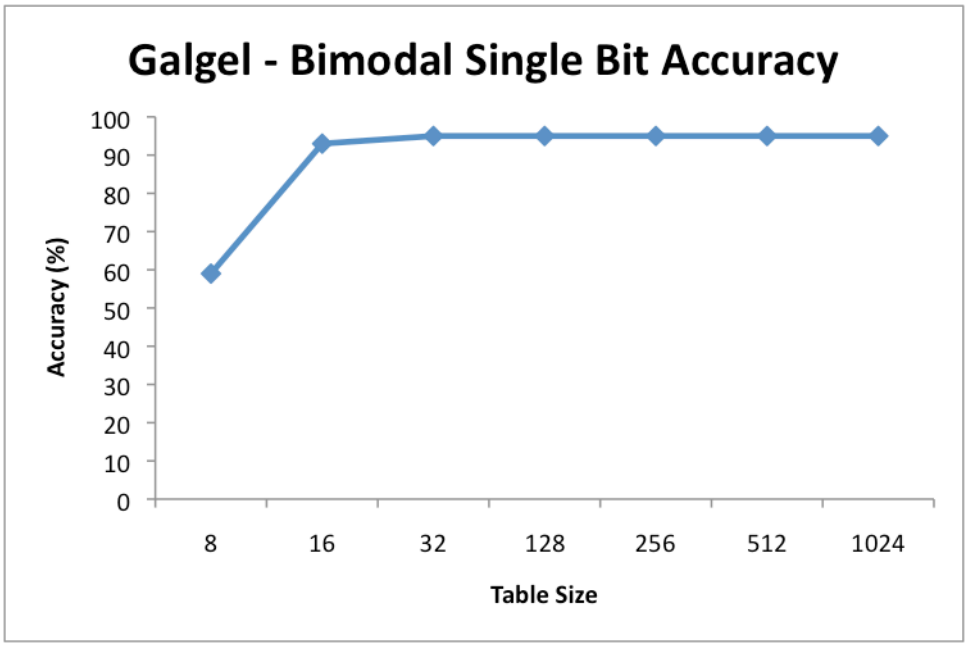
Danny Yu
CS320
Project1 Report – Branch Predictors

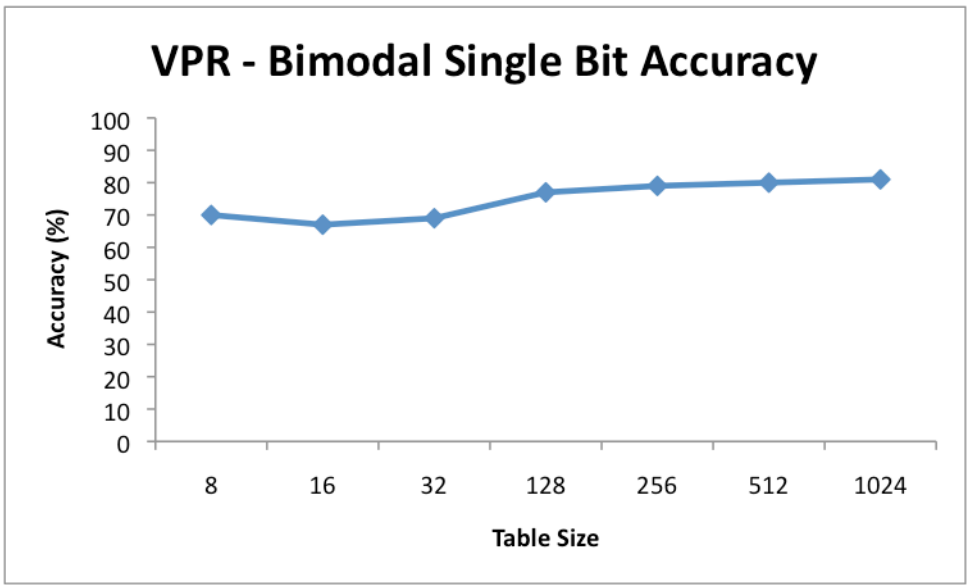
Bimodal Single Bit



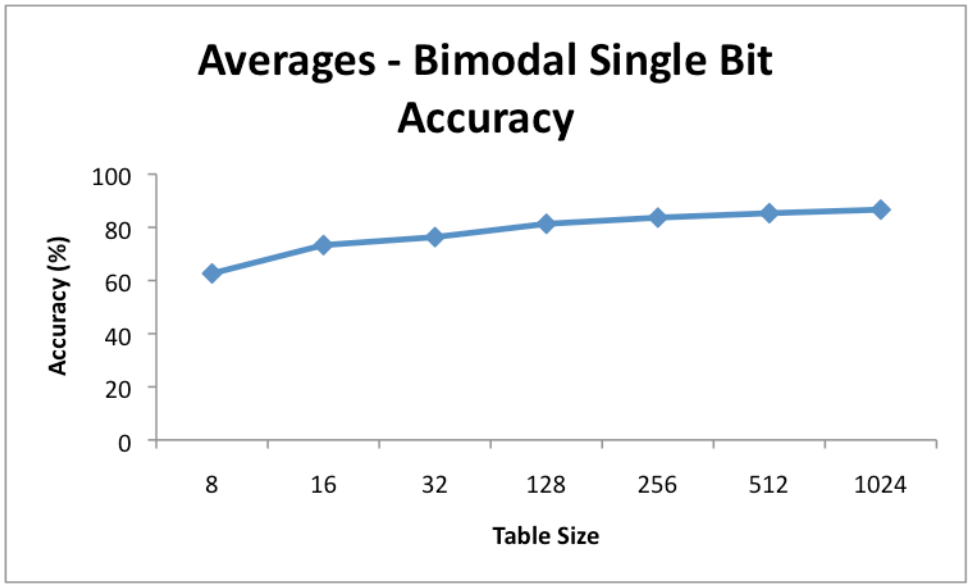
Optimal table size for Crafty was 1024 entries at 84% accuracy.



Optimal table size for Galgel was tied between 32, 64, 128, 512, and 1024 entries at 95% accuracy.

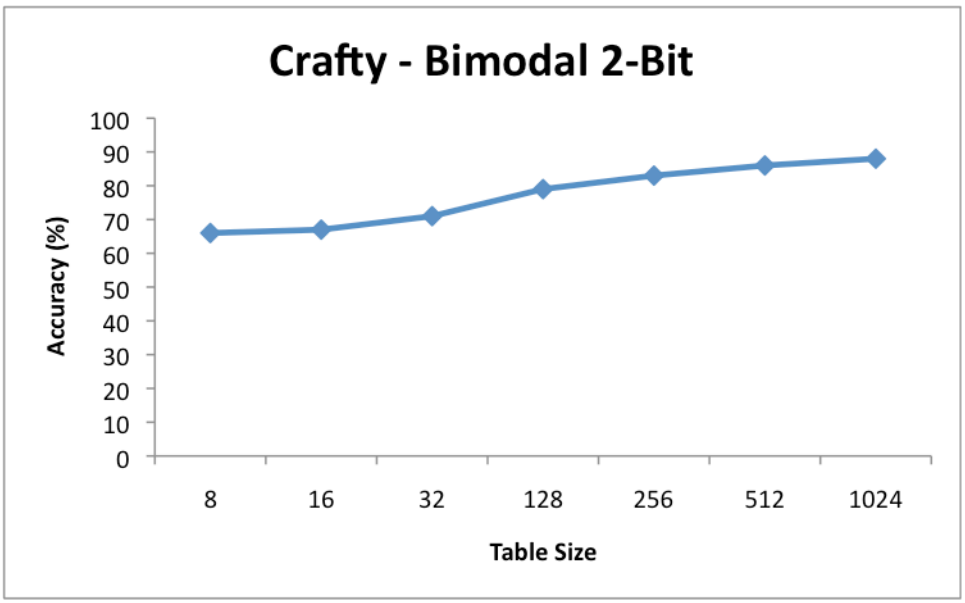


Optimal table size for VPR was 1024 entries at 81% accuracy.

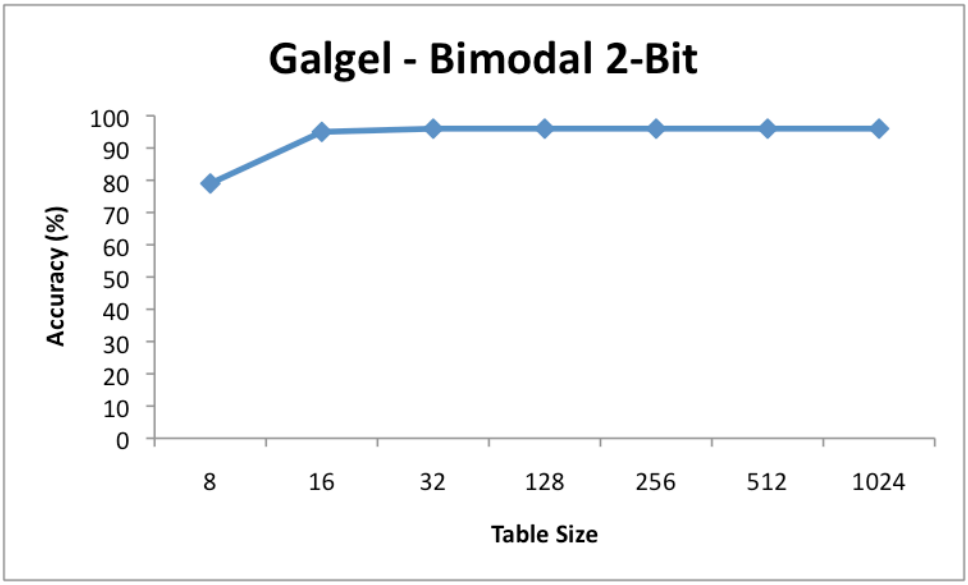


Optimal table size on average was 1024 entries at 86.66% accuracy.

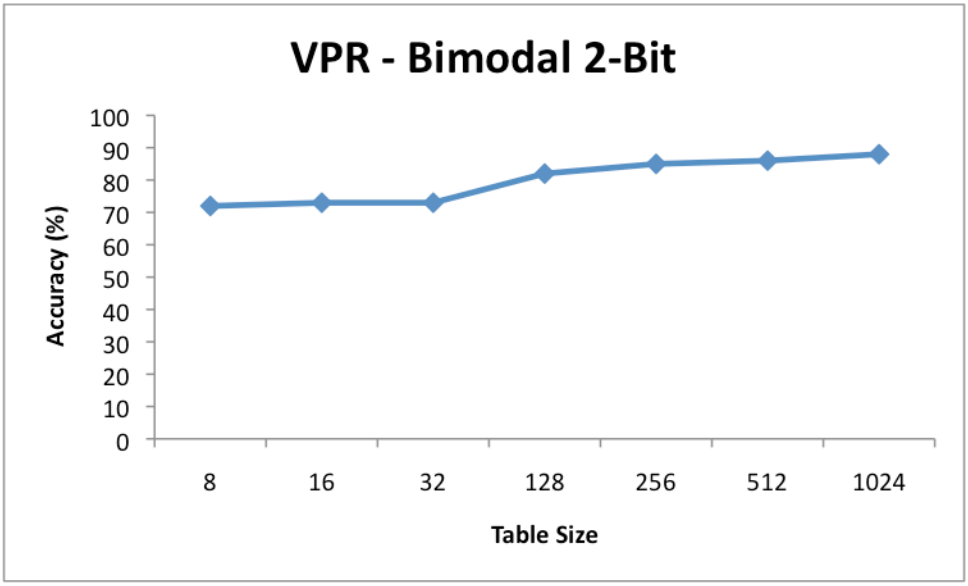
Bimodal Two-Bit



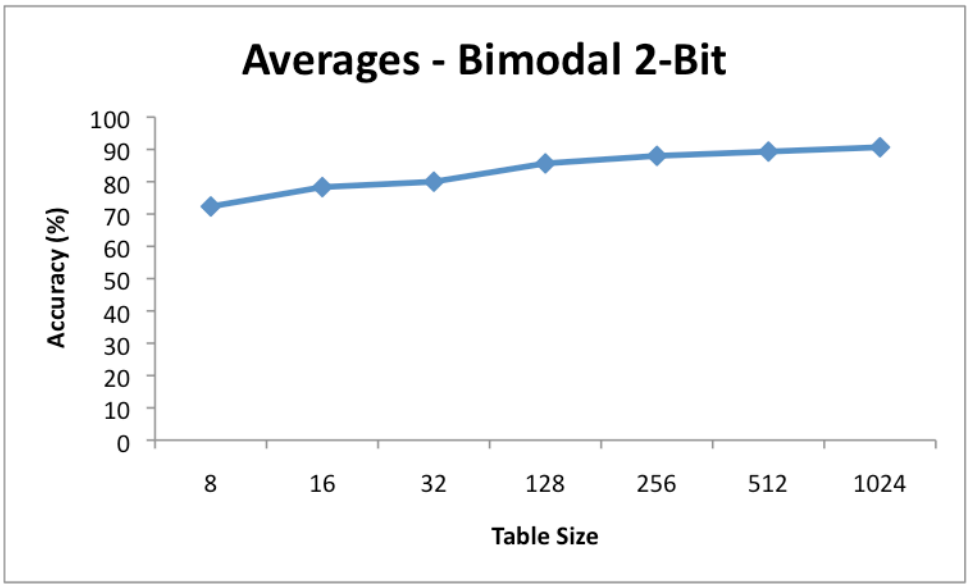
Optimal table size for Crafty was 1024 entries at 88% accuracy.



Optimal table size for Galgel was tied between 32, 64, 128, 256, 512, and 1024 entries at 96% accuracy.

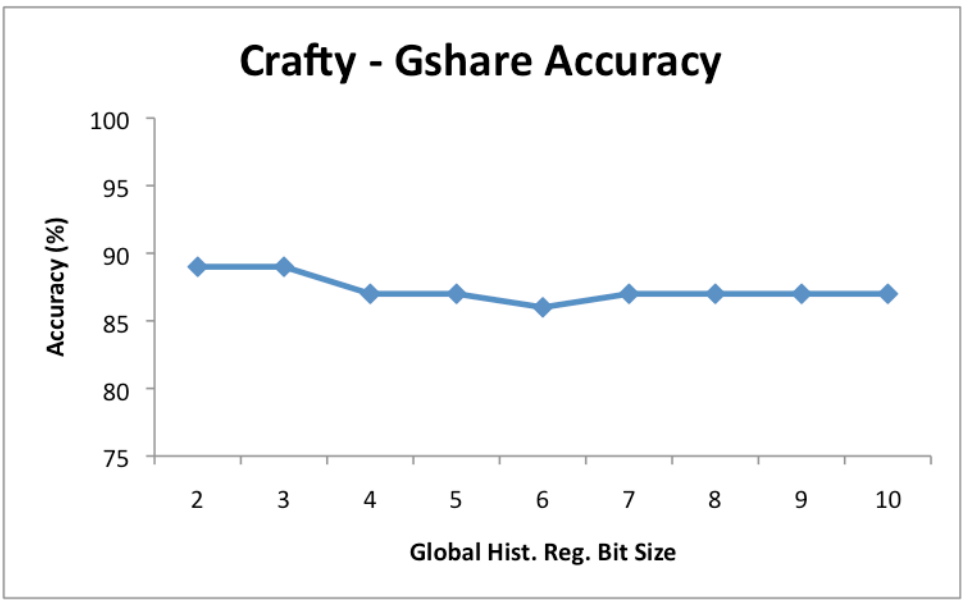


Optimal table size for VPR was 1024 entries at 88% accuracy.

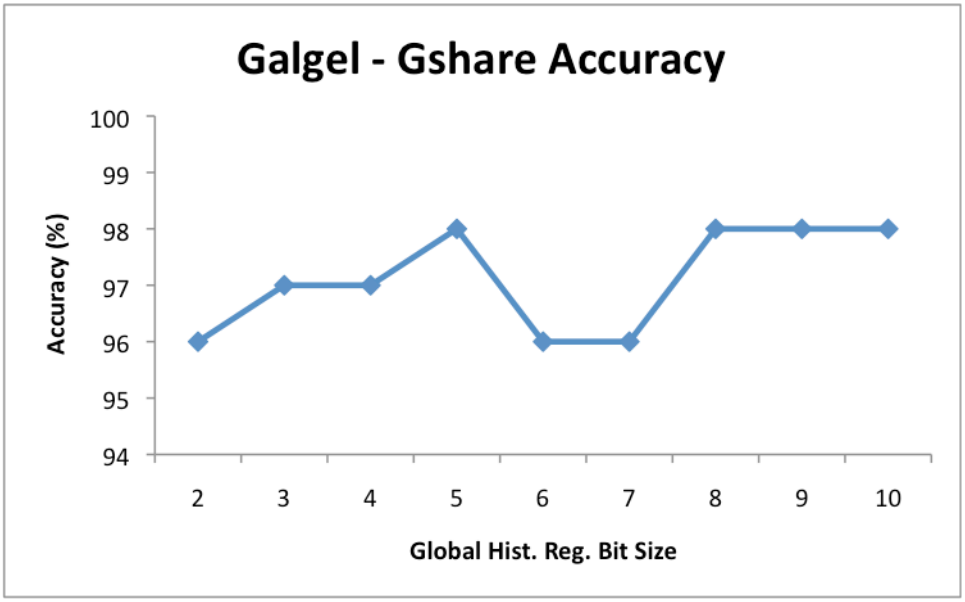


Optimal table size on average was 1024 entries, at 90.66% accuracy.

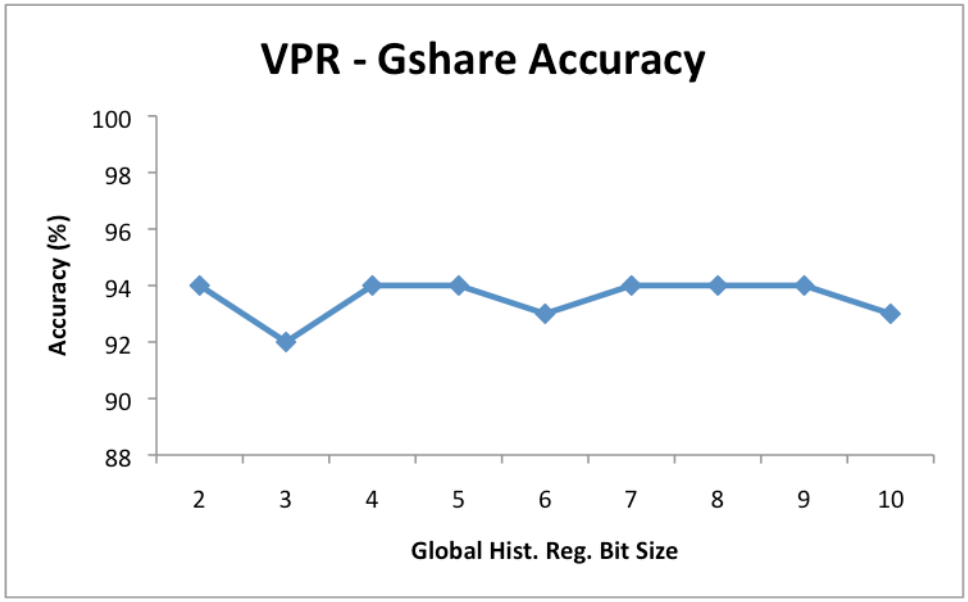
Gshare



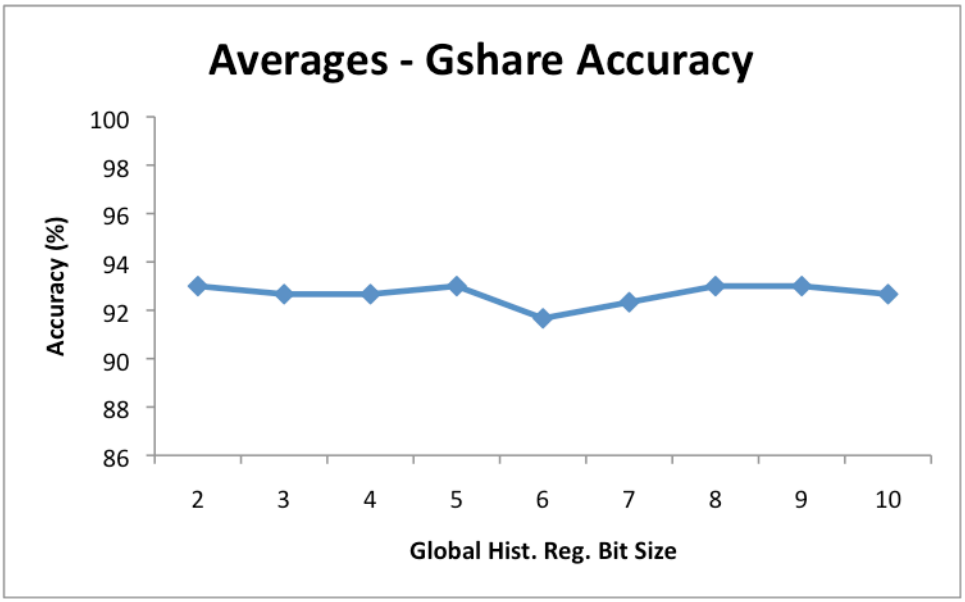
Optimal global history register bit size for Crafty was tied between 2 and 3 bits, at 89% accuracy.



Optimal global history register bit size for Galgel was tied between 5, 8, 9, and 10 bits at 98% accuracy.

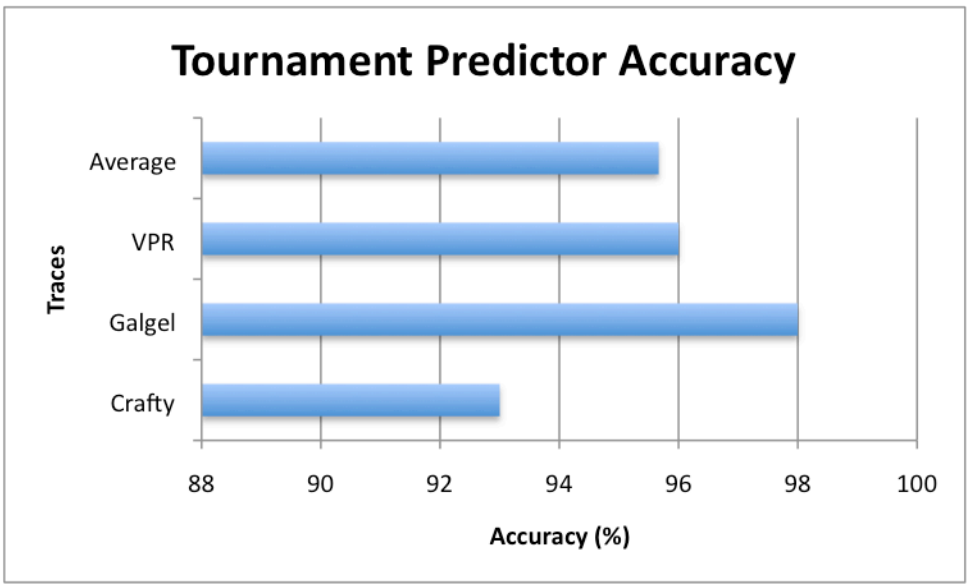


Optimal global history register bit size for VPR was tied between 2, 4, 5, 7, 8, and 9 bits at 94% accuracy.



Optimal global history register bit size on average was tied between 2, 5, 8, 9 bits at 93% accuracy.
Overall, there is no clear optimal global history register bit size. As global history bit size increases, accuracy for Crafty decreases for Crafty, accuracy for Galgel increases, and accuracy for VPR stays almost the same.

Tournament



Accuracy for VPR was 96%.
Accuracy for Galgel was 98%.
Accuracy for Crafty was 93%.
Accuracy on average was 95.66%.

1. The tournament predictor provides the best performance at 95.66% accuracy, on average. Next would be Gshare, at 93% accuracy on average for 2, 5, 8, 9 bit global history register sizes, then the bimodal predictor with 2-bit saturating counters at 90.66% accuracy on average, with a table size of 1024 entries. Lastly is the bimodal predictor with a single bit of history at 86.66% accuracy on average with a table size of 1024 entries.
2. The optimal configuration for the tournament predictor requires the bimodal 2-bit predictor to use a table size of 1024 entries. There is no clear optimal bit size for the Gshare predictor.