The Effect of Speculatively Updating Branch History on Branch Prediction Accuracy, Revisited

Eric Hao
Po-Yung Chang
Yale N. Patt

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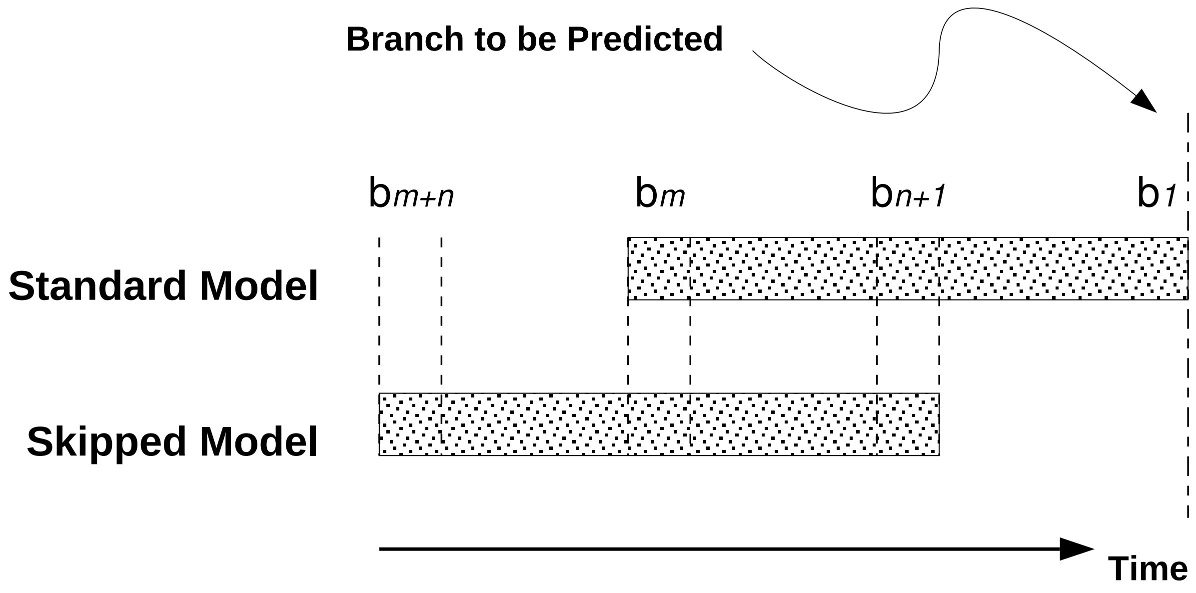
Speculative Update: Worthwhile?

- Yes [Yeh and Patt 1992]
- No [Talcott et al. 1994]

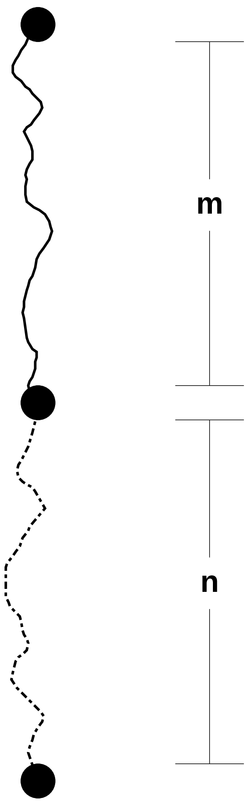
Overview

- Introduction
- **Skipped Model**
- Speculative Update vs. No Speculative Update
- Conclusion

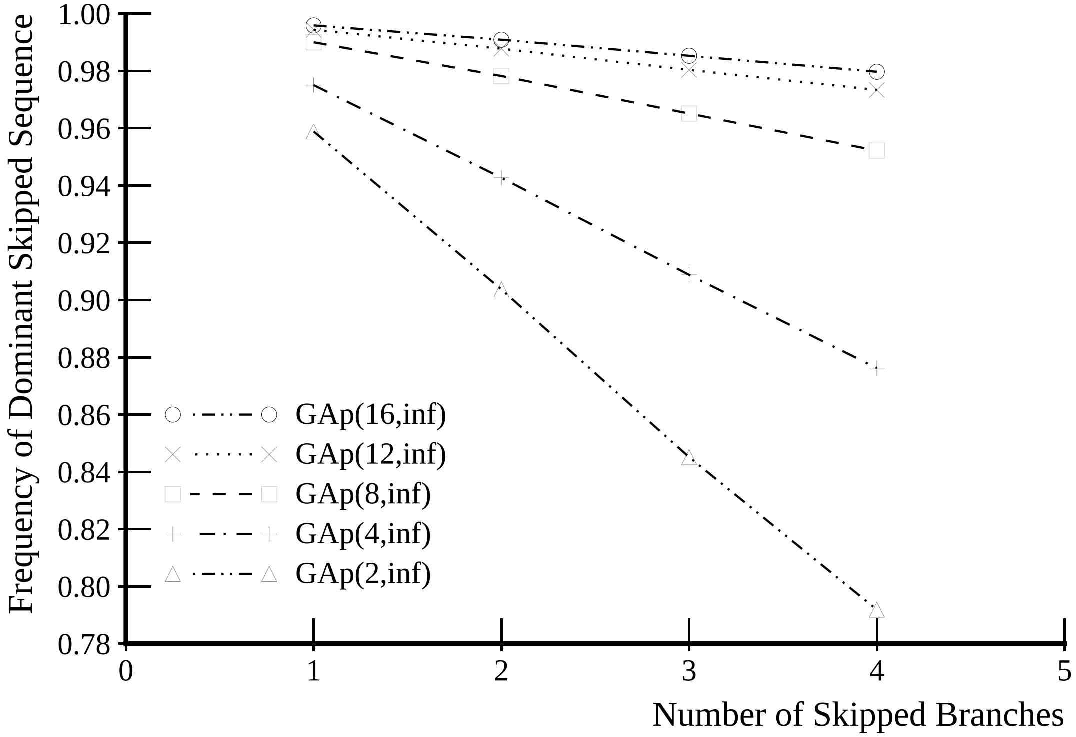
The Skipped Model



Dominant Skipped Sequence



Frequency of Dominant Skipped Sequences (gcc)



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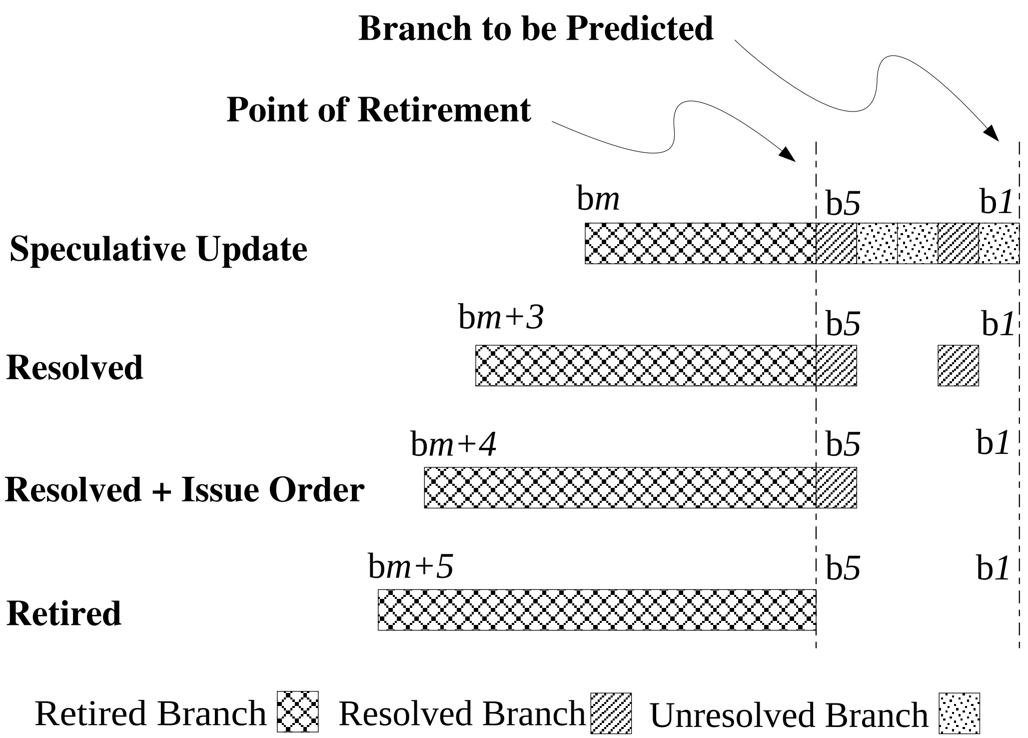
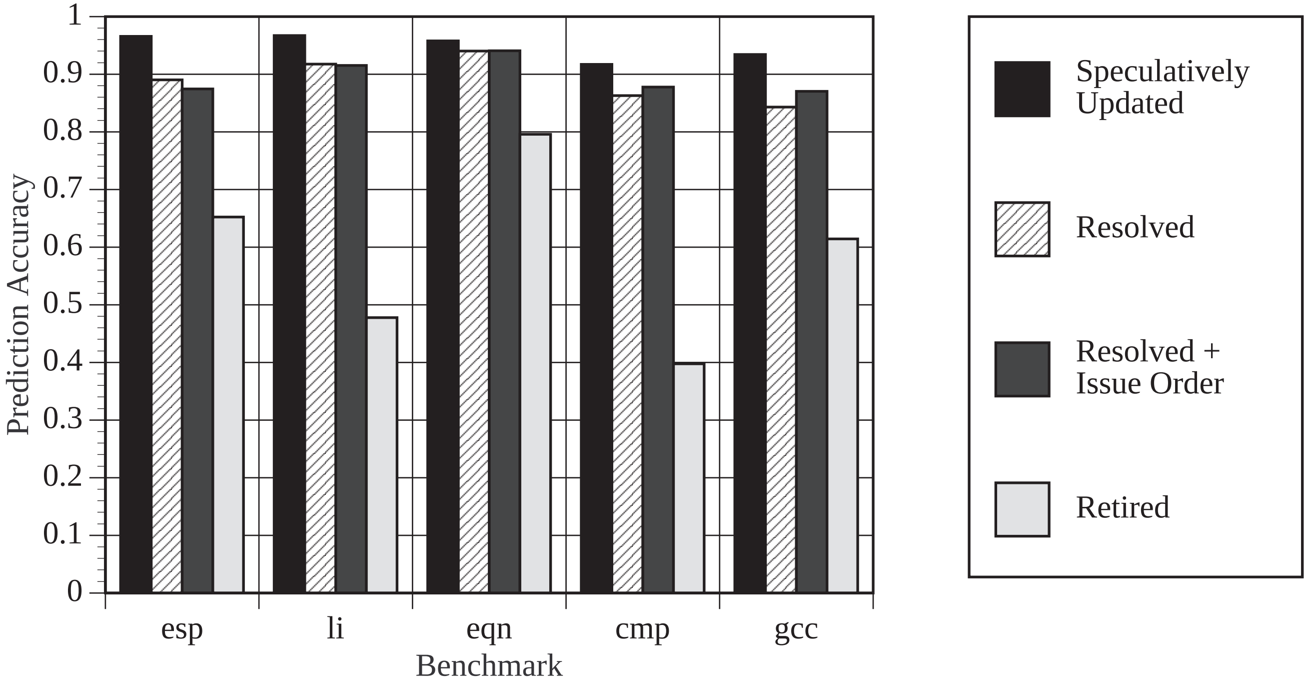
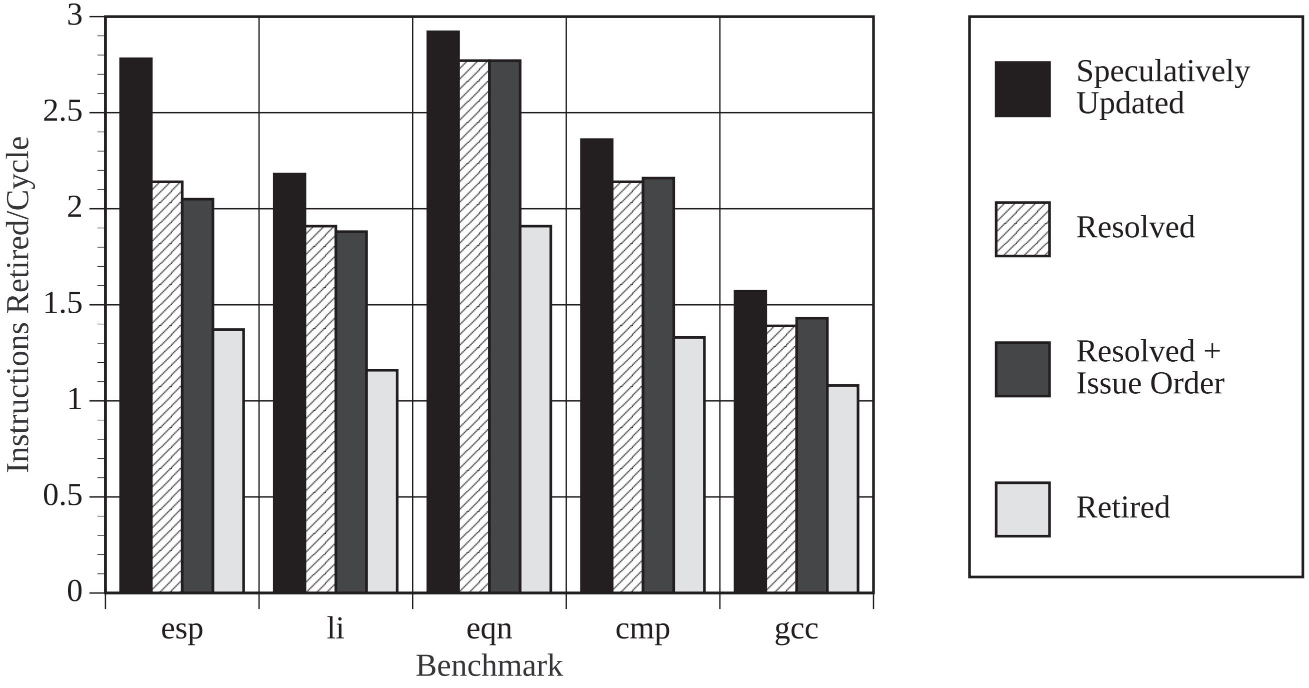
Four Models of Branch History Update



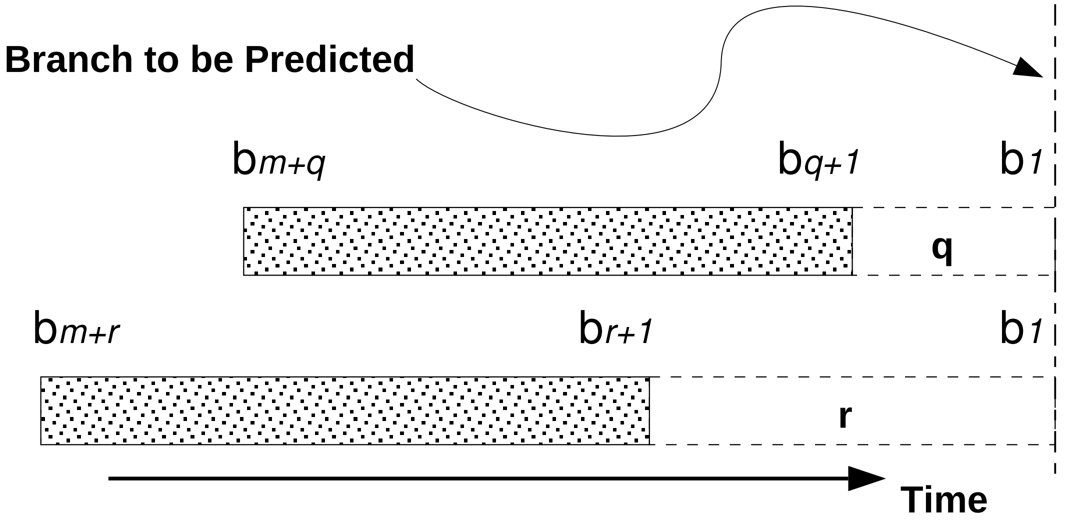
Prediction Accuracy



Instructions Retired Per Cycle



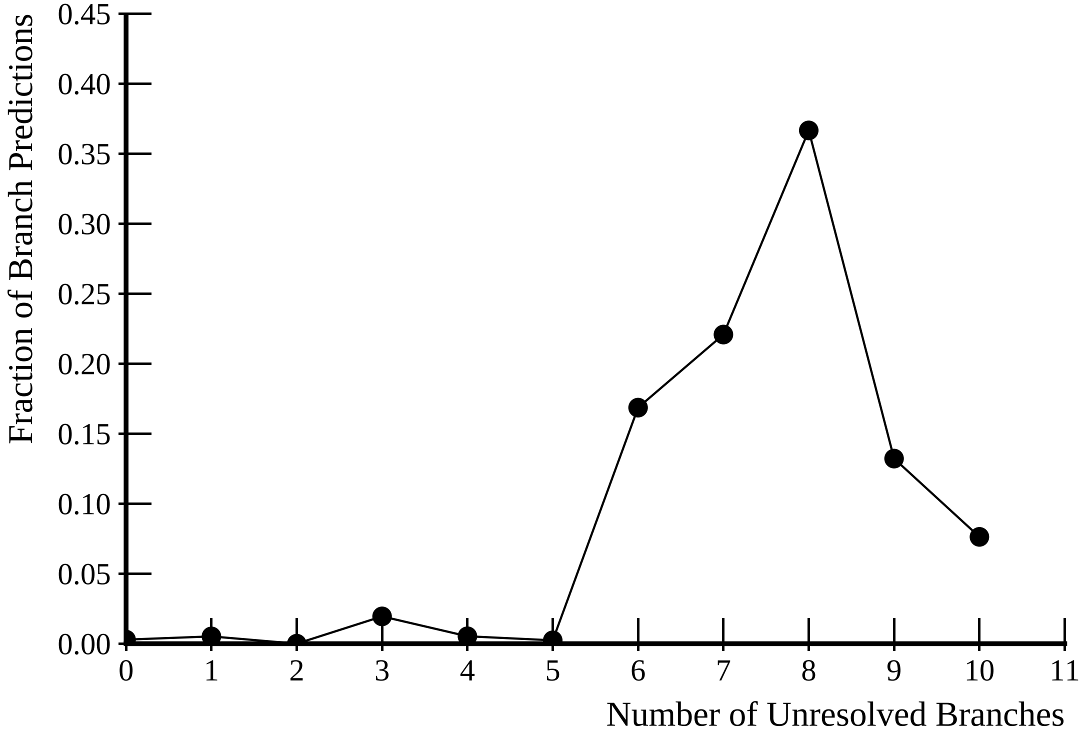
Why the Drop in Prediction Accuracy?



Conclusions

- Can omit recently-issued branch outcomes
- Speculative update is important

Unresolved Branches Per Branch Prediction



Prediction Accuracy (GAp(16,inf))