Title of the Paper

CBP 2025 Submission #**NaN** – Confidential Draft – Do NOT Distribute!!

Double-blind review: Do NOT include author information in your article at this time.

Abstract

The 6th Championship Branch Prediction (CBP2025), held in conjunction with ISCA 2025, provides a platform for evaluating and comparing conditional branch predictors within a common infrastructure and standardized constraints. This document provides a structured template for submissions. Your paper should include: motivation behind your design, design overview, predictor operation, cost analysis, complexity analysis, and experimental results and analysis. Submissions are limited to 4 pages (including all text, tables, figures, graphs, *etc.*), excluding references and the dedicated cost analysis Appendix A (there is no page limit for references and the cost analysis Appendix A). In the abstract, please mention the key evaluation results (the average BrMisPKI and CycWpPKI) obtained by your branch predictor over the 105 training traces.

1 Introduction

Provide the motivation behind your design. Explain whether it's inspired by prior predictors, introduces novel techniques, or adopts a hybrid strategy. Highlight the key innovation or idea.

2 Related Work

You should either include a dedicated related work section or cite and discuss each relevant related work at appropriate points in the paper. Figure 1 shows how you can get the full citation for a paper [1] that is available in IEEE Xplore and/or the ACM Digital Library.

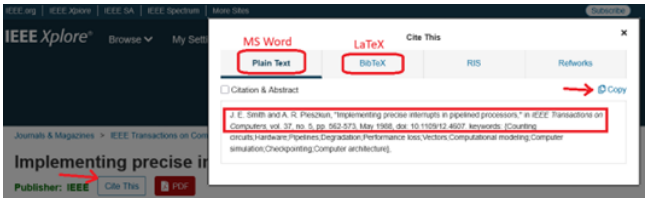

Figure 1: Getting the full citation for a paper in IEEE Xplore.

3 High-Level Design Overview

Provide a conceptual overview of your branch predictor. Indicate whether your design is derived from established predictors (*e.g.*, TAGE-SC-L from CBP-2016) or represents a new approach. Use diagrams or flowcharts where appropriate to aid understanding.

'CBP 2025', June 21, 2025, Tokyo, Japan
2025. ACM ISBN How.to.remove.this?(Not.ACM)
https://doi.org/How.to.remove.this?(Not.ACM)

4 Predictor Operation

Describe how your predictor operates in detail. Include information on prediction logic, update mechanisms, and history tracking.

4.1 Component A

Explain this component's function, logic, and how it interacts with other parts of the predictor.

4.2 Component B

Do the same as above, elaborating on another major component.
(Add more subsections as needed.)

5 Experimental Results and Analysis

Present performance results using the CBP2025 evaluation framework and training traces. Include both CycWpPKI and BrMisPKI metrics. Compare your results against relevant baselines and support your findings with graphs and/or tables to ensure clarity. Analyze the results and provide insights.

6 Discussion

Analyze the strengths and weaknesses of your design. Consider:

- Performance consistency across different traces
- Generalizability across various workloads
- Cold-start behavior and sensitivity to training
- Design complexity and implementation feasibility

7 Conclusion

Summarize the key contributions and insights of your work. Suggest areas for future exploration, such as hybrid models, adaptive strategies, or simplification for hardware integration.

References

[1] J.E. Smith and A.R. Pleszkun. 1988. Implementing precise interrupts in pipelined processors. *IEEE Trans. Comput.* 37, 5 (1988), 562–573. https://doi.org/10.1109/12.4607

A Cost Analysis

Provide a quantitative breakdown of storage to ensure the total does not exceed the 192 KB budget. Clarify which parts of the TAGE-SC-L reference design were retained or modified.
For example:

Component	**Details of each field of each entry, # entries, *etc.***	**Cost**
Main table [variable name in the source code]	field 1: 5 bits, . . . , N entries	X KB
Auxiliary table [variable name in the source code]	field 1: 5 bits, . . . , N entries	Y KB
...	...	...
TOTAL		$\leq$ 192 KB

Note: Exclude *pred_time_histories*, and the like, from this budget but describe them clearly.[1]

[1]From the CBP2025 website, "Competition Rules": In a processor, it is typical to have a structure that records prediction-time information so it can be later used at update-time. An example of such information is the history register(s). For example, in the supplied base predictor (64KB TAGE-SC-L), there is a structure *pred_time_histories* that serves this purpose: it is used to save the histories prior to making a prediction. Later, at update-time, the same histories are retrieved and used to update the branch predictor. This structure does NOT count towards the branch predictor budget. If contestants have any doubts about whether or not certain information is permitted to be stored in this structure, and therefore not counted towards the budget, please email the CBP2025 Organizing Committee directly. Although this structure does not count toward the branch predictor budget, please separately document its cost in the source code comments and paper.