Minsung Cho

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Education

Northeastern University, Ph.D. Computer Science 2022–Present

Advisor: Steven Holtzen

Carnegie Mellon University, B.S. Mathematics and Philosophy (Logic track) 2018–2022

Thesis: *Cops and Robbers in Lean*
Advisor: Jeremy Avigad

Experience

NSF REU Researcher, University of Tennessee at Chattanooga 2021

- Classified the Krein–von Neumann extension on regular even–order quasi–differential operators
- Published in *Opuscula Mathematica*

Researcher in Combinatorics, Carnegie Mellon University 2020

- Generalized the cop-win property to 1-connected infinite graphs
- Research featured on 2021 CMU Mathematics newsletter
- Grant proposal featured by CMU Undergraduate Research for exceptional writing

Publications

The Krein-von Neumann extension of a regular even order quasi-differential operator. M. Cho, S. Hoisington, B. Udall, R. Nichols. Opuscula Mathematica. 41.6 (2021): 805-841.[1]

Invited Talks

Scaling Decision–Theoretic Probabilistic Programming Through Factorization DRAGSTERS @ PLDI 2023

Joint work with Steven Holtzen. Also presented at PLDI SRC 2023.

Projects

Generic Max-Sum Optimization Problem Solving On Semirings Rust

We introduce a class of semirings that admits a tractable branch-and-bound algorithm in the style of Huang and Darwiche to solve max-sum optimization problems frequently seen in probabilistic reasoning.

The Next 700 Probabilistic Programming Languages Beyond Inference

We discuss, on top of a simple monadic discrete probabilistic programming language, how optimization over inference can also take on (co-)monadic shape while still maintaining tractability via Boolean compilation.

The Software Evolution of Theorem Provers Jupyter Notebook, Typescript

We investigate the history of different theorem provers through a software engineering lens to visualize the development of the modern theorem proving community, focusing on Isabelle, Coq, and Lean.

[1] In math, author order is alphabetical. All authors contributed equally.

Cops and Robbers in Lean Lean 3

We formalized the game of Cops and Robbers on a graph and associated theorems such as *a complete graph is always cop-win* and *every cop-win graph has a corner*.

Awards

PLMW@PLDI 2023 scholarship recipient.

University and College honors from Carnegie Mellon.

Skills

Fluent in Korean and English.

Experience in functional programming (Lean, Coq, Haskell, ML dialects), Python, Rust, Dafny, LaTeX.

5 semesters of TA experience in mathematics and logic, including one graduate course, at CMU.