Minguk Choi

Master of Science

Dankook University, Yongin, Korea

 GitHub Profile

 Personal Website

 mgchoi@dankook.ac.kr

RESEARCH INTEREST

- ML for System (Learned Index)
- System for ML (Scheduler for ML Cluster)

ON-GOING PROJECT

- **Semi-ordered Parallel Updatable Learned Index**
  - Enhances performance in multi-threaded environments by reducing the critical section and data sorting overhead while maintaining lookup performance and size.
- **Adaptive Sample Training Algorithm for Learned Index**
  - An algorithm for dynamically training with the optimal sampling interval by considering the data distribution and error-bound.
- **Accelerating Learned Index via SIMD**
  - Accelerating the unique training and operations (e.g., model-biased insert) of learned index through the parallelism of internal ML models, which has not yet been actively studied.

EDUCATION

- **Dankook University**   Yongin, Korea
  MS in AI-based Convergence / Advisor: Jongmoo Choi   Mar 2023 - Present
- **Dankook University**   Yongin, Korea
  BS in Software Science/ **Salutatorian** (GPA:4.1/4.5)   Mar 2017 - Feb 23

PUBLICATIONS

International Conference

- [**SIGMOD 24**] Can Learned Indexes be Built Efficiently? A Deep Dive into Sampling Trade-Offs
  Minguk Choi, Seehwan Yoo, Jongmoo Choi

International Journal

- [**Electronics 23**] An Empirical Study of Segmented Linear Regression Search in LevelDB
  Ramadhan Agung Rahmat, Minguk Choi, Yoojin Chung, Jongmoo Choi.

Domestic Conference

- [**KCC 24**] Breakdown Internal Operations in Updatable Learned Index
  Suhwan Shin, Minguk Choi, Nakyeong Kim, Seehwan Yoo, Jongmoo Choi

- [**KCC 24**] Analysis of Updatable Learned Indexes with Index Size Perspective
  Nakyeong Kim, Minguk Choi, Suhwan Shin, Seehwan Yoo, Jongmoo Choi

- [**KCC 24**] Accelerating RMI Training with SIMD
  Boseung Kim, Minguk Choi, Yeojin Oh, Yongjie Zhu, Seehwan Yoo, Jongmoo Choi

- [**KCC 24**] Analysis of RMI Using CPU-Optimized Search Algorithms
  Yeojin Oh, Minguk Choi, Boseung Kim, Yongjie Zhu, Seehwan Yoo, Jongmoo Choi

- [**KCC 24**] Performance Analysis of Batch Prediction Using SIMD in RMI
  Yongjie Zhu, Minguk Choi, Yeojin Oh, Boseung Kim, Seehwan Yoo, Jongmoo Choi

- [**KSC 22**] Bloom Filter Optimization in LevelDB based on Hit-Ratio
  Hansu Kim, Minguk Choi, Seehwan Yoo, Jongmoo Choi

- [**KSC 22**] Read performance analysis according to Compaction Trigger
  Zhao Guangxun, Sangwoo Kang, Minguk Choi, Seehwan Yoo, Jongmoo Choi

- [**KSC 22**] LevelDB Cache Structure and Performance Analysis
  Subin Hong, Minguk Choi, Seehwan Yoo, Jongmoo Choi

- [**KSC 22**] Per Key-Value Checksum Analysis on RocksDB
  Suhwan Shin, Seyeon Park, Minguk Choi, Seehwan Yoo, Jongmoo Choi

Opensource Contribution

- **BASIL**   Owner
  Benchmark of sampling applied learned indexes (To be released)
- **Leveldb Study/Wiki**   Owner
  Analysis document about leveldb
- **YCSB-CPP**   Contributer
  Yahoo! Cloud Serving Benchmark(YCSB) written in C++
- **Uftrace**   Wiki Contributer
  Function graph tracer for C/C++/Rust/Python
- **PGM-Index**   Bug Report
  State-of-the-art learned data structure

Experience

- **Student Researcher**   Dankook University
  System Software Laboratory   Jul 2021 - Present
- **Teaching Assistant**
  – Operating System, Dankook University   Mar 2024 - Present
  – Index Structure Study, Dankook University   Jan 2024 - Feb 2024
  – System Programming, Dankook University   Sep 2023 - Dec 2023
  – Operating System Practice, Dankook University   Sep 2023
  – LevelDB Study, Dankook University   Jul 2022 - Aug 2022
- **Compulsory Military Service**   Korean Air Force
  Honorable Discharge   Jan 2019 - Oct 2020

Project

- **Key-Value DB for Unstructured Big Data (SW StarLab)** | IITP   Jul 2021 - Present
- **Key-Value Store with Predictable Latency Support** | NRF   Mar 2022 - Present
- **Future Vehicle Security System** | KEA   May 2023 - Present

Language and Technical Skills

- **Languages**: Native korean, Englsih (TOEIC 970/990, OPIc IH)
- **Programming Languages**: c/c++, python
- **Developer Tools**: gcc/g++, gdb, uftrace, git, matplotlib
- **System Knowledge**: Leveldb, Rocksdb

Personal interests

- **Fitness**: Running, Weight lifting
- **Cooking**: Korean Cuisine, Japanese Cuisine, Grilling

References

- Prof. Jongmoo Choi | choijm@dankook.ac.kr   Software Science, Dankook University
- Prof. Seehwan Yoo | seehwan.yoo@dankook.ac.kr   Mobile Systems Engineering, Dankook University