

Kabilan Mahathevan

Computer Science PhD Student

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Profile

I am an alchemist! I believe in the law of equivalent exchange: I sacrifice complex compiler problems to gain ultimate runtime speed. My current mission is transmuting sparse tensor computation into something efficient and usable on heterogeneous hardware, abstracting away the chaos so users don't have to see the Truth behind the gate.

Areas of Interest & Expertise

Sparse Tensor Computation - High Performance Computing - Programming Languages & Compilers - Program Analysis - Machine Learning

Education

PhD Computer Science ([Virginia Tech](#))

Blacksburg VA, USA 2025-present

- Advised by Prof. Kirshanthan Sundararajah.
- Working on sparse tensor compiler construction and validation.

BSc Computer Science and Engineering ([University of Moratuwa](#))

Colombo, Sri Lanka 2019-2024

- CGPA: **3.92/4.2** (First Class)
- Dean's List Semesters: 7/8
- Batch Representative for 5th and 6th Semesters.

G.C.E Advanced Level (V/Vavuniya Tamil Madhya Maha Vidyalayam)

Vavuniya, Sri Lanka 2016-2018

- Merit Pass - Physical Science Stream
- Z-Score: **1.9835**
- National Rank: **557/32,304** (Top 1.7%)
- Received Mahapola scholarship to complete undergraduate studies.

Research Experience

PhD Student ([Virginia Tech](#))

Blacksburg, USA 09/2025 - Present

- Optimizing sparse tensor computation to guarantee correctness and efficiency across heterogeneous hardware systems.

Visiting Research Scholar ([TEST Lab](#), [NUS](#))

Singapore 09/2024 - 05/2025

- Worked with Prof. Manuel Rigger in increasing the performance of the mutation testing for SQL queries and dialect-agnostic AST for SQL queries using LLMs.

Fuzzing Cloud PaaS Systems ([University of Moratuwa](#))

Colombo, Sri Lanka 07/2023 - 06/2024

- Developed a specialized fuzzing technique to systematically uncover reconciliation bugs within Kubernetes, as a vital component of my undergraduate final year project. The empirical data on the reconciliation bug in Kubernetes has been accepted to APSEC 2024.
- Advisors: Dr. Sunimal Rathnayake & Dr. Ridwan Shariffdeen

Publications

Junwen An, **Kabilan Mahathevan**, and Manuel Rigger. Dialect-agnostic sql parsing via llm-based segmentation. In *Proceedings of the 45th ACM SIGMOD Symposium on Principles of Database Systems (PODS 2026)*. Association for Computing Machinery, 2026.

Kabilan Mahathevan, Yining Zhang, Muhammad Ali Gulzar, and Kirshanthan Sundararajah. Tensure: Fuzzing sparse tensor compilers (registered report). 2026.

Kabilan Mahathevan, Sivakajan Sivaparan, Tharsha Sivapalarajah, Sunimal Rathnayake, and Ridwan Shariffdeen. Bugsinkube: A collection of reconciliation bugs. In *2024 31st Asia-Pacific Software Engineering Conference (APSEC)*, pages 447–451, 2024.

Professional Experience

- Teaching Assistant (*Virginia Tech*)

Blacksburg, USA

 - CS1064 - Introduction to Programming in Python, under Prof. John Lewis.
- Software Engineer (*Sysco LABS*)

Colombo, Sri Lanka06/2024 - 09/2024

 - Worked on a competition organizing and judging platform from backend to frontend.
 - Implemented the unit test suite, regression testing, UI functional testing suite, and the relevant CI pipeline.
- Teaching Assistant (*University of Moratuwa*)

Colombo, Sri Lanka07/2023 - 06/2024

 - CS3063 - Theory of Computing, under Prof. Sanath Jayasena.
 - CS2043 - Operating Systems, under Dr. Buddhika Karunarathne and Ms. Vishaka Nanayakkara.
 - Material Created: Docker Container Created for Evaluation Purpose of Pintos Project: kabilanmahathevan/pintos.
 - CS3043 Database System, under Dr. Sapumal Ahangama.
- Software Development Engineer Intern (*The Software Practice*)

Cecil Court, Singapore01/2023 - 06/2023

 - Worked on LEAP project for Building And Construction Authority (BCA), Singapore.
 - Worked with the front-end team to create a better and user-friendly interface.
 - Created the entire Regression Testing Suite for the project under Tony Tieu Ha Phong.

Services

- Artifact Reviewer
 - 23rd USENIX Conference on File and Storage Technologies [FAST'25]
- Google Summer of Code
 - Mentored SQLancer Project in GSoC 2025

Skills

- Python
 - C++
- LLVM/MLIR
 - Java
- Haskell
 - Rust
- Git & GitHub
 - LaTeX

Languages

- English [Fluent]
- Tamil [Native]