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 verification.

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.
- Publications and Presentations:
  - **Kabilan Mahathevan**, Yining Zhang, Muhammad Ali Gulzar, Kirshanthan Sundararajah, "TenSure: Fuzzing Sparse Tensor Compilers", accepted for presentation at the 5th International Fuzzing Workshop (FUZZING) co-located with NDSS, Feb 2026 (To Appear).

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.
- Work submitted to SIGMOD and currently under review.

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

Professional Experience

Teaching Assistant *(Virginia Tech)* **Blacksburg, USA**

- **CS1064** - **Introduction to Programming in Python**, under Prof. John Lewis.

Software Engineer *(Sysco LABS)* **Colombo, Sri Lanka** *06/2024 - 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 Lanka** *07/2023 - 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, Singapore** *01/2023 - 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

- C++
- Java
- Rust
- LaTeX
- Python
- Haskell
- Git & GitHub

Languages

- **English** [Fluent]
- **Tamil** [Native]