SUPUN ABEYSINGHE

🏠 supun.online ✉ supunabeysinghe@gmail.com ⬡ github.com/supunab in /supunabeysinghe

📍 West Lafayette, IN, USA 📞 +1 (765)-775-8679

EDUCATION

Purdue University   West Lafayette, IN
Ph.D. in Computer Science - **GPA 4.0/4.0**   *Expected Dec' 23*
Advisor: Prof. Tiark Rompf
Relevant Courses: Operating Systems, Algorithms, Compilers, Database Systems, Distributed Systems

University of Moratuwa   Sri Lanka
B.Sc Engineering (Hons) (Computer Science & Engineering)   *Dec' 18*
First Class Honours - **GPA 4.06/4.20**

EXPERIENCE

Graduate Research Assistant, Purdue University   *May 2020 - Present*
- Research on using runtime code generation techniques to build efficient data analytics and ML systems. Lead two research projects resulting in two paper submissions so far (one accepted at SIGMOD '22, other in submission)

Research Engineer, WSO2 Inc. Sri Lanka   *Jan 2019 - July 2019*
- Was part of the research team, working on utilizing ML techniques to auto-tune server configurations dynamically. Co-authored one publication that was published in ISCC '19

Research Intern, StatNLP Lab, SUTD Singapore   *Jun 2017 - Dec 2017*
- Was responsible for testing and fixing bugs of the StatNLP framework by implementing several traditional ML models

SELECTED PROJECTS

1. **Optimizing End-to-end Data Science Pipelines:** Leveraging generative programming techniques to accelerate combined data processing and ML workloads. Observed **speedups up to 20x** in end-to-end performance (**Scala, C++, CUDA**)

2. **Efficient Incrementalization of SQL Queries with Nested Aggregates:** Building novel tree-based index structures to improve the incrementalization efficiency of nested-aggregate queries by **up to 1000x** over the state-of-the-art

3. **Server Parameter Auto-tuning using Machine Learning (2019):** Leveraging ML based optimization techniques to dynamically auto-tune server parameters to enhance runtime performance (**Java, Python, PyTorch**)

4. **Social Media Analytics Platform (2018):** A platform for automatically extracting information related to a particular entity (e.g., restaurant reviews from multiple sources) and performing various types of analysis (emotion detection, aspect-based sentiment analysis, trending topics and evolution of them, etc.) (**Python, PyTorch**)

SELECTED COURSE PROJECTS

1. **Graph Query Compilation:** Extending relational query compilation techniques based on generative programming to support compilation of graph queries, achieving **an order of magnitude speedup** compared to interpreted engines (**Scala, C++**)

2. **Sharded, Distributed Key-Value Store:** Implemented a sharded, distributed KV store using Paxos algorithm for replication and support for transactions using Two-phase Commit (**Java, Distributed Systems**)

3. **University C Compiler:** A compiler for a C-like programming language that uses LLVM as an IR. Written multiple LLVM passes for compiler optimizations (**C++, LLVM**)

TECHNICAL SKILLS

- **Programming Languages:** Scala, Java, Python, C, C++

- **Systems and Libraries:** Spark, Flink, PyTorch, Tensorflow, CUDA, LLVM;
  Prior Experience - Spring Boot, Angular, Node.js

SELECTED OPEN SOURCE CONTRIBUTIONS

Lantern - Deep Learning Framework
- Implemented custom CUDA kernels for several Deep Learning operators (Softmax, Embedding layer, etc.), added support for modern deep learning models like Transformers, etc.

Lightweight Modular Staging (LMS) - A Compiler Framework
- Several key feature additions (e.g., lambda lifting support for top level functions for the C codegen backend) and general maintenance

SELECTED PUBLICATIONS

1. **Efficient Incrementialization of Correlated Nested Aggregate Queries using Relative Partial Aggregate Indexes (RPAI)**
   Supun Abeysinghe, Qiyang He, Tiark Rompf
   (To appear at SIGMOD '22)

2. **Architecting Intermediate Layers for Efficient Composition in End-to-End Data Science Pipelines**
   Supun Abeysinghe, Fei Wang, Gregory Essertel, Tiark Rompf
   (in submission)

3. **ADAPT-T: An Adaptive Algorithm for Auto-Tuning Worker Thread Pool Size in Application Servers**
   *Nilushan Costa, Malith Jayasinghe, Ajantha Atukorale, **Supun Abeysinghe**, Srinath Perera, Isuru Perera*
   At International Symposium on Computers and Communications (ISCC), Barcelona, Spain (2019)

4. **Sentylic at IEST 2018: Gated Recurrent Neural Network and Capsule Network Based Approach for Implicit Emotion Detection**
   *Prabod Rathnayaka, **Supun Abeysinghe**, Chamod Samarajeewa, Isura Manchanayake, Malaka Walpola*
   At Workshop on Computational Approaches to Subjectivity and Sentiment Analysis (held with EMNLP) (2018)

5. **Enhancing Decision Making Capacity in Tourism Domain Using Social Media Analytics**
   Supun Abeysinghe, Isura Manchanayake, Chamod Samarajeewa, Prabod Rathnayaka, Malaka J. Walpola, Rashmika Nawaratne, Tharindu Bandaragoda, Damminda Alahakoon
   International Conference in ICT for Emerging Regions (ICTer) (2018)

SELECTED AWARDS

- **Competitive Programming:** IEEEXtreme v12.0 (2018) - Country Rank 1st Global Rank 60th (top 2%), IEEEXtreme v10.0 (2016) - Country Rank 3rd Global Rank 106th (top 5%)

- 5th place - Implicit Emotion Detection Shared Task, Organized as part of WASSA 2018 at EMNLP 2018

- **Dean's List Award**: Dean's list award for all semesters (should achieve a semester GPA of 3.8 or above to be included in the Dean's List) (in undergraduate)