Shashika Ranga Muramudalige

Senior Software Engineer

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🌐 https://shashika.github.io   in https://linkedin.com/in/shashika   ○ github.com/shashika

Selected Technical Experience

Senior Software Engineer
BillGO Inc

Realtime platform for managing and paying bills while connecting bankers, billers, and consumers together

📅 May 2021 – Ongoing   📍 CO, USA

- Developing ETL pipelines with robust monitoring and alarming
- Implementing and maintaining AWS cloud infrastructure of data pipelines, data lake, and data warehouse using Terraform
- Implementing and maintaining serverless cloud architecture for data tokenization with high scalability and availability
- Applying machine learning models for data extraction and classification

Graduate Research Assistant
Electrical & Computer Engineering, Colorado State University

An award-winning academic research institute in the USA

📅 July 2018 – May 2021   📍 CO, USA

- Developed a pattern detection framework to discover specific latent and emergent behaviors of individuals/groups in social and knowledge networks
- Extracted context-related information in text sources using convolutional neural networks (CNNs) and transfer learning based NLP techniques
- Developed novel investigative graph search techniques using graph databases
- Developed a feature mapping technique for small, discrete, and incomplete datasets using generative adversarial networks (GANs)

Application Consultant
United Overseas Bank

A leading bank in Asia that provides corporate & personal banking/financial services

📅 Jan 2018 – July 2018   📍 Singapore

- Implemented scalable APIs to communicate among disparate banking databases
- Enabled mobile solutions to interactively communicate with different functionalities like banking campaigns/loans

Co-founder, Research Engineer
VaticHub Pvt Ltd

Driver behavior analysis, driver profiling, and vehicle health monitoring using complex event processing and machine learning

📅 July 2016 – Dec 2017   📍 Sri Lanka

- Developed vehicular data analytic products using stream processing and machine learning for driver profiling, vehicular diagnostics, and maintenance
- Managed company operations while communicating with customers

Software Engineer
ShipXpress Inc

Supply chain management solutions for transportation and commodities businesses

📅 Nov 2015 – July 2016   📍 Sri Lanka

- Developed novel features for a cloud-based supply chain management system in the U.S. railways
- Conducted specific industry research on ESB (Enterprise Service Bus) integration among multiple web applications for real-time message passing

Education

Ph.D. in Computer Engineering
Colorado State University, USA

📅 July 2018 – May 2022

GPA - **4.0/4.0**
Dissertation title: Automating Investigative Pattern Detection using Machine Learning and Graph Pattern Matching Techniques

M.Sc. in Computer Science
University of Moratuwa, Sri Lanka

📅 Oct 2015 – May 2018

GPA - 3.7/4.2
Thesis title: Simulated Annealing-based Optimized Driver Scheduling for Vehicle Delivery
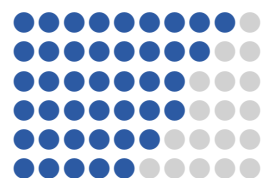
B.Sc. in Computer Science & Eng.
University of Moratuwa, Sri Lanka

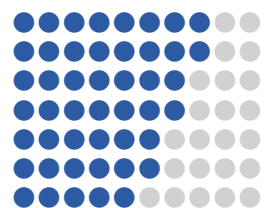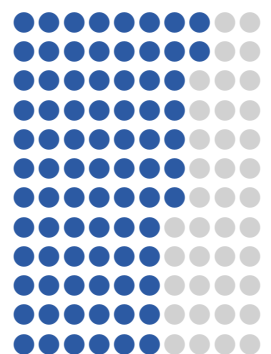📅 June 2010 – Apr 2015

Technical Strengths

Languages

Skill	Level
Python	●●●●●●●●●○
Java	●●●●●●●●○○
C	●●●●●●●○○○
NodeJS	●●●●●●●○○○
C++	●●●●●●○○○○
Scala	●●●●●○○○○○

ML/data frameworks & libraries

Skill	Level
Scikit-learn	●●●●●●●●○○
Tensorflow	●●●●●●○○○○
SpaCy	●●●●●●○○○○
PySpark	●●●●●●○○○○
Spark	●●●●●●○○○○
BERT	●●●●●○○○○○
Hadoop	●●●●○○○○○○

AWS services

Skill	Level
Lambda	●●●●●●●●○○
S3	●●●●●●●●○○
API Gateway	●●●●●●●●○○
Glue	●●●●●●●●○○
DynamoDB	●●●●●●●○○○
Cloudwatch	●●●●●●●○○○
IAM	●●●●●●●○○○
Redis	●●●●●●○○○○
Route53	●●●●●●○○○○
KMS	●●●●●●○○○○
EC2	●●●●●●○○○○
ASG	●●●●●○○○○○

Databases

Skill	Level
MySQL	●●●●●●●○○○
Neo4j	●●●●●●○○○○
MongoDB	●●●●●●○○○○

Selected Projects

Serverless & highly available data tokenization service
BillGO Inc, USA

- Implemented serverless, single-tenant tokenization service using AWS services to securely store personally identifiable information (PII)
- Security is enforced through single-tenancy that deploys the infrastructure for each client with different encryption keys and mutual TLS is used in API gateway for connectivity
- Application is multi-regional with realtime health checks to failover and failback to maintain the high availability
- Cloud infrastructure is deployed and maintained using code via Terraform

Tech | AWS (API gateway, Lambda, DynamoDB, Route53, S3, WAF, Cloudwatch, IAM, KMS, SSM), Python, Java

Automating investigative pattern detection using machine learning & graph pattern matching techniques
Electrical & Computer Engineering, Colorado State University, USA

- Developed an investigative pattern detection framework for counterterrorism
- Implemented data extraction techniques in disparate text databases using NLP techniques; named entity recognition (NER), coreference resolution, multi-label text classification (convolutional neural network (CNN) and transfer-learning approach using BERT)
- Developed novel investigative graph search algorithms on graph databases and obtained over 50% of query performance over conventional techniques
- Developed a feature mapping technique for small and incomplete datasets to synthesize data using generative adversarial networks (GANs)

Tech | Neo4j, Python, Java, Scikit-learn, SpaCy, BERT, Tensorflow, Keras, Pytorch

Scalable mobile banking application development/integration
United Overseas Bank Limited, Singapore

- Designed and implemented APIs to communicate among disparate banking databases. The common API layer is made available for the latest mobile banking applications via a user-friendly environment
- Actively involved with mobile development teams to implement the required APIs in the best possible ways

Tech | Java, Spring, Oracle, MongoDB, Python, NodeJS, Twitter API

Vehicular data analytics platform
VaticHub Pvt Ltd, Sri Lanka

- Designed and developed a vehicular data analytics platform. Implemented driver profiling, vehicular diagnostics, and maintenance applications using complex event processing and machine learning models
- Implemented web and mobile realtime dashboards for supply-chain management customers Mobile app - Kampana

Tech | Nodejs, AngularJS, Java, Android SDK, Nginx, Spark, Complex Event Processor (CEP), AWS (EC2, S3, API Gateway)

Cloud-based driver monitoring & vehicle diagnostic with OBD2 telematics
Computer Science & Eng., University of Moratuwa, Sri Lanka

- Designed and developed a cloud based IoT architecture to stream vehicular data via On-board Diagnostics (OBD2)
- Real-time data is processed on both a mobile app and a cloud server for driver behavior monitoring, driver profiling, and vehicle diagnostics

Tech | Complex Event Processor (CEP), Android, Java, Python, AWS (EC2)

Selected Publications

🗎 Journal Articles

- **S. R. Muramudalige**, et al., "A feature mapping technique for complex data object generation with likelihood and deep generative approaches," *IEEE Access, Submitted* .
- **S. R. Muramudalige**, et al. (2022), "Enhancing investigative pattern detection via inexact matching and graph databases," *IEEE Transactions on Services Computing,* 2022. doi : 10.1109/10.1109/TSC.2021.3073145
- C. M. Kattadige, **S. R. Muramudalige**, et al. (2022), "VideoTrain++: GAN-based adaptive framework for synthetic video traffic generation," *Computer Networks,* 2022. doi : 10.1016/j.comnet.2022.108785

👥 Conference Proceedings

- C. M. Kattadige, **S. R. Muramudalige**, et al. (2021) "VideoTrain: A Generative Adversarial Framework for Synthetic Video Traffic Generation," *in Proc. WoWMoM 2021,* pp. 209-218, Pisa, Italy, Jun. 2021. doi : 10.1109/WoWMoM51794.2021.00034
- H. Shirazi, **S. R. Muramudalige**, et al. (2020), "Improved Phishing Detection Algorithms using Adversarial Autoencoder Synthesized Data," *in Proc. IEEE 45th Conference on Local Computer Networks (LCN2020)* **[Best paper finalist]**. doi : 10.1109/LCN48667.2020.9314775
- B. W. K. Hung, **S. R. Muramudalige**, et al (2019), "Recognizing Radicalization Indicators in Text Documents Using Human-in-the-Loop Information Extraction and NLP Techniques," *in Proc. 2019 IEEE International Symposium on Technologies for Homeland Security (HST)*. doi : 10.1109/HST47167.2019.9032956
- **S. R. Muramudalige**, et al. (2019), "Investigative Graph Search using Graph Databases," *in Proc. 2019 First International Conference on Graph Computing (GC 2019),* pp. 60-67. doi : 10.1109/GC46384.2019.00017
- **S. R. Muramudalige** and H.M.N.D. Bandara, "Demo: Cloud-Based Vehicular Data Analytics Platform", *in Proc. 14th MobiSys Conference,* Singapore, 2016. doi : 10.1145/2938559.2948849

Awards

- Thampachen Kunjunny Memorial Scholarships, 2020-21 and 2019-20, Colorado State University, USA
- Walter Scott, Jr. Graduate Fellowship, 2018-19, Colorado State University, USA
- Web application designer and developer, *SLbutterflies.lk* (Best Non-profit Website, 2018), *bookbinders.lk*, *cnrl.colostate.edu*
- MobiSys Student Scholarship, 2016, ACM MobiSys 2016, Singapore.
- Robotics Competitions - XbotiX 2014 (video, code), IESL RoboGames 2013 (video), Runners-up, Sri Lanka