Mayank Tiwary

Contact Information	E-Mail - *mayanktiwari09@gmail.com* Tel - +91 − 9778250581 Address - *B/23, Sector − 05, Rourkela − 02, Odisha*

Personal Information	Date of Birth: 10-12-1993 Nationality: Indian Language Known: English, Hindi, Oriya

Education

Degree	University/Board	Year of completion	% of Marks
Matriculation (10)	CBSE	2010	9 (CGPA)
SSE (12)	CBSE	2012	73.5%
B.Tech in IT	BPUT	2016	8.27 (CGPA)

Technical Skills

- Programming: C, C++, Java, Go, and Python.
- Certifications:
  - Cisco Certified Network Associate (CCNA).
  - Cisco Certified Network Professional (CCNP).
  - IBM Certified AIX 7.1 Administrator
  - Certified Linux Administrator - (Spoken Tutorials IIT Bombay)
  - Certified PHP-MYSQL Administrator-(Spoken Tutorials IIT Bombay)

Work Experiences

- Currently working as a Developer in SAP Labs Cloud Platform core (1 year and 4 months).
  - Working on SAP Cloud Platform - PaaS offerings from SAP, which uses Cloud-Foundry, Kubernetes and Bosh
  - Developing CF-CLI-Plugin for Service Fabrik and K8s (Go)
  - Developing Monitoring Agent for Service-Fabrik, ETCD and Dockers (Go)
  - Worked on Credentials Management of backing service: Credhub (Shell, Nodejs and Python)
  - Developing Turbulence Framework for Service-Fabrik and ETCD. (Shell and Bosh)
  - Effective Storage management for Service-Fabrik (NodeJs and Shell)
  - Maintaining data conisistency between Bosh and API Server and writing jobs to correct data in-consistency for Service-Fabrik state data. (Go and Shell)
  - Evaluating and enhancing Autonomous DB-Tuning as a Service: Ottertune - Large Scale Machine Learning (Carnegie Mellon Databaselogy Group)
  - Production System Outage Prediction - Large Scale Machine Learning : Macrobase (Dawn - Stanford)
  - Intelligent ERP Integration Recommendation System - Large Scale Machine Learning : Macrobase (Dawn - Stanford)
  - Developing Business Services on SAP CP - Intelligent Asset Management - Scala, Java, ElastiSearch, MongoDB and SAP HANA
- Support Associate in SAP Labs (1 year - 6 months)
  - SAP Business ByDesign - Supplier Relationship Management and Projects
  - Worked on ABAP Debugging and custom UI Designing

– Worked on developing Fiori based Applications using OData and REST

Publications and Patents

- Filed 17 US Patents with SAP Labs and 4 in review.
  - Serverless Function Execution based on Data Gravity (2019)
  - Connectivity Interfaces Optimization Recommendation Engine for Enterprise IT Systems (2019)
  - Performance Throttling Identification for Data Management Systems (2019)
  - JIT as a Serverless Service: A web-assembly based framework (2019)
  - Workload Mapping for tuning Backing Service (2019)
  - Automated database plan upgrade Recommendation system using Information Divergence Metrics (2019)
  - Executing Serverless Functions as per data locality (2019)
  - Connectivity Interfaces Optimization Recommendation Engine (2019)
  - Provisioner Data Recovery Framework for PaaS offerings (2018)
  - Generic DB Tuner as a Service provisioned through PaaS (2018)
  - Pricing Model for Multi-tenant Networks (2018)
  - Network Multi-Tenancy for ERP to DB traffic Flows (2018)
  - Introducing Network based Multitenancy for cloud based ERP solutions (2018)
  - Object locking for cloud based ERP using network monitoring (2017)
  - Cloud VM Scaling based on ERP Analytics and Software Defined Networks (2017)
  - Network Virtualization for ERP Queries (2017)
  - Maintaining Data Consistency in Federated Cloud Environment using Software Defined Networks for ERP Solutions (2018)

- More than 17 technical publications in reputed Conferences and Journals.

  Sahoo K.S, **Tiwary. M**, Mishra P., Reddy S.R.U, Balusamy B., Gandomi A.H. (2019) "Improving End-Users Utility in Software-Defined Wide Area Network Systems" In the Proc. of IEEE Transactions of Network and Service Management.

  Sahoo K.S., Puthal. D, **Tiwary. M**, Muhammad U., Sahoo B., Wen Z., Sahoo B.P.S, Ranjan. R (2019) "ESMLB: Efficient Switch Migration-based Load Balancing for Multi-Controller SDN in IoT" In the Proc. of IEEE Internet of Things Journal.

  Mishra P., Puthal. D, **Tiwary. M**, Mohanty S. (2019)"Software Defined IoT Systems: Properties, State-of-the-art and Future Research" In Proc of IEEE Wireless Communications (Accepted)

  Tiwary. M, Puthal. D, Sahoo. K.S, Sahoo. B, Yang. L.T. (2019) "Response Time Optimization for Cloudlet in Mobile Edge Computing" In International Journal of Parallel and Distributed Computing (Elsevier).

Panigrahi C.R., Sarkar J.L., **Tiwary. M**, PATI B., MOHAPATRA P. (2019) "DATALET: An approach to manage big volume of data in cyber foraged environment" In International Journal of Parallel and Distributed Computing (Elsevier).

Tiwary. M, SHARMA. S, MISHRA. P, EL-SAYED. H, PRASAD. M, PUTHAL. D (2018). "Building Scalable Mobile Edge Computing by Enhancing Quality of Services" In IEEE 13th International Conference on Innovations in Information Technology (IIT'18) (Accepted).

Mishra. P, **Tiwary. M**, YANG. L.T, PUTHAL. D. (2018). "S2R: Service trading based response time optimization in mobile edge computing " In 16th IEEE International Symposium on Parallel and Distributed Processing with Applications (ISPA 2018) (Accepted).

Tiwary. M, KUMAR. S, AGRAWAL P.K., PUTHAL. D, SAHOO K.S., SAHOO. B. (2018). "Introducing Network Multi-Tenancy for Cloud-Based Enterprise Resource Planning: An IoT Application" In the Proc. of 27th International Symposium on Industrial Electronics (IEEE).

Sahoo. K.S, **Tiwary. M**, SAHOO. S, NAMBIAR. R, SAHOO. B, DASH. R (2018). "A Learning Automata-based DDoS Attack Defense Mechanism in Software Defined Networks" In the Proceedings of the 24th Annual International Conference on Mobile Computing and Networking (Mobicom).

Sahoo. K.S, Puthal. D, **Tiwary. M**, RODRIGUES. J.P.C, SAHOO. B, DASH. R (2018). "An early detection of low rate DDoS attack to SDN based data center networks using information distance metrics" In the Proceedings of Future Generation Computer Systems (Elsevier).

SAHOO. K.S **Tiwary. M**, SAHOO. B, DASH. R, NAIK. K (2018). "DSSDN: Demand-Supply based Load Balancing in Software Defined Wide Area Networks" In International Journal of Network Management (ACM/Willey).

SAHOO. K.S **Tiwary. M**, SAHOO. B, DASH. R, NAIK. K (2018). "A load prediction model for SDN controllers" In International Journal of Autonomic Computing (ACM/Inderscience).

Tiwary. M, SAHOO. K.S, SAHOO. B, MISRA. R (2017). "CPS: a dynamic and distributed pricing policy in cyber foraging systems for fixed state cloudlets" In Springer Computing Journal, Volume - 99 Issue - 5, Pages - 447-463.

SAHOO. K. S, **Tiwary. M**, SAHOO. B (2018). "Detection of High Rate DDoS Attack From Flash Events Using Information Metrics in Software Defined Networks" In Comsnets IEEE.

PANIGRAHI. C, **Tiwary. M**, PATI . B, SARKAR J.L. (2015). "EEOA: Improving Energy Efficiency of Mobile Cloudlets Using Efficient Offloading Approach" In the Proc. of International Conference on Advanced Networks and Telecommuncations Systems (ANTS), IEEE.

PANIGRAHI C., **Tiwary M.**, PATI B., PRASATH R. (2014). "Malware Detection in Big Data Using Fast Pattern Matching: A Hadoop based Comparison on GPU". In Proceeding of 2nd International Conference on Mining Intelligence and Knowledge Exploration (MIKE 14) Springer, LNAI 8891, Ireland, pp. 407-416.

Tiwary, M., PRIYADARSHINI, R., MISRA, R. (2014). "A faster and intelligent steganography detection using Graphics Processing Unit in cloud," High

Performance Computing and Applications (ICHPCA), 2014 International Conference on (IEEE Xplore), pp.1-6 Dec 2014.

Research Projects	• Database Tuning Services on SAP Cloud Platform: Worked on Evaluating Open Source projects (Ottertune) which automates logical tuning of databases using large scale Machine Learning:

- Database Tuning Services on SAP Cloud Platform: Worked on Evaluating Open Source projects (Ottertune) which automates logical tuning of databases using large scale Machine Learning:
  - Identifying performance throttling in database ("When does a database needs a knob tuning"), which helps increasing the scalability of Tuning Service on SAP Cloud Platform. (Part of the work communicated to VLDB)
  - Workload Characterisation using deep neural networks, which helps in characterising the production database workloads.
  - Scaling database containers (Kubernetes) based on the obtained recommendations from Tuning Services.
  - Database Instance Plan advisor - Using recommendations from Ottertune to generate instance plan recommendations.
  - Generating Synthetic workloads for Ottertune training using Generative Adversarial Networks (GANs).
- Data Management with Serverless Computing: Web-Assembly Sandbox
  - Web-Assembly Execution Platform - A Web-Assembly runtime which executes web-assembly in a multi-tennented mode (CPU, Memory and File-System Isolation), secures the code execution using Intel's SGX instruction set and provisions systems call via WASI (from Mozilla).
  - Converting PostgreSQL to stateless - serverless web-assembly functions. - Inspired by https://narma.github.io/2015/redis-in-browser/ for redis, we started the same for PostgreSQL as stateless functions
  - Data Aware function placement - Placing serverless functions as per data gravity and executing them in multi-tennented sandboxes secured by Intel's SGX instruction set. (Started writing manuscript for the same)
- Data Management on FPGAs
  - Fast Query Planners on FPGA for PostgreSQL - Implementation using OpenCL
  - High Speed Key-Value store on FPGA for ERP systems/applications - Implementation using OpenCL
- Intelligent ERP Integration Recommendation System: Large Scale Machine Learning using Macrobase (Dawn - Stanford)
  - Designing scalable solutions for ERP integration interface scanner.
  - Designing automated recommendation system for Integration interface optimisation using large scale machine learning: MacroBase.
- Resilient and Robust Control Plane in Software Defined Networks:
  - Demand-Supply/Game Theoretic based load-balancing in Large Scale distributed control plane managing Wide Area Networks (Using Floodlight open source project and Extreme X440 Switches)
  - Detection and Prevention of DDoS Attacks on Control Plane using Reinforcement Learnings/Information Metrics. (POX Controllers and Mininet)
- Energy Efficiency and Robust Computational Layer in Cyber Foraging
  - Improving Energy Efficiency of Mobile Cloudlets by introducing optimised data offloading approach (C++ based NS3 simulations)
  - Introducing Dynamic and Distributed Game Theoretic Load Balancing Techniques/Pricing Models for task distributions in mobile cloudlets (C++ based NS3 simulations)
  - Enhancing task distributions by mobility predictions in mobile cloudlets (C++ based NS3 simulations and Keras)

- Executing Map-Reduce with GPUs
  - Malware Detection: Pattern Matching (Hadoop and jcuda)
  - Steganography Detection: Large Scale Machine Learning (Hadoop, jcuda and LibSVM)

Achievements
- Winner of Thought Leadership Award 2018 under Star Innovator: SAP Annual Awards
- Winner of 5 Quarterly Innovation Awards SAP Labs India.
- Runner-up under SAP Labs Annual Awards 2017 under Star Innovator - Thought Leadership category.

Internships
- Summer Intern at C.V Raman College of Engineering Bhubaneswar, Topic - "High Performance Computing" in the Nvidia CTC labs under Prof. Rachita Misra 2014.
- Summer Intern at National Institute of Technology Rourkela, Topic - "Software Defined Networks" in Cloud Research Labs Computer Science Department Under Prof. Bibhudatta Sahoo 2015.

Extra Curricular Activities
- Speaker in Open Source Summit and Cloud Foundry Summit on Serverless with web-assembly.
- Jmeter Documentation - a project from MHRDA through IIT Kharagpur.
- Second Prize in National Level Free Open Source Tools for Software Engineering (FOSSTSE).
- Travel Grants from Computer Society of India (CSI) to attend MIKE conference 2014 at Cork, Ireland.
- Two weeks short term course on "Internet Of Things" in IIT Khragpur.
- Participation in variety of National Level Workshops.
- Student Coordinator of Computer Student of India Information Technology, C.V. Raman College of Engineering.
- Student Coordinator for National Level Workshops in Information Technology, C.V. Raman College of Engineering.

Declaration   I solemnly declare that all the all the above information is correct to the best of my knowledge and belief.

Mayank Tiwary

Dated   December 12, 2019