Akhil Sai Bandarupalli

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EDUCATION

Purdue University, West Lafayette, IN, USA Jun'19 – Dec'20
Master of Computer Science – GPA: 3.88/4
Coursework: Randomized Algorithms, Distributed Systems Security, Blockchain and Cryptocurrencies, Security Analytics, Information Security, Network Security, Cryptography, Introduction to Systems

Indian Institute of Technology Madras, **Chennai, India** Jul'13 – May'17
B. Tech, Electrical Engineering – GPA: 8.37/10
Coursework: Data structures and Algorithms, Computer Architecture, Networks and systems, Introduction to C Programming, C and Python Lab, Topics in Cryptography, Foundations of Cryptography, Cryptography and network security, Communication networks

SKILLS AND EXPERTISE

Languages: Java (Proficient), C, GoLang, Python, JavaScript, PHP, MATLAB
Tools: Hyperledger Fabric, Ethereum, Mbed-OS, GCrypt, OpenSSL, Git, Docker, Linux

PUBLICATIONS

[1] Adithya Bhat, Manish Nagaraj, Akhil Sai Bandarupalli, Michael K. Reiter, Saurabh Bagchi, and Aniket Kate, "E2C: Energy Efficient Byzantine Fault Tolerance for Cyber-Physical Systems," To be submitted to DSN, 2021

RESEARCH EXPERIENCE

Approximate Consensus in Mobile Cyber-Physical Settings Jul'20 – Present
Dr. Saurabh Bagchi, Dr. Aniket Kate and Dr. Michael Reiter, Purdue University

- Researching Byzantine Approximate Consensus protocols in Dynamic Networks like drones
- Pushing the boundaries of Byzantine Consensus in terms of safety, consistency, and network communication to achieve ultra-low latency, critical for latency-sensitive dynamic networks

E2C – Energy Efficient Consensus protocol for Cyber-Physical Settings Jul'20 – Present
Dr. Saurabh Bagchi, Dr. Aniket Kate and Dr. Michael Reiter, Purdue University

- Implementing an energy-efficient Byzantine State Machine Replication (SMR) protocol on NUCLEO-F401RE ARM-Cortex microprocessor using MBed-OS
- Used Bluetooth Low Energy (BLE) and the k-cast model to achieve communication between processors
- Employed RSA PKCS digital signatures, currently exploring Hash-based signatures for the protocol
- Submitting this work to Dependable Systems and Networks (DSN) Conference 2021 [1]

Program Synthesis for Internet of Things Dec'19 – May'20
Dr. Berkay Celik, Purdue University

- Used Program Synthesis techniques to synthesize applications for smart homes
- Designed a framework to capture user input using BNF grammar and used SAT solvers to synthesize Finite State Machines from user requirements and program traces
- Ensured the output complied with all security policies written in Linear Temporal Logic (LTL)
- Implemented the State Machine in OpenHAB, an open-source home automation software

Hyparo – A repair framework for Consortium Blockchains Mar'20 – Jun'20
Dr. Aniket Kate, Purdue University

- Designed a protocol for repairing faulty transactions in an Execute-Order-Validate blockchain, without having to fork it. The protocol is divided into 3 phases – Identification, Collaboration, and Execution
- Developed an identification service that analyses the downstream impact of a faulty transaction and compiles a list of all the impacted stakeholders
- Created a smart contract called Repair Chaincode on Hyperledger Fabric, to enable collaboration between stakeholders. A repair is executed after all the stakeholders express their approval
- Modified the source code of Hyperledger Fabric to perform repairs after receiving stakeholder approval

Side Channel Cryptanalysis of AES-128, Undergraduate Thesis Nov'16 – May'17
Dr. Chester Rebeiro, IIT Madras

- Derived information about the secret key of AES-128 running on a 22nm FPGA with a high probability, by analyzing the power consumption of the chip
- Used a co-variance optimized moving average filter to create templates from traces and attacked the cipher using three different template matching algorithms
- Found definitive proof that chip configuration prioritizing encryption latency is more susceptible to side-channel cryptanalysis

WORK EXPERIENCE

Amazon Web Services, Dallas, Texas May'20 - Aug'20
Software Development Engineering Intern, Worldwide Revenue Operations Team

- Developed a data quality framework to introduce transparency in the data pipelining process of the team
- Worked with AWS applications like Lambda and Redshift and UI technologies like ReactJS to develop the framework
- Developed a scalable backend service using Docker and AWS cloud

Open Insights LLC, Pune, India Jul'17 – Jun'19
Multiple Positions, Product Development Team

- Remodeled the in-house data profiler using Spark Streaming, Apache Kafka, Apache Avro, and Spring Boot to achieve a 4000% reduction in memory footprint and a 100% improvement in latency
- Designed and developed a big data ingestion framework which can ingest data from 70 different data sources into HDFS and Kafka by using Apache NiFi, Spring Boot, Spring Data JPA, Spring Cloud, and Apache Kafka
- Worked on a single click deployment project to configure a cluster on AWS/GCP, set it up, and bring up all the services in a single click. Extensively worked on Apache Ambari's Mpack framework and Cloudbreak to achieve the goal
- Designed and developed an OData-v4 API service over Apache Hive (JDBC) by using Apache OLingo, Spring Boot, and HikariCP. Implemented a plug and play-based design to ease the configuration of data sources

Barclays Technology Centre, Pune, India May'16 – Jul'16
Business Analyst Intern, Barclaycard Analytics

- Developed a logging framework and a statistics dashboard to identify latency bottlenecks in the pipeline of the Real-Time Streaming Engine at Barclays by using Apache Kafka, Elasticsearch, Kibana, and Apache Maven
- Developed a framework to execute custom Java Archive files (JARs) on Logstash pipelines
- Awarded the Barclays Best Intern Award 2016 for commendable contributions to the company