Siva Kesava Reddy K

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Interests

I am a third year PhD Student in the Network Verification (NetVerify) Group at University of California, Los Angeles. My research interests lie at the intersection of Networks and Programming Languages. My research seeks to address limitations in network verification technology.

Education

2017 – Present **MS / PhD in Computer Science.**,
University of California, Los Angeles. CGPA: 4.0 / 4.0.
Advisors: *Prof. George Varghese* and *Prof. Todd Millstein*

2013 – 2017 **B. Tech. in Computer Science and Engineering (*Honors*).**,
Indian Institute of Technology, Kharagpur. CGPA: 9.67 / 10.0.

Research Papers and Posters

[Poster] **One small step for DNS, one giant leap for Networking**,
Siva Kesava Reddy Kakarla, Ryan Beckett, Behnaz Arzani, Todd Millstein, George Varghese
– Microsoft Intern poster session 2019.

NSDI '20 **Finding Network Misconfigurations through Automatic Template Inference**,
Siva Kesava Reddy Kakarla, Alan Tang, Ryan Beckett, Karthick Jayaraman, Todd Millstein, Yuval Tamir, George Varghese.
Artifact https://github.com/SivaKesava1/SelfStarter

[Arxiv] **Expect More from the Network: DDoS Mitigation by FITT in Named Data Networking**,
Zhiyi Zhang, Vishrant Vasavada, Siva Kesava Reddy Kakarla, Eric Osterweil, and Lixia Zhang.

GLOBECOM '17 **IEEE 802.11ac DBCA: A Tug of War between Channel Utilization and Fairness**,
Mahankali Saketh, Siva Kesava Reddy Kakarla, Raja Karmakar, Samiran Chattopadhyay, Sandip Chakraborty.

Awards and Honors

2018 UCLA Dean's Graduate Student Research (GSR) Fellowship.

2017 – 2019 UCLA Graduate Dean's Scholar Award (GDSA), offered to the department's most prized newly admitted PhD students.

2014 Jagadish Bose National Science Talent Search (JBNSTS) Scholarship, West Bengal, India.

2013 Secured all India Rank-330 in IIT-JEE Advance.

2013 Secured all India Rank-229 in Joint Entrance Examination(JEE) Mains.

2012 KVPY Fellowship (Dept. of Science and Technology, India).

Talks and Presentations

Aug '19 SelfStarter – Intentionet

Aug '19 SelfStarter – MNR Group, Microsoft Research

Sep '19 gRoot – MNR Group, Microsoft Research

Research Experience

Microsoft **gRoot: Scalable Static Verification of DNS**
(Intern) with *Ryan Beckett, Behnaz Arzani (MNR Group), Prof. Todd Millstein and, Prof. George Varghese*   *Summer '19 – Present*

DNS outages made it clear that there are several other components in the network stack that could precipitate cloud failures besides router configurations. In this ongoing work, we are aiming to statically verify the DNS configuration files.

UCLA

SelfStarter: Finding Network Misconfigurations through Automatic Template Inference

(Graduate RA)

with *Ryan Beckett (Mobility and Networking group, Microsoft Research), Karthick Jayaraman (Windows Azure security group, Microsoft), Prof. Todd Millstein, Prof. Yuval Tamir and, Prof. George Varghese*   *Summer '18 – Present*

Network verification to detect router configuration errors typically requires an explicit correctness specification. Unfortunately, specifications either do not exist, or are incomplete and written informally in English. I developed an approach to infer likely network configuration errors without a specification by automatically identifying configuration outliers. We have implemented our techniques in the tool SelfStarter and used it to automatically identify likely bugs in a large university network and several data centers and wide area network(WAN) from a major cloud provider. Many of these likely bugs were confirmed by operators.

UCLA

Producer-Assisted Pushback

(Course Project)

with *Prof. Lixia Zhang*, Internet Research Lab.   *Winter '18 – Spring '18*

In this report, we describe how the basic properties of NDN make the launch of DDoS attacks more difficult and the attacks less effective. We further make use of NDN's architectural properties to develop a new DDoS mitigation solution – Producer-assisted Pushback, called PAP. PAP pushes back DDoS traffic to misbehaving entities, at a much finer granularity than existing DDoS defense mechanisms in IP networks.

IIT Kharagpur

Does QUIC Kill Your Data Plan? A View Using YouTube Adaptive Streaming Clients

(Bachelor Thesis)

with *Prof. Sandip Chakraborty*, Complex Network Research Group (CNeRG). *Fall '16 – Spring '17*

In this work, we focused on comparing adaptive bitrate streaming performance over QUIC and TCP. We observed that QUIC was better in maintaining a higher bitrate during playback, as well as, reduces bitrate switching, relative to TCP. However, QUIC uses more bandwidth to download higher data volume for buffering,especially at low bandwidth, and even suffers from more rebuffering events during playback compared to TCP.

IIT Kharagpur

IEEE 802.11ac DBCA: A Tug of War Between Channel Utilization & Fairness

(UG RA)

with *Prof. Sandip Chakraborty*, Complex Network Research Group (CNeRG). *Fall '16 – Spring '17*

In this work, we developed a two dimensional Markov chain approach to model the performance of Dynamic Bandwidth Channel Access(DBCA) under various channel bonding conditions. We observed that under certain circumstances, the secondary channel users can affect the throughput of primary channel users, which may introduce a short-term unfairness and a significant performance drop in the network.

IISc Bangalore

Experimenting with Akka Package

(Intern)

with *Prof. Komondoor V. Raghavan*, Compilers, PL and SE Group.   *Summer '15*

Worked on the topic of modeling distributed systems using the Akka package and developed a mini shopping system which works in a distributed environment using it. Modeled the same system using the Alloy, a declarative specification language.

Professional Experience

LinkedIn

Enhancement of LinkedIn Spam Detection Tool with dependency injection model and Mockito unit tests

(Intern)

with *Prashanth Nimmagadda*, Content Filtering & Spam Detection Team. | Bangalore *Summer '16*