RAHUL ANAND SHARMA

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Advisors: Prof. Vyas Sekar and Anthony Rowe

EDUCATION

Carnegie Mellon University   *August 2018 - Present*
PhD CyLab, Department of Electrical and Computer Engineering
Department of Structural Engineering

International Institute of Information Technology   *July 2011 - July 2016*
B.Tech and MS By Research in Computer Science

ONGOING PROJECTS

- Working on using Machine Learning to develop solution to identify and localize IoT devices in an unknown environment

- Accurately Measuring Global Risk of Amplification Attacks using AmpMap

- Contention-Aware Performance Prediction For Virtualized Network Functions

PUBLICATIONS

- **Rahul Anand Sharma**, Adwait Dongare, John miller, Nicholas Wilkerson, Vyas Sekar, Prabal Dutta & Anthony Rowe "All that GLITTERs: Low-Power Spoof-Resilient Light Anchors for Augmented Reality" ACM/IEEE Conference on Information Processing in Sensor Networks (IPSN), 2020

- **Rahul Anand Sharma** & Ranveer Chandra, "DeepEdge: A Network Edge for Deep Learning Workloads" USENIX Symposium on Networked Systems Design and Implementation Poster (NSDI Poster), 2019

- Vasuki Narasimha Swamy, Deepak Vasisht, Zerina Kapetanovic, **Rahul Anand Sharma**, Ranveer Chandra, Manohar Swaminathan, Anirudh Badam, Gireeja Ranade & Sudipta Sinha "Low-Cost Aerial Imaging for Small Holder Farmers" ACM SIGCAS Conference on Computing Sustainable Societies (COMPASS), 2019

- Tusher Chakraborty, Akshay Nambi, Ranveer Chandra, **Rahul Anand Sharma**, Manohar Swaminathan, Jonathan Appavoo & Zerina Kapetanovic "Fall-curve: A novel primitive for IoT Fault Detection and Isolation" ACM Conference on Embedded Networked Sensor Systems (SenSys), 2018

- **Rahul Anand Sharma**, Bharath Bhat, Vineet Gandhi & C.V. Jawahar "Automated top view registration of broadcast football videos" IEEE Winter Conference on Applications of Computer Vision (WACV), 2018

- **Rahul Anand Sharma**, Visesh Chari, Vineet Gandhi & C.V. Jawahar "Automatic analysis of broadcast football videos" Springer Journal on Signal, Image and Video Processing (JOSIVP), 2016

- **Rahul Anand Sharma**, Pramod Kompalli & C.V. Jawahar "Fine-Grain Annotation of Cricket Videos" Asian Conference on Pattern Recognition (ACPR), 2015

- Himangi Saraogi, **Rahul Anand Sharma** & Vijay Kumar "Event Recognition in Broadcast Soccer Videos" Indian Conference on Computer Vision, Graphics and Image Processing (ICVGIP), 2016

PREPRINTS

- **Rahul Anand Sharma**, Praneeth Netrapalli, Navin Goyal and Monojit Choudhary "Learnability of Learned Neural Networks"

PATENTS

Filed two patents while at Microsoft Research, India

EXPERIENCE

- **Microsoft Research**   Bangalore, India
  Research Fellow   Aug 2016 - July 2018

  - FarmBeats: Worked with Dr. Ranveer Chandra & Dr. Manohar Swaminathan on FarmBeats: IoT for agriculture. Our mission is to improve farming through data-driven practices. We are inventing new ways to gather data, to store them in the cloud, and provide the analytics to the farmers.

  - Learnability of Neural Networks: Together with Dr. Praneeth Netrapalli & Dr. Navin Goyal, we are exploring the simplicity of learned neural networks under various settings: learned on real vs random data, varying size/architecture and using large minibatch size vs small minibatch size. The notion of simplicity used here is that of learnability i.e., how accurately can the prediction function of a neural network be learned from labeled samples from it.

  - DeepEdge: In collaboration with Dr. Ranveer Chandra, we propose a new Internet Edge architecture, called DeepEdge, for handling Deep Learning workloads on a network edge. It leverages insights about the structure of Deep Neural Networks (DNN) to schedule tasks in a way that can achieve good performance for small workloads, and gracefully degrades when the workload increases

- **HackerRank**   Bangalore, India
  Software Engineering Intern   May 2015 - Aug 2015

  - Code Checker: HackerRank organizes various online programming contests and Codechecker is the module which makes sure that each submitted solution passes the required test cases meanwhile following the specified resource constraints. As part of my work I improved the Codechecker by adding support for Image Processing related problems. My other work as a intern led to ten fold reduction in deployment time by improvising the asset pre-compilation pipeline.

  - Static Code Analysis: As part of the internal hackathon organized by the company, developed a static code analysis tool which is currently under development to be offered as a service to end-users

- **IIIT Hyderabad**   Hyderabad, India
  Research assistant   May 2013 - Aug 2016

  - Automated top view registration of broadcast football videos: Developed a system for automatic registration of a broadcast soccer frame to its corresponding top view. For the task of image registration we propose an alternate approach exploiting the edge information and demonstrate its success in a specific scenario of registering football broadcast video frames on the static top view model of the playing surface

  - Automatic analysis of broadcast football videos using contextual priors: Demonstrated that contextual information can be harnessed for automatic analysis of sports videos. Here the

proposed algorithm allows us to extract salient events such as Goal, Foul, Corner, Substitution etc. automatically from a given broadcast soccer video.

- Fine Grain Annotation of Cricket Videos: Presented a solution that enables rich semantic annotation of Cricket videos at a fine temporal scale. Our approach circumvents technical challenges in visual recognition by utilizing information from online text-commentaries. We obtain a high annotation accuracy, as evaluated over a large video collection.

- Event Recognition in Broadcast Soccer Videos: Proposed an approach for soccer event recognition using deep convolutional features combined with domain-specific cues. This approach uses deep convolution feature (TDD) in combination with our proposed algorithm of Automated top view registration to improve upon the task of Event recognition.

- **IIIT Hyderabad**   Hyderabad, India
  Teaching assistant

  - Artificial Intelligence

  - Principle of Programming Languages

  - Digital Image Processing

  - Digital Signal Analysis and Applications

ACHIEVEMENTS

- Made into Deans list of Academic and Research excellence at IIIT Hyderabad

- Won outstanding technical achievement award for our project FarmBeats as part of Microsoft AI School

- Research Work on Fine-Grain Annotation of Cricket Videos covered by Washington Post ,NDTV and others.

REFERENCES

Available upon Request