

YASH SINHA

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Research Interests Software Defined Networks, P2P Networks, Computer Vision and Data Science.
Recent research: Hybrid SDN, leveraging WebRTC for P2P DHTs and character recognition.

Education **Birla Institute of Technology and Science (BITS)**, Pilani 2016 – 2018
M.E. Computer Science
Birla Institute of Technology and Science (BITS), Pilani 2012 – 2016
M.Sc.(Tech.) Information Systems, 8.1/10
Bachelor Thesis (Advisor: Dr. K. Haribabu): **Realizing Hybridization in Software Defined Networks** Design and implementation of a hybrid SDN model in an IP network to enable a smooth transition to pure SDN.

Publications (acceptance rates, if available, are marked in brackets; cross-referenced [] with research experience)

Journal Articles

- [1] Sandhya, Yash Sinha, K. Haribabu **A Survey: Hybrid SDN** Journal of Network and Computer Applications, vol. 100, no. Supplement C, pp. 35 – 55, 2017. Impact Factor: 3.5

Peer-Reviewed Conference Articles

- [2] Yash Sinha, S. Bhatia, G.S.S. Chalapati, Rajiv Kumar **MPI Aware Routing in SDN**
Proceedings of the 26th International Symposium on High-performance Parallel and Distributed Computing (HPDC), Washington DC, USA, 2017
- [3] Yash Sinha, S. Bhatia **Control-Data Plane Intelligence Trade-off in SDN**
The 38th IEEE Symposium on Security and Privacy (S & P), San Jose, CA, USA, 2017
- [4] Yash Sinha, S. Bhatia, G.S.S. Chalapati, V.S. Shekhawat **MPLS based Hybridisation in SDN**
Proceedings of 4th International Conference on Software Defined Systems (SDS), pp. 156–161, Valencia, Spain, 2017
- [5] Yash Sinha, S. Vashishth, K. Haribabu **Meticulous Measurement of Control Packets in SDN**
Proceedings of the Symposium on SDN Research, ACM SOSR, pp. 187–188., Santa Clara, CA, USA, 2017
- [6] S. Vashishth, Yash Sinha, K. Haribabu **A Browser-based Distributed Framework for Content Sharing and Student Collaboration**
4th International Conference on Advanced Computing, Networking, and Informatics (ICACNI), NIT, Rourkela, India. Progress in Intelligent Computing Techniques: Theory, Practice, and Applications. Vol. 2. Ed. by Sa P., Sahoo M., Murugappan M., Wu Y., Majhi B. Vol 519. Advances in Intelligent Systems and Computing pp 111–118. Springer Singapore, 2017. (26.4%)
- [7] S. Vashishth, Yash Sinha, K. Haribabu **Addressing Challenges in Browser Based P2P Content Sharing Framework Using WebRTC**
IEEE 30th International Conference on Advanced Information Networking and Applications (IEEE-AINA) pp. 850 – 857. Co-organised by HES-SO University & Icare Research Institute. Le Regent Congress Centre, Crans-Montana, Switzerland (CH), 2016 (29.13%)

- [8] Yash Sinha, P. Jain, N. Kasliwal **Comparative Study of Preprocessing and Classification Methods in Character Recognition of Natural Scene Imagess**
International Workshop on Machine Intelligence and Signal Processing (IEEE SPS-ASPIPA MISP), IIITD, New Delhi. Ed. by Richa Singh, Mayank Vatsa, Angshul Majumdar, & Ajay Kumar. Vol. 390. Advances in Intelligent Systems and Computing. pp. 119 – 129. Springer New Delhi, 2016. (42.8%)

Articles in Press

- [9] Siddharth Bhatia, Yash Sinha **LLVM Superoptimizer**
Selected for ACM Student Research Competition at IEEE/ACM International Symposium on Code Generation and Optimization (CGO'18), Austria
- [10] Harsh Sinha, Raunak Manekar, Yash Sinha, Pawan K. Ajmera **Convolutional Neural Network based Human Identification using Outer Ear Images**
Proceedings of the 7th International Conference Soft Computing for Problem Solving (SocProS), IIT Bhubaneswar. Advances in Intelligent Systems and Computing, Springer
- [11] Siddharth Bhatia, Yash Sinha, Lavika Goel **Lung Cancer Detection: A Deep Learning Approach**
Proceedings of the 7th International Conference Soft Computing for Problem Solving (SocProS), IIT Bhubaneswar. Advances in Intelligent Systems and Computing, Springer
- [12] Yash Sinha, S. Vashishth, K. Haribabu **Estimation of raw packets in SDN**
Proceedings of the EAI International Conference on Ubiquitous Communications and Network Computing (UBICNET), Bengaluru, 2017
- [13] Yash Sinha, S. Vashishth, K. Haribabu **Real Time Monitoring of Packet Loss in Software Defined Networks**
Proceedings of the EAI International Conference on Ubiquitous Communications and Network Computing (UBICNET), Bengaluru, 2017

Manuscripts Submitted

- [14] Krishna Kant Garg, Yash Sinha **Tabla++: A programming language for South Asian percussion**
POPL 2018 Student Research Competition at the 45th ACM SIGPLAN Symposium on Principles of Programming Languages (POPL'18), LA, CA, USA
- [15] Harsh Sinha, Raunak Manekar, Yash Sinha, Pawan K Ajmera **Ear Biometric: A Convolutional Neural Network Approach** Pattern Recognition Letters, International Association for Pattern Recognition, Elsevier

Research Experience & Projects (cross-referenced [] with publications)

Centre for Excellence in Software Defined Networks (SDN Lab), BITS Pilani

Mentor: Prof. K. Haribabu

1. Enabling OpenFlow in NetFPGA, Ongoing Jan 2017
 - Deploying OpenFlow switch on FPGA-based PCI Express board incorporating Xilinx's Kintex-7 325T FPGA
2. Enabling SDN in campus networks Aug 2016 – Dec 2016
 - Transition of SDN to existing campus networks to cater to organisational budget constraints and smooth transition, that reduces network deployment costs [1]

3. Hybridization Techniques in Software Defined Networks Jan 2016 – May 2016
 – Came up with a original idea for incremental deployment of class based hybrid SDN in an IP network. Implemented and evaluated its performance with the help of a prototype [Thesis]
4. Measuring control packets in SDN May 2015 – Dec 2015
 – Proposed a new algorithm to estimate the fraction of raw packets. Estimation accuracy is within 3% experimental error rate [12][5]
5. Minimizing noise: Realtime Estimation of Packet Loss in SDN May 2015 – Dec 2015
 – Designed a new approach for monitoring and measuring packet loss statistics in SDN which makes packet loss estimation 8% more accurate than other implementations. [13]
- Mentor: Prof. V. S. Shekhawat
6. MPLS based Hybridization in Software Defined Networks Aug 2016 – Dec 2016
 – Proposed a network architecture for deployment of MPLS based class based hybridisation in SDN [4]

Dept. of Mathematics, BITS Pilani

Mentor: Prof. Rajiv Kumar

7. MPI Aware Routing in SDN Feb 2017 – Jun 2017
 – Maximize the utilization of the network of the cluster system, by deploying the SDN routing [2]

Dept. of Electrical & Electronics Engineering, BITS Pilani

Mentor: Prof. Pawan K Ajmera

8. Ear Biometrics: A Convolutional Neural Network Approach Aug 2017
 – Ear localization with a HOG+SVM framework and ear recognition using a CNN approach with Adagrad Optimization. The experiments have been performed on USTB III dataset to yield accuracy of 92.3% [15][10]

Dept. of CS/IS, BITS Pilani

Mentor: Prof. Lavika Goel

9. Lung Cancer Detection using Deep Learning Jan 2017 – May 2017
 – Ensemble of UNet + RandomForest and ResNet + XGBoost for Lung Cancer Detection [11]

Mentor: Prof. Sundar S. Balasubramaniam

10. LLVM IR Superoptimizer using GreenThumb Framework Aug 2016 – Dec 2016
 – Implemented a superoptimizer for LLVM IR leveraging GreenThumb for generating peephole optimisations using DrRacket

Mentor: Prof. K. Haribabu

11. Browser based P2P framework for content distribution Jan 2015 – Apr 2015
 – Designed, implemented and deployed a new P2P framework leveraging the Chord protocol using WebRTC for content distribution using Web browsers [6][7]

Mentor: Prof. Navneet Goyal

12. Identify characters from Google Street View images Sep 2014 – Dec 2014
 – Proposed a new technique that comprised of a pipeline of image processing and machine learning algorithms to recognize characters segmented out from the natural scene images to achieve the then state of the art accuracy of 73%, placed among top 3 at Kaggle.com [8]

Sterlite Tech. Elitecore, Ahmedabad

May 2014 – Jul 2014

Mentor: Brijesh Mirstry, Technology Lead, Elitecore

13. Applicability of Hadoop (and other computing frameworks) in Bioinformatics

- deployed Hydra, a sequence database search engine for Hadoop to perform sequence searches

14. EasyConnect: A Windows Phone App for Wi-Fi Monetization

- Developed EasyConnect WP App on Windows Phone platform to search and connect seamlessly to Wi-Fi networks with Wi-Fi Sense and Hotspot 2.0

Wikimedia Foundation & Swathanthra Malayalam Computing

Mentors: Vasudev Kamath, Debian & Santhosh Thottingal

15. Indic Transliteration Module

Jun 2013 – Jul 2013

- Improved cross language transliteration system of LIBINDIC, Indic language processing applications library by employing the CMU Pronouncing Dictionary for adding support of Hindi.

Honors
and
Grants

Selected for ACM Student Research Competition

Nov 2017

ACM HPDC 2017 Student Travel Award

Jun 2017

ACM SOSR Travel Award

Mar 2017

Merit Scholarship cum. 40% Fee Wavier, BITS Pilani

Aug 2016

BITSAA-IRU Partial Travel Grant, BITSAA Scholarships

Apr 2016

- Travel grant of ₹25k for research presentation at Switzerland

Kishore Vaigyanik Protsahan Yojana (KVPY) Fellowship

Aug 2012 – Jul 2016

- fellowship by DST, Govt. of India, one of 77 recipients selected among 95,000 applicants

- Received grant of ₹350k over 4 years

The University of New South Wales Distinction

2009

Work
Experience

Academic Registration and Counselling Division, BITS, Pilani

Aug 2016 – Present

Graduate Teaching Assistant

- automation of maintenance of students' academic history, the usage of various academic flexibilities available to the students. such as registration, addition, substitution, withdrawal etc.

Clickcounselor

Oct 2013 – Dec 2014

Co-Founder cum. Tech. Lead

- Founded a technology company focused on psychological counselling, attracted 26 psychologists to join on-board

- Adjudged as the best effort at New Venture Creation course, an innovative course at BITS Pilani, conceptualized & coordinated by BITS Spark Connect, BITSAA in association with Center for Entrepreneurial Leadership, CEL

- Developed a browser based video conferencing software using WebRTC. An effort to bring the ecosystem of counsellors and counselees online and conduct online counselling via video conferencing.

Dept. of Visual Media, BITS, Pilani

Aug 2012 – Jun 2015

Head, Web Design & Development Team

- Responsible for online presence of the college festivals drawing participation from over 140 colleges and a combined budget in excess of \$200k

- Designed, developed and deployed APOGEE'14, OASIS'13, BOSM'13 websites using Django, three.js and Webstack, one of which was acclaimed to be the first 3D website of any college fest in India.

Other
Projects

Springleaf Marketing Response

Oct 2015

Deployed XGBoost to predict which customers will respond to a direct mail, AUC: 0.79, placed in top 16% at Kaggle.com among 2500 international participants

Capture of Carbon Dioxide from Ambient Air

Sep 2011 – Nov 2011

Implemented a method of CO₂ Sequestration which involved adsorption of carbon dioxide on ammonia based resins

Scholarly Presentations

- “MPI Aware Routing in SDN”, 26th International Symposium on High-performance Parallel and Distributed Computing (HPDC’17), Washington DC, USA. 26th - 30th June 2017.
- “Meticulous Measurement of Control Packets in SDN”, Symposium on SDN Research, Santa Clara, CA, USA. 3rd - 4th Apr 2017.
- “A Browser Based Distributed Framework for Content Sharing”, 4th International Conference on Advanced Computing, Networking, and Informatics (ICACNI), NIT, Rourkela, India. 22nd - 24th Sept 2016.
- “Character recognition of natural scene images”, IEEE SPS-ASPIPA Winter School on Machine Intelligence and Signal Processing (MISP), IIITD, New Delhi, India. 20th - 23rd Dec 2014.
- “Capture of CO₂ from ambient air”, Invited at All India CBSE Science Exhibition Finalists’ Presentation, Modern School, New Delhi, India, 21st - 22nd Oct 2011.

Coursework **MOOCS: Coursera & edX**

Practical Machine Learning, Regression Models, Statistical Inference, Reproducible Research, Exploratory Data Analysis, Getting and Cleaning Data, R Programming, The Data Scientist’s Toolbox, Johns Hopkins University, Coursera	Jun 2014 – Aug 2014
Machine Learning, Stanford University, Coursera	Oct 2013 – Jan 2014
Algorithms: Design and Analysis, Part 1, Stanford University, Coursera	Jul 2013 – Aug 2013
CS184.1x: Foundations of Computer Graphics, UC Berkeley, edX	Mar 2013 – May 2013
6.00x: Introduction to Computer Science and Programming, MIT, edX	Sept 2012 – Jan 2013

Accolades

Startup ClickCounselor selected for implementation at Pilani Campus, BITS Pilani. Finalists at All India Business Planning competitions: Vishisth, IIT Delhi & Ventura, NIT Trichy	Dec 2014
Finalist at APOGEE’14, BITS Pilani’s tech. fest’s technical presentation	Mar 2014
Selected to attend Look Inwards, a NASSCOM 10,000 Startups invite-only , in-conversation session with Mr. Vinod Khosla, co-founder, Sun Micro. & Mr. Nandan Nilekani, Chairman, UIDAI	Sept 2013
N. D. Grover Memorial Super Performers’ Award as an honour for academic excellence for entire schooling period.	Jul 2012
N. D. Grover Memorial Super Performers’ Award for exceptional performance in International Assessments for Indian Schools, UNSW, Australia.	Jul 2012
National Finalist at All India CBSE Science Exhibition amongst 18,000 schools in India, Adjudged the best exhibit at the State (CBSE Patna Zone, 1200 schools) and District Levels.	Oct 2011
Highest International Grade cum. State Topper in Science, International Assessments for Indian Schools by the University of New South Wales, Australia.	Dec 2009
Qualified for Second Level National Talent Search Examination (NTSE) conducted by NCERT.	2008
Secured Rank 1 in Jharkhand state in 35 th U. P. U. Letter Writing Competition organized by Universal Postal Union, the United Nations.	2006

Technical Skills

- Languages and Libraries: Python, JavaScript, C, Java, MySQL familiar with C++, Prolog, Scheme, x86 assembly language, Verilog, OpenGL, C#
- Web Stack: HTML5, CSS3, Nodejs, Flask, Jinja, django, JavaScript, jQuery, WebRTC, CoffeeScript, Bootstrap, three.js, scrollr.js, Amps, Octopress, FileZilla
- Computing & Statistical packages: R, Matlab, Numpy, Scikit-Learn, Scikit-Image, Matplotlib
- Version Control: Git
- Type Setting: L^AT_EX, Open Office, Microsoft Office
- Technologies: Eclipse, Netbeans, Visual Studio, RStudio and basic familiarity with Hadoop, Adobe Premier Pro CS6 and Adobe Photoshop CS6.
- Operating Systems: Linux (Ubuntu), Windows.

Professional Student Member, IEEE Societies

Dec 2014 – present

Extra-Curricular Activities **Sangeet Prabhakar, Prayag Sangeet Samiti**, Allahabad (B.Mus. eq.)
Degree for recognition in instrumental percussion, 74%

2004 – 2011

Featured on TV Show: Jharkhand Ke Sitare as **National Level Percussionist** at Naxatra News, popular Hindi news channel in the Jharkhand state

Jul 2012

National Level Championship in All India Youth Festival
Awarded by D. A. V. College Management Committee

Nov 2011