Abhilash Jindal
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RESEARCH INTERESTS
Mobile systems, ML systems, operating systems, software engineering.

EDUCATION
Doctor of Philosophy, Master of Science. Computer Science
Purdue University. 2011-2017

Bachelor of Technology. Electrical Engineering
Indian Institute of Technology, Kanpur. 2007-2011

EXPERIENCE
Assistant Professor — January 2021 - present
Department of CSE, IIT Delhi — `https://web.iitd.ac.in/~ajindal`

Senior Software Engineer — December 2019 - January 2021
Instabase, San Francisco, CA — https://instabase.com/
- Developed distributed execution backbone for supporting large-scale automated workflows.

Co-founder and CTO — August 2017 - present
Mobile Enerlytics, San Francisco, CA — http://mobileenerlytics.com/
- Commercialized technologies to help answer two key questions: *where is my app draining battery? And why is my app draining more battery than usual?*
- Found and reported new energy bugs in Netflix and Pandora Android apps using our products. The bugs were present in the apps for several releases and got quickly fixed by respective developers using our reported diagnostics.
- Developed and released Estar, a battery saver app. Estar became the top-trending app in the Tools category on Google Play receiving 100k+ downloads without any marketing expenditure.
- Directly managed a team of 6 engineers and mentored them from onboarding to project leadership.

GRANTS
Principal Investigator for NSF SBIR Phase II award of $749, 998. Enabling Technologies for Energy-Centric Mobile App Design to Extend Mobile Device Battery Life. [Award number: 1660221]

Contributed to the writing of NSF CSR Small award of $475,000. Extending Smartphone Battery Life via Prescriptive Energy Profiling. [Award number: 1718854]

Contributed to the writing of NSF SBIR Phase I award of $150,000: Enabling Technologies for Energy-Centric Mobile App Design to Extend Mobile Device Battery Life. [Award number: 1549214]

PATENTS
Y. Charlie Hu and **Abhilash Jindal**. *Differential resource profiling with actionable diagnostics.* U.S. Patent Application No.: 16/595,321. Oct. 2019.

Y. Charlie Hu, **Abhilash Jindal**, Samuel P. Midkiff, and Abhinav Pathak. *Systems and methods of detecting power bugs.* US Patent 10,379,925. Aug. 2019. URL: `https://patents.google.com/patent/US10379925B2/en`.

Y. Charlie Hu, **Abhilash Jindal**, Samuel P. Midkiff, and Abhinav Pathak. *Systems and methods of detecting power bugs*. US Patent 9,501,382. Nov. 2016. URL: https://patents.google.com/patent/US9501382B2/en.

CONFERENCE PUBLICATIONS

Abhilash Jindal and Y. Charlie Hu. "Experience: Developing a Usable Battery Testing and Diagnostic Tool for the Mobile Industry". In: *Proceedings of the 27st Annual International Conference on Mobile Computing and Networking (MobiCom)*. ACM. 2021. URL: https://sigmobile.org/mobicom/2021/.

– "Differential energy profiling: energy optimization via diffing similar apps". In: *Proceedings of the 12th USENIX conference on Operating Systems Design and Implementation (OSDI)*. USENIX Association. 2018, pp. 511–526. URL: https://www.usenix.org/conference/osdi18/presentation/jindal.

Abhilash Jindal, Prahlad Joshi, Y. Charlie Hu, and Samuel P. Midkiff. "Unsafe time handling in smartphones". In: *2016 USENIX Annual Technical Conference (ATC)*. USENIX Association. 2016, pp. 115–127. URL: https://www.usenix.org/node/196199.

Xiaomeng Chen, **Abhilash Jindal**, Ning Ding, Y. Charlie Hu, Maruti Gupta, and Rath Vannithamby. "Smartphone background activities in the wild: Origin, energy drain, and optimization". In: *Proceedings of the 21st Annual International Conference on Mobile Computing and Networking (MobiCom)*. ACM. 2015, pp. 40–52. URL: https://dl.acm.org/citation.cfm?id=2790107.

Xiaomeng Chen, Ning Ding, **Abhilash Jindal**, Y. Charlie Hu, Maruti Gupta, and Rath Vannithamby. "Smartphone energy drain in the wild: Analysis and implications". In: *Proceedings of the 2015 ACM SIGMETRICS International Conference on Measurement and Modeling of Computer Systems*. ACM. 2015, pp. 151–164. URL: https://dl.acm.org/citation.cfm?id=2745875.

Ana Nika, Yibo Zhu, Ning Ding, **Abhilash Jindal**, Y. Charlie Hu, Xia Zhou, Ben Y. Zhao, and Haitao Zheng. "Energy and performance of smartphone radio bundling in outdoor environments". In: *Proceedings of the 24th International Conference on World Wide Web (WWW)*. International World Wide Web Conferences Steering Committee. 2015, pp. 809–819. URL: https://dl.acm.org/citation.cfm?id=2741635.

Abhilash Jindal, Abhinav Pathak, Y. Charlie Hu, and Samuel P. Midkiff. "Hypnos: understanding and treating sleep conflicts in smartphones". In: *Proceedings of the 8th ACM European Conference on Computer Systems (EuroSys)*. ACM. 2013, pp. 253–266. URL: https://dl.acm.org/citation.cfm?id=2465377.

Abhinav Pathak, **Abhilash Jindal**, Y. Charlie Hu, and Samuel P. Midkiff. "What is keeping my phone awake?: Characterizing and detecting no-sleep energy bugs in smartphone apps". In: *Proceedings of the 10th international conference on Mobile systems, applications, and services (MobiSys)*. ACM. 2012, pp. 267–280. URL: https://dl.acm.org/citation.cfm?id=2307661.

Faez Ahmed, **Abhilash Jindal**, and Kalyanmoy Deb. "Cricket team selection using evolutionary multi-objective optimization". In: *International Conference on Swarm, Evolutionary, and Memetic Computing (SEMMCO)*. Springer. 2011, pp. 71–78. URL: https://dl.acm.org/citation.cfm?id=2183886.

JOURNAL PUBLICATIONS

Faez Ahmed, Kalyanmoy Deb, and **Abhilash Jindal**. "Multi-objective optimization and decision making approaches to cricket team selection". In: *Applied Soft Computing* 13.1 (2013), pp. 402–414. URL: https://dl.acm.org/citation.cfm?id=2401415.

WORKSHOP PUBLICATIONS

Abhilash Jindal, Abhinav Pathak, Y. Charlie Hu, and Samuel P. Midkiff. "On death, taxes, and sleep disorder bugs in smartphones". In: *Proceedings of the Workshop on Power-Aware Computing and Systems (HotPower)*. ACM. 2013, p. 1. URL: https://dl.acm.org/citation.cfm?id=2525845.

Xiaomeng Chen, **Abhilash Jindal**, and Y. Charlie Hu. "How much energy can we save from prefetching ads?: energy drain analysis of top 100 apps". In: *Proceedings of the Workshop on Power-Aware Computing and Systems (HotPower)*. ACM. 2013, p. 3. URL: https://dl.acm.org/citation.cfm?id=2525848.

Mark S. Drew, Graham D. Finlayson, and **Abhilash Jindal**. "Colour image compression by grey to colour conversion". In: *Computational Imaging IX*. Vol. 7873. International Society for Optics and Photonics. 2011, 78730Z. URL: https://doi.org/10.1117/12.871353.

SELECTED MEDIA COVERAGE

"One app update could make the battery on your Android phone last longer." In: *BGR* (May 17, 2019). URL: https://bgr.com/2019/05/17/netflix-app-battery-drain-android-issue/.

"AI lifeline to help devs craft smartphone apps that suck a whole lot less battery capacity." In: *The Register* (Oct. 9, 2018). URL: https://www.theregister.co.uk/2018/10/09/ai_mobile_app_battery_life/.

"Tool tackles power-hungry Android apps." In: *BBC* (Sept. 14, 2015). URL: http://www.bbc.com/news/technology-34244665.

"Smartphone Battery Drains a Lot Even with Dark Screen." In: *Scientific American* (June 25, 2015). URL: http://www.scientificamerican.com/podcast/episode/smartphone-battery-drains-a-lot-even-with-dark-screen/.

"Estar: the Ultimate Android App to Master Your Battery Life." In: *Mashable* (Sept. 2, 2014). URL: http://mashable.com/2014/09/02/estar-battery-app/.

"Android's power management API can lead to 'no-sleep energy bugs', according to Purdue researchers." In: *The Verge* (June 18, 2012). URL: http://www.theverge.com/2012/6/18/3094840/android-power-management-api-no-sleep-energy-bugs.

INTERNSHIPS

Software engineering intern — August 2016 - November 2016
Google, Mountain View, CA

- Created a battery leaking Android app to serve as an in-house usecase for Project Volta. The app used anti-patterns extracted from analyzing battery leaks in Google's apps.
- Made feature contributions to Battery Historian written in Go.

Research intern — May 2010 - July 2010
Simon Fraser University, Canada

- Developed and compared four novel algorithms for fast image compression.
- Poster accepted for Electronic Imaging, SPIE 2011 at San Francisco, US.

INVITED TALKS

CS department talks in IIT Delhi, IIT Bombay, IIT Chennai, IISc Bangalore, India, 2019.

USENIX Symposium on Operating Systems Design and Implementation (OSDI), Carlsbad, CA, 2018.

Huawei Vision Forum Theme: R&D Competency in the Intelligent Era, Santa Clara, CA, 2017.

Yelp Engineering Learning Group: Application Energy Management, San Francisco, CA, 2017.

USENIX Annual Technical Conference (ATC), Denver, CO, 2016.

Panel member on Intersection of Energy & Mobile panel at Mobile Development Day, Champaign, IL, 2015.

USENIX Workshop on Power-Aware Computing and Systems (HotPower), Farmington, PA, 2013.

European Conference on Computer Systems (Eurosys), Prague, Czech Republic, 2013.

International Conference on Mobile Systems, Applications, and Services (ACM MobiSys), Low Wood Bay, Lake District, United Kingdom, 2012.

THESIS PROJECT

Towards automated energy debugging in smartphones August 2011 - July 2017
Advisor: Professor Y. Charlie Hu, Purdue University

Despite the far-reaching societal impact of smartphones, the user experience has been severely limited by meager battery life. The thesis takes first steps in to automate the non-trivial task of energy optimization of complex mobile software stack.

- Discovered a new class of bugs, *sleep disorder bugs*, which plague the complete smartphone software stack: apps, framework, kernel, and device drivers. Created developer tools that collectively found hundreds of new bugs across all software layers.
- Performed the first large-scale measurement study of how smartphones drain battery in the wild. Built a screen-off energy optimizer, HUSH, that saves 15.7% of battery on average with minimal impact on the user experience.
- Developed a new methodology, *differential energy profiling*, that employs novel tree matching algorithm to compare profiler output of two similar apps to generate actionable diagnosis.

AWARDS

Was awarded Young Faculty Innovation Fellowship, IIT Delhi, 2021.

Selected for TBO Group New Faculty Fellowship, IIT Delhi, 2021.

Won the best undergraduate project award in Department of Electrical Engineering, IIT Kanpur for our project *"Tracking Humans using Multiple pairs of PTZF Cameras and Wide-Angle Cameras"* performed under the guidance of Professor KS Venkatesh.

Won Boeing-IIT Kanpur scholarship for two consecutive years.

SERVICE

ACM SF meetup organizer 2018-2019

PC member, MobileSoft 2020