

# Sudershan Boovaraghavan

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## EDUCATION

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### Carnegie Mellon University

*Ph.D. in Computer Science - Societal Computing*

Advisor: Yuvraj Agarwal

Pittsburgh, PA

*Aug 2018 – Present*

GPA: 3.9/4.0

### SRM University

*B.Tech in Computer Science and Engineering*

Chennai, India

*Jun 2012 – Jun. 2016*

## SELECTED AWARDS AND HONORS

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CMU CyLab Presidential Fellowship

2023

Best Demo Award, BuildSys'20

2020

## PUBLICATIONS

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- [6] **Sudershan Boovaraghavan**, Haozhe Zhou, Mayank Goel, Yuvraj Agarwal. 2023. Kirigami: Privacy-Preserving Audio Data Transformations for Smart Buildings. (**Under major revisions at Ubicomp '23**)
- [5] **Sudershan Boovaraghavan**, Prasoon Patidar, and Yuvraj Agarwal. 2023. TAO: Context Detection from Daily Activity Patterns Using Temporal Analysis and Ontology. *Proc. ACM Interact. Mob. Wearable Ubiquitous Technol.* 7, 3, Article 87 (September 2023), 32 pages.
- [4] **Sudershan Boovaraghavan**, Chen Chen, Anurag Maravi, Mike Czapik, Yang Zhang, Chris Harrison, and Yuvraj Agarwal. 2023. Mites: Design and Deployment of a General-Purpose Sensing Infrastructure for Buildings. *Proc. ACM Interact. Mob. Wearable Ubiquitous Technol.* 7, 1, Article 2 (**Ubicomp '23**), 32 pages.
- [3] Abdelkareem Bedri, Yuchen Liang, **Sudershan Boovaraghavan**, Geoff Kaufman, and Mayank Goel. 2022. FitNibble: A Field Study to Evaluate the Utility and Usability of Automatic Diet Monitoring in Food Journaling Using an Eyeglasses-based Wearable. In *27th International Conference on Intelligent User Interfaces (IUI '22)*. ACM, New York, NY, USA, 7992.
- [2] **Sudershan Boovaraghavan**, Anurag Maravi, Prahaladha Mallela, and Yuvraj Agarwal. 2021. MLIoT: An End-to-End Machine Learning System for the Internet-of-Things. In *Proceedings of the International Conference on Internet-of-Things Design and Implementation (IoTDI '21)*. ACM, New York, NY, USA, 169181.
- [1] Jason Koh, Dezhi Hong, Shreyas Nagare, **Sudershan Boovaraghavan**, Yuvraj Agarwal, and Rajesh Gupta. 2019. Who can Access What, and When? Understanding Minimal Access Requirements of Building Applications. In *Proceedings of the 6th ACM International Conference on Systems for Energy-Efficient Buildings, Cities, and Transportation (BuildSys '19)*. ACM, New York, NY, USA, 121124.

## PREPRINTS

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- [1] Matuř Tomlein, **Sudershan Boovaraghavan**, Yuvraj Agarwal, and Anind K. Dey. Supporting Maintenance Operations for IoT-Based Activity Recognition Using Transfer Learning. arXiv preprint (2018).

## POSTERS & DEMOS

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- [3] Matilda Kathryn Ferguson, **Sudershan Boovaraghavan**, and Yuvraj Agarwal. 2020. Vista: Spatial Data Representation for Smart Buildings. In Proceedings of the 7th ACM International Conference on Systems for Energy-Efficient Buildings, Cities, and Transportation (**BuildSys '20**). Association for Computing Machinery, New York, NY, USA, 342343. [**Best Demo Award**]
- [2] **Sudershan Boovaraghavan**, Chen Chen, Dohyun Kim, Yuvraj Agarwal, GioTTO: A Safe, Secure and Easy to Use IoT Stack for Buildings, CMU Energy Week, March 2018, Pittsburgh, PA, USA.
- [1] Matúš Tomlein, **Sudershan Boovaraghavan**, Yuvraj Agarwal, and Anind K. Dey. 2017. CharIoT: an end-user programming environment for the IoT. In Proceedings of the Seventh International Conference on the Internet of Things (**IoT '17**). ACM, New York, NY, USA, Article 25, 12.

## PATENTS

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- [1] Yuvraj Agarwal, Christopher Harrison, Gierad Laput, **Sudershan Boovaraghavan**, Chen Chen, Abhijit Hota, Bo Robert Xiao, and Yang Zhang. "Virtual sensor system." U.S. Patent Application 16/591,987, filed January 30, 2020. (**Accepted**)

## RESEARCH EXPERIENCE

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- **Software and Societal Systems, Carnegie Mellon University** Pittsburgh, PA  
*Research Assistant (Ph.D. student) || Advisor: Yuvraj Agarwal* *Aug 2018 – Present*
  - I work on different research topics broadly in IoT, ubiquitous sensing systems, privacy, security, and applied machine learning.
- **Carnegie Mellon University** Pittsburgh, PA  
*Research Associate || Advisor(s): Yuvraj Agarwal and Anind Dey* *Jan 2016 – Aug 2018*
  - Led and developed various IoT systems that include a building operating system called [BuildingDepot](#), a sensing system known as [Mites](#), and an IoT platform known as [GIOTTO](#).
- **National Internet Exchange of India (NIXI) and SRM** Chennai, India  
*Researcher || Mentor: D. Narayana Rao* *Dec 2013 – Dec 2015*
  - Designed and implemented a cluster-based [search engine](#) tailored towards Indian websites and languages.

## TEACHING EXPERIENCE

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- Teaching Assistant, Carnegie Mellon University** Pittsburgh, PA  
*17-422/722,05-499/899: Building User-Focused Sensing Systems (Undergraduate & Graduate)* *Spring 2020*
- Teaching Assistant, SRM University** Chennai, India  
*CS 238: Introductions to Computer Networks* *Spring 2015*

## TECHNICAL SKILLS

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- **Programming Languages:** C, C++, Java, Python, HTML, CSS, PHP, Javascript, Node.js, Vue.js
- **Machine Learning Tools:** TensorFlow, PyTorch, Keras, Scikit-learn

## SELECTED INVITED TALKS AND PRESENTATIONS

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- Ubicomp**, Context detection from daily activity patterns 2023
- Ubicomp**, Mites: General-Purpose Sensing Infrastructure for Buildings 2023
- CyLab Partners Conference**, Mites: General-Purpose Sensing Infrastructure for Buildings 2022,2023
- IoTDI Conference**, Building Machine Learning Systems for the Internet-Of-Things 2021

<b>CyLab Partners Conference</b> , Towards Safe and Secure Internet-Of-Things infrastructure	2020
<b>BuildSys Conference</b> , Spatial Data Representation for Smart Buildings	2020
<b>CMU Scott Institute for Energy Innovation</b> , Sensors in IoT	2018
<b>CMU Energy Week</b> , Safe, Secure and Easy to Use Building Infrastructure for IoT	2018
<b>CMU 50th Anniversary Expo</b> , Towards Building a Safe and Secure IoT Infrastructure	2017

#### ACADEMIC SERVICE

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##### External Reviewer:

ACM IMWUT	2021, 2022
ACM CHI	2022, 2023
ACM CHI LBW	2023
ACM CHI Play	2023
IEEE ISMAR	2023

#### SELECTED PRESS

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<b>ACM Communications</b> , <i>Privacy Battle Erupts Over Smart Building Sensors</i>	2023
<b>MIT Tech Review</b> , <i>Computer scientists designing the future cant agree on what privacy means</i>	2023
<b>Carnegie Mellon</b> , <i>Sensors to detect that a dementia patient is having symptoms they can't remember</i>	2018
<b>New Atlas</b> , <i>Single Synthetic Sensor keeps watch over entire room</i>	2017
<b>Digital Trends</b> , <i>Synthetic Sensors create a connected home without adding smart devices</i>	2017
<b>Engadget</b> , <i>A smart home mega sensor can track what goes on in a room</i>	2017
<b>TechCrunch</b> , <i>Google-funded super sensor project brings IoT powers to dumb appliances</i>	2017

#### ACADEMIC MENTEES

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<b>Anurag Maravi</b> , <i>Undergraduate, Computer Science, (Currently pursuing Masters at USC)</i>	2017 - Present
<b>Mike Czapik</b> , <i>Research Scientist, (Currently at TikTok)</i>	2017 - 2023
<b>Suryaa Selvaraj</b> , <i>CMU Masters, ECE</i>	2022 - 2023
<b>Bingchen Li</b> , <i>CMU Undergraduate, Computer Science</i>	2022 - 2023
<b>Lucas Blanchard</b> , <i>REU Student, (Joining Masters at CMU)</i>	2022
<b>Shreyas Nagare</b> , <i>SRM Undergraduate, CMU Masters, Computer Science, (Currently at Apple)</i>	2017 - 2020
<b>Abhijith Raghav</b> , <i>Undergraduate, Computer Science, (Currently at Amazon)</i>	2017 - 2020
<b>Matilda Fergurson</b> , <i>REU Student</i>	2019
<b>Kunal Bhuwarka</b> , <i>Undergraduate, Computer Science, (Currently at Apple)</i>	2017 - 2018
<b>Prahal Mallela</b> , <i>Undergraduate, Computer Science, (Currently at Google)</i>	2017 - 2018

#### REFERENCES

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Yuvraj Agarwal	Associate Professor, School of Computer Science, Carnegie Mellon University
Chris Harrison	Associate Professor, School of Computer Science, Carnegie Mellon University
Mayank Goel	Associate Professor, School of Computer Science, Carnegie Mellon University