Keshav Kaushik

Postdoc at National University of Singapore

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SUMMARY

- Analytical researcher with 4+ years of experience in **EnergyPlus, Artificial Intelligence (AI), Machine Learning (ML), Internet of Things (IoT), and Networks**
- 5 years of teaching experience as **Teaching Assistant** in Graduate and Undergraduate level courses
- **Principal Investigator** on a Grant received from ACM SIGMobile. Administered a team of electricians and computer engineers
- **Invited Talk** at ERROR 2023
- **Principal Inventor** in 3 Patent applications
- Author of **7 publications** in top peer-reviewed prestigious venues like **BUILDSYS, e-Science, COMSNETS, and EI.A**

RESEARCH EXPERIENCE

NUS (Postdoctoral Fellow)   **Feb 2024 - Current**

TU Dortmund (Visiting Scholar**)**   **June 2023 - July 2023**

BITS Pilani (Doctoral Researcher – Thesis Submitted)   **Jan 2019 - Dec 2023**
Department of CS&IS, Laboratory of Prof. Vinayak Naik

IoT and AI for Energy Systems

- Development of AI-based IoT systems to optimize energy consumption by cooling systems. We observed energy savings of up to 62% in real-world applications
- Proposed a three-staged AI technique to identify faults in cooling systems in real-time. We also identify the cause of the fault. The approach saved up to 48% of energy
- We set up a Living Lab on campus at more than 6 locations to evaluate the solutions. The sensors are connected to the Internet using 4G and 5G networks
- We used EnergyPlus to evaluate proposed solutions in simulated environments

DESIDOC D.R.D.O (Research Intern)   **June 2017-Sept 2017**
Laboratory of Scientist Vivek Kumar

Security in Wireless Sensor Networks

- Identification of hello-flood attacks on a system with minimal knowledge of the attacker

- Proposed Advanced RAEED protocol which evaluates the network and performs data analysis to identify attacker nodes and limiting their interactions in the network

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AWARDS
- Research Explorer Ruhr 2023
- ACM SIGMobile Student Community Grant to make the dataset of ductless-split cooling system publicly available
- COMSNETS 2023 Travel Grant to attend and present my work
- 2nd Position in 5 minutes Innovation Challenge held at SKM 2019
- Received Grant to present my work at IISc CSA Summer School in 2017
- Child Scientist by NCERT
- Secured 3rd Position in Paper Presentation at TekRan-2017
- 2nd Position in Delhi State Science Exhibition
- 1st Position in Centre Level Science Exhibition
- Secured a prestigious position in Science Open Merit Test

SELECT PUBLICATIONS
- Keshav Kaushik and Vinayak Naik, "MaOC: Model-Assisted Optimal Control for Ductless-Split Cooling Systems in Building Environments" Invited paper at IEEE COMSNETS 2024
- Keshav Kaushik, and Vinayak Naik, "An Energy Consumption Dataset for Ductless-split Cooling Systems to Train Large Models," Accepted at ACM BUILDSYS 2023
- Keshav Kaushik, and Vinayak Naik, "OCSRL: An Model-Based Reinforcement Learning Approach to Optimize Energy Consumption of Cooling Systems," Accepted at IEEE e-Science 2023
- Keshav Kaushik, and Vinayak Naik, "A Real-Time Non-Invasive Anomaly Detection Technique for Cooling Systems," Accepted at Energy Informatics.Academy 2023
- Keshav Kaushik, Prabhutva Agarwal, and Vinayak Naik, "A Dynamic Scheduling Technique to Optimize Energy Consumption of Ductless-split Cooling Systems," Accepted at IEEE ICOIN 2023
- Keshav Kaushik, Vinayak Naik, "Making Ductless-split Cooling System Energy Efficient using IoT", Accepted at IEEE COMSNETS 2023
- Keshav Kaushik, "Use of IoT to Make Energy Efficient Ductless-split ACs," accepted for presentation in ACM SenSys 2022

PATENTS
- Keshav Kaushik and Vinayak Naik, "IoT Based Dynamic Control System to Optimize Energy Consumption of Ductless-Split Air Conditioners," application number: 202211055186.
- Keshav Kaushik and Vinayak Naik, "A Real-Time Non-Invasive Anomaly Detection Technique for Cooling Systems", Filed

- Keshav Kaushik and Vinayak Naik, "NN-DBSCAN: A Domain-BAsed Classifier to Identify Faulty Parts in Cooling Systems using IoT", Filed

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TECHNICAL SKILLS

Tools: Python, MongoDB, Network Simulator, Linux, EnergyPlus, ReST API,

Packages: Scikit-Learn, NumPy, SciPy, MatplotLib, TensorFlow/ Keras, Prophet

ML/ AI: Supervised Learning, Unsupervised Learning, Reinforcement Learning, Deep Learning, Transfer Learning

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TEACHING EXPERIENCE

- Teaching Assistant for Advanced Computer Networks 2023. I was responsible for evaluating assignments and the answer scripts
- Teaching Assistant for Pervasive Computing 2020, 2021, and 2022. I was responsible for conducting tutorials and guiding students for graduate-level projects
- Teaching Assistant for Computer Networks 2021, 2022, and 2023. Here, I administered Labs for Undergraduate courses. I was also responsible for conducting tutorials
- Teaching Assistant for Theory of Computation 2019-2020. Here, I was responsible for conducting tutorials
- Teaching Assistant for Computer Programming 2019-2020. I administered Lab for Undergraduate course
- Teaching Assistant for Software for Embedded Networks 2020-2021. I was responsible for conducting Labs for undergraduate and graduate students

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EDUCATION

BITS Pilani, Goa

Ph.D. in Computer Science & Information Systems   **2023 (Submitted)**

Qualifier Subjects: Computer Networks, Machine Learning (ML), Algorithms, Network Security

GGSIPU, Delhi

B.Tech in Computer Science & Engineering   **2018**

CRRIT, Delhi

Diploma in Electronics Engineering   **2015**

COMMUNITY SERVICE

- TPC for ICLR Tiny Papers 2023, 2024
- SPC for COMPASS 2021
- TPC for COMPASS posters 2021, 2022
- TPC for ICCCIS 2021, 2022

REFEREES

1. Prof. Vinayak Naik, Professor, Department of Computer Science and Information Systems, BITS Pilani, Goa, India | Email: vinayak@goa.bits-pilani.ac.in
2. Dr Sougata Sen, Assistant Professor, Department of Computer Science and Information Systems, BITS Pilani, Goa, India | Email: sougatas@goa.bits-pilani.ac.in
3. Dr Sravan Danda, Assistant Professor, Department of Computer Science and Information Systems, BITS Pilani, Goa, India | Email: dandas@goa.bits-pilani.ac.in