

Aniruddha Basak

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EDUCATION

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- **Carnegie Mellon University** U.S.A
• MS/PhD, *Electrical and Computer Engineering* Aug 2011 - Nov 2017
Thesis: Scalable Bayesian Network Learning and its Applications. Advisor: Ole J. Mengshoel
 - **Jadavpur University** Kolkata, India
• Bachelor of Engineering, *Electronics and Telecommunication Engg.* July 2007 - May 2011

INDUSTRY EXPERIENCE

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- **Amazon - Applied Scientist**, Seattle, WA Nov 2017 - Present
 - **Hunches**: Launched smart home recommendations about anomalous appliances throughout the day. Built personalized graphical models for millions of customers for state prediction of home appliances. Combined with a “global” neural network model for intent classification increased hunches volume by 2x and improved acceptance by 6%.
 - **Setup Hunches**: End-to-end delivery (design, implementation, and launch) of intelligent configuration recommendations for SmartHome to enable natural control of devices, and reduce friction. Augmented language embedding with temporal, and device specific features to classify the type of a smart plug. Currently helping millions of customers in the U.S.
 - **Alexa Energy Dashboard**: Built HVAC energy estimation model, to help customers track and save energy.
 - **Explaining Proactive Hunches**: Designed and built explanations for all proactive actions. Published research on explaining black box neural network model in the Explainable AI workshop in Amazon Machine Learning Conference.
 - **Teaching and Advising**: Instructor for an accelerated course in Amazon Machine Learning University. Helped engineers and scientists from other part of the organization via Science Office hours, and machine learning reading group.
 - **Google - Software Development Intern**, New York, NY May 2014 - Aug 2014
 - **Google Maps**: Improved prediction of verifiable new businesses found from google-search query logs.
 - **Google - Software Development Intern**, Pittsburgh, PA May 2013 - Aug 2013
 - **Google Ads**: Developed distributed feature selection algorithm for sparse high dimensional data. Enabled addition of new relevant features required to improve detection of policy violation for (Google) Ads landing pages.
 - **Expedia - Software Development Intern**, Bellevue, WA June 2012 - Aug 2012
 - **Data Warehouse and Intelligence**: Implemented hotel clustering using “user click-stream data”, on Expedia’s Hadoop platform. The clusters showed promise in enriching similar hotel search, and improving recommendations.

SKILLS SUMMARY

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- **Languages**: Python, Java, Bash, R, Scala, MATLAB, C++, C, Visual Basic, SQL, JavaScript.
 - **Frameworks**: Apache Spark, TensorFlow, Keras, Scikit, Apache Hadoop, CUDA, OpenMP, Shell scripting.

PUBLICATIONS (SHORT SUMMARY)

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- **CADDeLaG: Framework for distributed anomaly detection in large dense graph sequences.** Aniruddha Basak, Kamalika Das, Ole J. Mengshoel. 2018. arXiv:1802.05421
 - **Wetting and drying of soil: From data to understandable models for prediction.** A. Basak et al. IEEE 5th International Conference on Data Science and Advanced Analytics (DSAA), 2018.
 - **Optimizing the Decomposition of Time Series using Evolutionary Algorithms: Soil Moisture Analytics.** A. Basak et al. In Proceedings of the Genetic and Evolutionary Computation Conference, Berlin, Germany, July 15–19, 2017.
 - **Scalable Causal Learning for Predicting Adverse Events in Smart Buildings.** A. Basak, Ole Mengshoel, Stefan Hosein, Rodney Martin. Proceedings of the AAAI Workshop on AI for Smart Grids and Smart Buildings, Phoenix, USA. 2016.

RESEARCH PROJECTS

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- **Graph Anomaly Detection** - identifying contributing factors of climate anomalies, and the transition of public support (sentiment) from the early phase of 2016 U.S. presidential elections. Developed scalable (and theoretically sound) methods for detecting anomalies in graphs with 260K nodes and 670 billion edges. The climate anomaly results revealed new connections between northern California and South American countries (Peru, Columbia) in regards to 1994-95 El Niño phenomenon.
 - **Uncertainty modeling of airport surface traffic in New York City metroplex.** Using Bayesian Network Structure Learning, constructed models of taxi time for all three airports: JFK, Newark, and LaGuardia. Simulated experiments showed, the probabilistic model of departure taxi time improved airport and metroplex scheduling, reducing delays in flight departure.
 - **Predicting adverse events in a smart building, and identifying the root causes.** Sensor data collected from Building Automation System of NASA Ames Sustainability Base, and probabilistic graph structure learning enabled identifying the causes of adverse events, such as abnormally low room temperatures in conference rooms.
 - **Soil moisture modeling to improve early warning systems for landslides or flash-floods.** Developed hydrology inspired, explainable soil moisture forecasting models for unsaturated soil. (Emphasis on challenging wildfire burnt landscapes)

HONORS AND AWARDS

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- **Leo Finzi Memorial Fellowship**: CMU ECE department’s endowed fellowship awards 2015/2016