Bhavani Ananthabhotla

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Education

Aug 2014— Feb 2019

Degree: Bachelor of Science in Computer Science
Where: Yale University, New Haven, CT
Thomas J. Watson Memorial Scholarship Awardee 2014–2018

Research Interests machine learning and data analytics applied to humanitarian assistance, disaster response, geospatial data, remote sensing

Research Projects

Apr 2020— Present

Project: COVID-19 Analytics for USNORTHCOM
Where: MIT Lincoln Laboratory, Lexington, MA
Advisor: Jonathan Pitts
Contributions:

- Project to deliver hospital resource (ICU Bed and ventilator) scarcity modeling during the pandemic in iterations starting as early as April 2020. Led the project sub-team for datasets research, vetting, cataloging, and preparation for automated ingestion. Coordinated with teams across the laboratory and with research teams at Google and Microsoft.
- Handled heterogeneous and sparse data; contributed to Lincoln team's deduplication method for multiple streams of hospital resource data.
- The project was honored with an **MIT Lincoln Laboratory Team Award** 2019-2020.

Sept 2019— Present

Project: Efficacy of Earthquake Forecasting From Ionosphere Data
Where: MIT Lincoln Laboratory, Lexington, MA
Advisor: Jessica Reid and Jeffrey Liu
Contributions:

- Developed classical machine learning approach to earthquake event detection from 10 years worth of 15-minute resolution Total Electron Content time-series data from NASA CDDIS.
- Initial results, along with results from a deep learning anomaly detection approach were **accepted for interactive poster presentation at the 2020 AGU Fall Meeting**.

Mar 2019— Apr 2020

Project: Automated Exploitation of Lidar Data for Disaster Response
Where: MIT Lincoln Laboratory, Lexington, MA
Advisor: Frederick Waugh and Sean Anklam
Contributions:

- Algorithmic development for segmentation and anomaly detection of aerial 3-D Lidar point cloud data for domain-specific pain points in wide-area post-disaster assessment. My contributions were leveraging a generated feature set of local geometries within the point cloud, as well as human-annotated uncertainty labels.
- Code for road and runway damage detection became part of the group's processing pipeline for flight tests of the lidar hardware for disaster response.

February 2019—June 2019

Project: Multispectral Imagery Analysis for Soil Pb Detection
Where: MIT Lincoln Laboratory, Lexington, MA
Advisor: Sean Anklam and Jayant Sharma
Contributions:

- Investigated the use of public and government-owned multispectral imagery datasets for the detection of lead (Pb) pollution to improve the efficacy of field interventions, on behalf of a premier pollution-mitigation non-profit organization. Field soil test data from the non-profit were used as ground truth to train a convolutional neural network.

Sept 2016—Apr 2017

Project: Research Intern: CHERish Drawing/Notetaking Tool
Where: Yale University, New Haven, CT
Advisor: Holly Rushmeier
Contributions:

- Performed testing of 3-D cultural heritage site documentation tool using 2-D documentary image datasets from the Dura Europos Collection and the Horace Walpole Strawberry Hills Collection at Yale.

June 2015—Aug 2015

Project: Automated UX of iSCAT Imaging Technology
Where: Max Planck Institute for the Science of Light, Erlangen, Germany
Advisor: Felix Knauf and Vahid Sandoghdar
Contributions:

- Automated analysis pipeline for research group's novel nano-scale interferometric scattering (iSCAT) imaging system using MATLAB and LabView.
- System developed for use in research on chronic kidney disease at the University of Erlangen's Translational Research Center.
- **First undergraduate student** accepted on TRENAL research grant for summer internship support.

Presentations and Papers

- Jeffrey Liu, Jessica Reid, and Bhavani Ananthabhotla. "QuakeCast, An Earthquake Forecasting System Using Ionospheric Anomalies and Machine Learning". In: *2020 Fall Meeting of the AGU*. Dec. 2020. Abstract accepted for interactive poster presentation.

- Sean Anklam, Bhavani Ananthabhotla, and John Aldridge. "Multispectral Imaging for Lead Detection". Nov. 2019. Internal report, MIT Lincoln Laboratory.

Media

- "QuakeCast Earthquake Forecasting System". In: *Lincoln Laboratory Bulletin* (Nov. 2020)
- "With lidar and AI, road status clears up after a disaster". In: *MIT News* (Apr. 2020). URL: `https://news.mit.edu/2020/lidar-and-ai-road-status-clears-after-disaster-0415`
- "Summer research experience at Max Planck Institute". In: *TRENAL* (2015). URL: `http://www.trenal.med.fau.de/2015/11/18/trenal-visiting-student-2015/`

Other Design Projects

- **Emergency Water Supply Resiliency** Shadowed senior engineers and conducted interviews in several schools/hurricane shelters in Puerto Rico; project with the American Red Cross (MIT Lincoln Lab, 2019).
- **MyMark.js** Final project for Intro Interactive Design, a site overlay inspired by the *bindi* (Course Grade: A, 2018).
- **User preference modeling for assembly task** within human-robot collaborative system (Yale Social Robotics Lab, 2018).
- **Infosys Business Plan Competition, 2nd Place Award** for novel industrial machine fault remediation system (2016).
- **Pick-and-place robot** Final project for Mechanical Design, which featured laser-cut rack-and-pinion system (Course Grade: A, 2015).
- **MouthBot** Prototype of robot which featured a moving jaw to aid young children with ASD with focusing on facial movement (Intern, Yale Social Robotics Lab, 2015).
- **Intern**, Apicella + Bunton Architects (2015).

Extracurricular/Leadership

- Homeland Protection Workshop Series Humanitarian Assistance and Disaster Response Poster Session Co-Chair (*cancelled due to pandemic*, 2020)
- MIT Campus Radio "Post-It Wall" Series co-hosting (2019)
- BulldogHACKS at Yale co-founder, organized undergraduate design hackathon events (2016), helped run Yale Medical School's CBIT/CORE Patient Experience Hackathon (2015)
- Yale Sur et Veritaal A Capella group Musical Director (2016-17), Assistant Musical Director (2015-16), Soprano II (2014-15)

Skills Python, Tensorflow/ Keras, Pandas; QTModeler, QGIS; SQL, web development