Bipul Islam

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Summary

- I look forward to pursue technically challenging opportunities in Computer Vision, Applied Mathematics, Data Science & Engineering and Medical Imaging. I like problem solving via analytics, as well as designing large scale software solutions by porting ideas to well-engineered code.
- Professional projects focusing on Statistical Analysis and Data Engineering mentioned in this document involved Python, R, Postgresql and AWS tools. Doctoral studies that primarily focused on the domain of Applied Mathematics (Partial Differential Equations), involved developing full stack environments in Python, Matlab (*repositories will be visible on request*) with some limited use of C++ for coursework.

Academics

Stony Brook University   **New York, United States**
PhD, Dept. of Biomedical Informatics   *Aug 2017- Dec 2020*
Specialized in applications of Control Theory to variational formulations in Computer Vision

Indian Statistical Institute   **West Bengal, India**
Master of Technology in Computer Science   *Aug 2011- Aug 2013*

West Bengal University of Technology
Bachelor of Technology in Computer Science and Engineering   *Aug 2007- Aug 2011*

Skill Set

Programming Languages	Python, R, Matlab, C/C++, Java, LaTeX
Big Data Environments	AWS, Amazon EMR, PySpark
Database	Postgresql, MySQL
Related Coursework	Data Science Fundamentals, Big Data Anaytics, Computer Vision, Medical Imaging, Compiler Design, System Security, Database Systems Linear Algebra, Probability and Statistics, PDE, Discrete Mathematics

Doctoral Research

Graduate Teaching Assistant   **Stony Brook University, NY, United States**
Computer Science   *Aug 2017 - May 2018*
Research Assistant
Computer Science and Biomedical Informatics   *May 2018 -Nov 2020*

Thesis: Control-Based Reconstruction and Pose-Estimation   *December, 2020*

Publications

- Bipul Islam, Ji Liu, Anthony Yezzi and Romeil Sandhu. *Forming 3D Operator Control for 2D Image-Based Ambiguous Environments.* (**Accepted**). 2021 American Control Conference.
- Bipul Islam, Ji Liu, Anthony Yezzi and Romeil Sandhu. An Interactive Control Approach to 3D Shape Reconstruction. 2020 American Control Conference (ACC). IEEE, 2020.
- Bipul Islam, Ji Liu, and Romeil Sandhu. Characterizing Distances of Networks on the Tensor Manifold. International Conference on Complex Networks and Their Applications. Springer, Cham, 2019.

Invited Talks

- *Interactive Feedback Control Towards Scene Reconstruction.* Invited talk: *Dialogues at Zendrive.* Jan 17, 2020.
- *An Interactive Control Approach to 3D Shape Reconstruction.* 2020 American Control Conference Denver (Virtual), CO, USA, July 1-3, 2020

Mentoring and Outreach

- Discussion sessions and grading for CSE 101. Fall 2017, Spring 2018.
- Simons Summer Research Program mentor 2019 and 2018.
- Mentor for Computer Science and Informatics Summer Research Experience Program (CSIRE, 2019).
- *Interactive Feedback Control Towards Scene Reconstruction.* CSIRE summer program guest talk, 2019.

Professional Experience

Associate Data-Scientist   **Zendrive, Bangalore, India**
Data Science & Engineering Team   *July 2014 - July 2017*

I worked on quantifying and improving on-road driving behaviour using vehicle telematics obtainable via smartphones as a part of the Data Science and Engineering teams. Projects mentioned in this document were a part of the *Minimal Viable Product* of the company.

Patent: Jayanta Pal, Bipul Islam, Romit Roy Choudhury, Pankaj Risbood, Jonathan Matus, and Vishal Verma. *Method for smartphone-based accident detection.* U.S. Patent 9,818,239, issued November 14, 2017.

Data Science Projects
- Development of the statistical methodology for quantifying and scoring on-road driving behaviour based on sensor traces during the trips.
- Development of the *Risky Event(s) detectors* that form the main components of the system, using machine learning techniques over sensor traces.
- Development of models for vehicular collision detection from smart-phone sensor data for early road-side assistance.
- Developed methods for detection/classification of different modes of locomotion.
- *Principal Component Analysis* based Clustering techniques for compressing efficient storage of sensor traces.
- Built a *Signal processing pipeline* for ensuring data sanity for different data ingestion methods and frequencies.
- Server side optimisation for removing anomalous trips and also building corresponding models for reducing smartphone sensor up-times for less battery conservation.

Data Engineering Projects
- Handling on-demand Large scale report generation, with detail query optimization to improve AWS Database CPU load. This also led to building an in-house AWS task management framework for handling processes that run longer than maximum allowed timings on AWS.
- Development of a full-System health metrics tracking system using Elastic-Search Data store, with email alerting for issues, integration with Asana issue reporting, integration with Hosted Graphite for visualization.
- Developed a Live Amazon EMR cluster update tool to install python, R, yum packages on the fly (in parallel), to eliminate bootstrap phase time and making the cluster more spark compliant.

Data Analysis Projects
- Weekly actionable insights from data for partners to demonstrate effectiveness of different forms of the product. Generate market research for products when necessary for decision making.
- Performance evaluation of various detectors in the ecosystem.
- Designing, maintaining and curating data collection experiments to build a large repository of events available for the data science team.
- Designing a full scale system that could handle weekly tasks of sending out bulk email reports to partners in parallel.

Interesting Projects

GitHub project links:
- 2D Segmentation with Snakes (Chan Vese, Bhattacharya, Interactive control): Standalone python 2.7 package
- Automated document indexing (TFIDF, LDA, Word Embedding): Standalone python 2.7 package
- Selenium based tool for analyzing website load times: Standalone python 2.7 package
- Interactive graph visualization tool: Front-end in D3.js, back-end in python flask.
- Map reduce for singular value decomposition, word frequency, set difference: Written in python 2.7
- Latex to Html converter: Written in flex (lex), bison (yacc).
- Inter process communication based simple server-client chat service: Written in C, uses Unix sockets.
- K coloring problem with SAT solvers: Preprocessing in Python, with zchaff SAT solver.
- OpenGL project with cubes rotating arbitrarily in synch: Written in C++ with GNU Open GL libraries.