

# Ainesh Bakshi

aineshbakshi@gmail.com • +1 (732) 604-4689

## EDUCATION

**Rutgers University**, New Brunswick, NJ, USA

Bachelor of Science (B.S.) in Computer Science

Aug 2013 – Dec 2015

- Cumulative GPA: 3.92 / 4.0

Relevant Courses

- Graduate Design and Analysis of Algorithms (CS 513)
- Graduate Computational Geometry (CS 529)
- Graduate Foundations of Computer Science (CS 509)
- Operating Systems Design (CS 416)

## PUBLICATIONS

### CONFERENCES

R. Aggarwal, A. Bakshi, “Non Dominated Sorting Genetic Algorithm for Chance Constrained Supplier Selection Model with Volume Discounts” *ACIIDS*, Lecture Notes in Computer Science pp. 465–474, Apr 2014.

A. Bakshi, K. Goel and Raunaq. Vohra, “A Novel Feature Selection and Extraction Technique for Classification,” *SMC 2014*, pp. 4033–4034, Oct 2014.

R. Sant, N. Kulkarni, A. Bakshi, K. Goel, and S. Kapur, “Autonomous Robot Navigation: Path Planning on a Detail-Preserving Reduced-Complexity Representation of 3D Point Clouds,” in *ICVS 2013*, pp. 173–182, Jun 2013.

R. Sant, N. Kulkarni, A. Bakshi, K. Goel, and S. Kapur, “Spatially Important Point Identification: A New Technique for Detail-Preserving Reduced-Complexity Representation of 3D Point Clouds,” in *WorldComp 2013*, Las Vegas, USA, May 2013.

## PATENT

Patent filed at the Indian Patent Office, Patent Application No: 185/DEL/2013 Patent Ref No. PA00061

System and Method for reduced complexity detail preserving representation of Data. Optimal representation of an environment by way of terrain maps is of considerable interest in mobile robotics and robot navigation. There are different terrain map representation techniques, and there are some benefits and costs in terms of complexity with each representation technique. This is an amalgamation of the above mentioned techniques combined with a hexapod robot as hardware.

## WORK EXPERIENCE

**Bloomberg LP.**, New York City, USA

May 2015 – Aug 2015

Intern, Search and Discoverability Group

- Worked on Query Reformulation ( Independent Project ), for all queries on the Bloomberg Terminal’s search function (HL <Go>).
- The system builds a contextual language model for the corpus, determines if the query should be reformulated and reformulates queries by adding terms to the original query based on it’s left and right context.
- Logically ORs the expanded queries with the original, aggregates the results and improves the NDCG of the search engine.
- Wrote the Query Reformulation module and service in C++, ran Hadoop clusters for data collection and wrote preprocessing scripts in python.
- Went from literature survey and research to production in 12 weeks.

**Microsoft Research**, Bangalore, India

May 2014 – Aug 2014

Intern, Machine Learning and Optimization Group

- Worked under Dr. Manik Varma on deterministic linear approximations of the RBF kernel
- Brought testing time complexity on the Gaussian kernel from  $O(n^3)$  to  $O(n)$ , while maintaining accuracy, crucial for real time applications.
- Implemented the gaussian kernel approximation using the LibSVM library and wrote a Matlab wrapper for it.
- Significant improvement over existing linear approximations of kernels.

## RESEARCH EXPERIENCE

**Rutgers University, New Brunswick**

Human Robot Interaction: Machine Vision and End Effector Control

Aug 2014 – May 2015

- Evaluated robotic arm trajectories that move along a collision free path as well as optimized the end effector’s grasping configurations.
- Detected objects in the environment, recognized their pose and orientation, determined trajectories that is intuitive to humans to ensure safe collaboration.
- Enabled complicated tasks and skilled labor accurately and securely, in a collaborative environment.
- Research areas: Human Robot Interaction, Machine Vision, Robotics, Machine Learning
- Advisor: Professor Kostas Bekris

Write Optimized File System for Solid State Drives Dec 2014 – Dec 2015

- Ported Fractal Tree File System to SSDs, bench marking performance of various file systems on SSDs.
- Buffered Writes to prevent unnecessary garbage collection in SSDs.
- Used the Betrfs open source code base.
- Research areas: External Memory Algorithms, File Systems
- Advisor: Professor Martin Farach-Colton

### **BITS PILANI, GOA**

Terrain Adaptive Gait modelling Aug 2012 – Aug 2013

- Made a hexapod learn and subsequently adapt to an unknown terrain culminating in an intelligently chosen gait under a set of topological and mechanical constraints.
- Developed a set of inverse kinematic relation for its motion were implemented by using a combined a wave and tripod gait.
- Developed 3D Point Cloud compression algorithm.
- Developed a dynamic Path Planning algorithm for the compressed representation of the terrain.
- Research areas: Robotics, Computer Vision, Path Planning, Topology, Machine Learning

Feature Selection and Multi-Label Text Classification Dec 2012 – Jul 2013

- Improved the accuracy of text classification using SVMs, controlled computational expense by performing intelligent feature selection.
- Developed Class/Group representative features to improve performance
- Re-evaluated the popular Tf-Idf statistic due to the inherent fallacy in its feature generation algorithm, which punishes features that are representative of a group of documents.
- Research areas: Machine Learning, Classification

Multi-Objective Optimization May 2013 – Dec 2013

- Stochastic Chance-Constrained Programming Model (SCCPM) for the supplier selection problem, with suppliers offering incremental volume discounts in a conflicting multi-objective scenario, under the event of uncertainty.
- Used genetic algorithms like NSGA-II, wrote source code for optimizing with probabilistic constraints.
- Research areas: Optimization, Supply Chain Management
- Advisor: Professor Remica Aggarwal

### **ACADEMIC HONORS & AWARDS**

Dean's List, Rutgers University 2013 – 2015

Aresty Research Assistant, Rutgers University 2014 – 2015

School of Arts and Science Excellence Award, Rutgers University Dec 2014

- Scholarship for outstanding academic record and strong record of service to the university and the community.

### **COMPUTER SKILLS**

#### **Languages**

- C & C++
- Python
- Java
- Matlab

#### **Operating Systems**

- xv6 ( MIT OS for teaching ), implemented signals, semaphores, kernel level threads and copy on write.
- Linux
- Robot Operating System (ROS)

### **RESEARCH INTERESTS**

#### **Artificial Intelligence & Algorithms**

- Machine Learning
- Graph Algorithms
- Search
- Natural Language Processing and Machine Vision

[CV compiled on 2015-10-20]