Ainesh Bakshi

CONTACT
INFORMATION

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RESEARCH
INTERESTS

Theoretical Machine Learning, Approximation Algorithms, External Memory Algorithms.

EDUCATION

Rutgers University, New Brunswick, NJ USA

Bachelor of Science (B.S.), Computer Science, Jan, 2016

- GPA : 3.94 / 4.0
- Major GPA : 4.0 / 4.0

Relevant Courses :

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

MANUSCRIPTS

<u>A. Bakshi</u> and P. Awasthi "Efficient Clustering Algorithms for Computing Better Local Optima" *Manuscript.*

<u>A. Bakshi</u>, "Polynomial-time Algorithms for {1, 2}-Instances below 2-perturbation resilience " *Manuscript.*

A. Conway, <u>A. Bakshi</u>, Y. Jiao, W. Jannen, Y. Zhan, J. Yuan, M. Bender, R. Johnson, B. Kuzmaul, D. Porter, M. Farach-Colton, "File Systems Fated for Senescence? Nonsense, Says Science!" *Manuscript.*

PUBLICATIONS

R. Aggarwal and <u>A. Bakshi</u>, "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.

K. Goel, R. Vohra and <u>A. Bakshi</u>, "A Novel Feature Selection and Extraction Technique for Classification," *ICFHR 2014*, pp. 104–109.

R. Sant, N. Kulkarni, <u>A. Bakshi</u>, 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.

POSTERS

<u>A. Bakshi</u>, K. Bekris, "Human Robot Interaction: Machine Vision and End Effector Control," *Aresty Research Symposium.*

K. Goel, R. Vohra and <u>A. Bakshi</u>, "A Novel Feature Selection and Extraction Technique for Classification," *SMC 2014*, pp. 4033–4034.

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.

HONORS AND
AWARDS

Graduated Summa Cum Laude, Computer Science, Phi Beta Kappa	**January 2016**
School of Arts and Science Excellence Award, Rutgers University	**December, 2014**

RESEARCH	**Rutgers University**, New Brunswick, New Jersey USA	**September, 2016 - present**

EXPERIENCE

Research Fellow, Advisor : Professor Pranjal Awasthi
Upper and lower bounds for clustering stable instances. Clustering with a center based objective function, in general, is NP-Hard. We study clustering instances that follow α-stability (α perturbation resilience) as proposed by Bilu and Linial. The current best known upper bound is a polynomial time algorithm for 2-stable instances under any objective and there is no known lower bound for k-means and k-median objective functions. We show that no existing reduction technique can be used to prove a lower bound for k-means and k-median objectives by giving a polynomial-time algorithm for these specific instances for α as low as $1 + \epsilon$, for any $\epsilon > 0$. We also describe efficient clustering algorithms for computing "better" local optima. This includes the first known algorithm to output a stable locally optimal solution even when the value of k, the number of optimal clusters, is unknown.

Rutgers University, New Brunswick, New Jersey USA   **January, 2016 - September 2016**

Research Fellow, Advisor : Professor Martin Farach-Colton
External Memory Algorithms and File System Aging. Seek times for rotation disks have been stable but bandwidth grows as square-root of capacity, thus theory suggest that fragmentation on disk will get worse as disks get bigger. However, aging is considered to be a solved problem by most UNIX-based file systems. Created realistic workloads, such as a mailserver and running through the git history of large open-source projects that caused file system heuristics to fail. For instance, for ext4 and zfs, performing a thousand pulls can reduce read performance by up to 30x as compared to a defragmented copy of the same file system. Demonstrated that BetrFS, a file system based on B^ϵ-tree avoids aging, which corroborates the theoretical performance guarantees of B^ϵ-trees.

Bloomberg L.P. , New York City USA   **May - August, 2015**
R&D Intern, Search and Discoverability Group
Designed and implemented a novel Query Reformulation system by creating a contextual language model for the entire Bloomberg text corpus, determining if the query is well formed and reformulating the query by adding and substituting terms. Project in production.

Microsoft Research, Bangalore India   **May - August 2014**
Intern, Machine Learning and Optimization Group
Worked with Dr. Manik Varma on deterministic linear approximations of the RBF kernel. Created a new algorithm improving testing time complexity for the Gaussian kernel from O (n^3) to O (n), while maintaining accuracy, crucial for real time applications.

COMPUTER SKILLS
- Languages: LaTeX, C, C++, Python, Bash, Matlab, Java, x86 Assembly, Scheme.
- Operating Systems: Unix/Linux, xv6 (MIT OS), Robot Operating System (ROS) .