Nilesh Kulkarni

504, The O'ville Prime, Seocho-2(i)dong, Seocho-gu
Seoul, South Korea
✆ +82 (10) 3338 4844
✉ nileshsatishkulkarni@gmail.com
🖰 nileshkulkarni.github.io/

Research Interests

Machine Learning, Natural Language Understanding,
Computer Vision, Robotics

Education

July 2011 - Aug 2015
Bachelor of Technology *Computer Science and Engineering*
Indian Institute of Technology, Bombay (IIT Bombay)
Honors in Computer Science Engineering
Minor in Electrical Engineering
GPA: 8.77/10

Publications

Dec 2016
Robust Kernel Principal Nested Spheres
Suyash P. Awate*, Manik Dhar*, Nilesh Kulkarni*
International Conference on Pattern Recognition (ICPR), Cancun, 2016   [link]
* Equal contribution

Industry Experience - Software R&D, Samsung Electronics, S. Korea

Mar 2016 - ongoing
Natural Language Modelling, Smart Input Panel
Research Associate, Artificial Intelligence Lab
- Designed language models for English and Korean using Recurrent Neural Nets (RNNs)
- Optimized the model for memory and inference time constraints on mobile devices
- Obtained better on-device keyboard predictions benchmarks than existing solutions

Sept 2015 - Feb 2016
Music Recommendation System, MILK Music
Research Associate, Artificial Intelligence Lab
- Developed a genre prediction engine for music tracks to complement collaborative filtering
- Built an ontology linking the various music genres from various non-standard meta-data sources
- Designed algorithms for genre similarity to personalize user recommendations

May 2014 - June 2014
Big Data Analytics for User data
Intern, Big Data Solutions Lab
- Designed a distributed algorithm for decision trees and random forests
- Deployed algorithms on user data for gender profiling
- Achieved speed up over 6 times compared to existing solutions; deployed on a Hadoop cluster

Research Experience

July 2014 - May 2015
Distributed Linear Programming Boost (LPBoost)
Undergraduate Dissertation, IIT Bombay
Mentor: Prof. Ganesh Ramakrishnan
- Designed a distributed LP Boost (D-LPBoost) algorithm.
- Implemented the algorithm over two paradigms: data and hypothesis space parallelization
- Formulated a master-slave solution with each slave working on a subset of hypotheses
- Used Alternating Direction Method of Multipliers (ADMM) to untangle various variables in the joint optimization   [Report][Code]

July 2014 - May 2015	**Kernel Principal Nested Sphere (KPNS)**
	Undergraduate Research Project, IIT Bombay
	Mentor: Prof. Suyash Awate
	○ Designed KPNS, a kernel space statistical procedure
	○ KPNS transforms data to independent un-corelated modes of variation called Principal Spheres
	○ The method leverages the fact that data lie on an unit sphere (unit-norm kernels)
	○ Achieved better results in the domains of Model Compactness, Dimensionality Reduction, Data Classification [paper]
May 2013 - June 2013	**Online Triangulation using a Swarm of simple Robots**
	Algorithms group, Technische Universitat Braunschweig Germany
	Mentor: Prof. Sándor P. Fekete
	○ Improved algorithms for exploring unkown areas using a swarm of simple robots
	○ Minimized overall error in navigation and localization, allowing for complicated maneuvers for exploration
July 2012 - May 2015	**Matsya, Autonomous Underwater Vehicle(AUV)**
	IIT Bombay & Naval Research Board, India
	Mentor: Prof. Leena Vachhani & Prof. Hemandra Arya
	○ Developed an Autonomous Underwater Vehicle to compete at International Robosub
	○ **Team Leader** - 2014:
	- Led a 40 member team comprising of three divisions: Electronics, Software & Mechanical
	- Managed operations, logistics, recruitment and knowledge transfer
	○ **Software Leader** - 2013:
	- Led a sub-division of 5 members
	- Involved in development of full system stack to ensure fail-proof mission execution
	○ 3 time Semifinalists at Robosub [Technical Paper][Website]

Achievements

- Secured **All India Rank 77** in IIT-JEE 2011, among 500,000 entrants
- Certifed as among the **Top 1%** in India, in the Indian National Chemistry Olympiad and Indian National Physics Olympiad, in 2011
- Awarded the Institute Technical Color (7 among 9000), 2014
- Awarded the Institute Technical Special Mention (15 among 9000), 2013

Teaching

2014	**Teaching Assistant** CS 210 Logic Design
2013	**Teaching Assistant** Workshop on Parallel Programming conducted by NVIDIA in association with CUDA Center of Excellence, IIT Bombay

Mentorship & Positions of Responsibility

2014-2015	**Department Academic Mentor** mentored 9 sophomores
2013-2014	**Technical Mentor** mentored 4 teams on technical projects
2012-2013	**Electronics Club Coordinator** club catering to hobby electronics at IIT Bombay

Seminars

Oct 2014	Generalization and Stability of Learning Algorithms	[Slides]
Mar 2014	Applications of Kalman Filters in Robot Localization	[Slides]
Feb 2014	Introduction to Robot Operating System: Creating software for Robots	
Jan 2014	Underwater Robotics: Developing AUVs	

Academics

Advanced Courses	Linear Optimization, Computer Vision, Image Processing, Medical Image Processing, Artificial Intelligence, Topics in Machine Learning

Skills	C, C++, Java, Python, MATLAB, Scala, Javascript, PHP, HTML, LATEX, Django, Boot-strap, Numpy-scipy, Hadoop, Cuda, TensorFlow, Torch, Theano

Course Projects

Spring 2015   **Image De-noising and Demosaicing using K-SVD**
Mentor: Prof. Suyash Awate   [Report] | [Code]
Denoised and Demosaiced image using the dictionary based learning and Orthogonal Matching Pursuit for Optimization for natural images.

Autumn 2014   **Texture Classification and Reconstruction**
Mentor: Prof. Suyash Awate   [Report][Code]
Modelled visual textures using **texton dictionary** based learning approach (**The Leung-Malik (LM) Filter Bank**) to model and represent visual textures.

Spring 2014   **Virtual Memory for Experimental OS**
Mentor: Prof. Dhananjay M. Dhamdhere   [Report][Code]
Design and implementated algorithms for effective processes handling; supports memory allocation, swap space management and process swapping for I/O operations in a virtual OS.

Autumn 2013   **Sequence Alignment on GPU's**
Mentor: Prof. Bernard Menezes   [Report][Code]
Implemented a Sequence Alignment problem on GPU's with parallel version of Needleman-Wunsch algorithm. Investigated Parallel Prefix and Diagonal based approaches to solve the problem. Achieved $O(n)$ complexity as compared to $O(n^2)$ in the Serial Version.

Autumn 2012   **N Body Simulation**
Mentor: Prof. Varsha Apte   [Code]
Designed a simulation for interaction of particles under intermolecular forces viz., gravitation, electrostatic and nuclear. We used the **Barnes-Hut** Algorithm to optimize computation.

References

○ Jihie Kim
Vice President
Artificial Intelligence Lab, Software R&D
Center, Samsung Electronics, S Korea
jihie.kim@samsung.com

○ Prof. Suyash Awate
Assistant Professor,
Computer Science and Engineering,
IIT Bombay
suyash@cse.iitb.ac.in

○ Prof. Leena Vachhani
Associate Professor,
Systems and Control Engineering,
IIT Bombay
leena.vachhani@iitb.ac.in

○ Prof. Ganesh Ramakrishnan
Associate Professor,
Computer Science and Engineering,
IIT Bombay
ganesh@cse.iitb.ac.in

○ Prof. Sándor P. Fekete
Professor,
Computer Science Department,
TU Braunschweig
s.fekete@tu-bs.de