NILAKSH AGARWAL

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Academic Details

Year	Degree	Institute	CGPA/Percentage
2019-2020	M.Tech in Computer Science	Indian Institute of Technology, Delhi	8.4/10
2015-2019	B.Tech in Engineering Physics	Indian Institute of Technology, Delhi	8.8/10
2015	Class XII, CBSE	Magnolia Maaruti Public School, Bangalore	96.4%
2013	Class X, CBSE	National Public School, Bangalore	10/10

Relevant Courses

AI for Robot Intelligence, Algorithmic Game Theory, Artificial Intelligence, Convolution Neural Networks, Database Management, Deep Learning, Extreme Classification, Graph Neural Networks, Machine Learning, Natural Language Processing, OSS Development with Linux and Git, Reinforcement Learning, Sequence Models, Tensorflow in Practice

Scholastic Achievements And Recognitions

- **Teaching Assistant** for UG courses on Machine Learning & Database Management (150+ students) (2019 - 2020)
- **IITD Semester Merit Award** Conferred for having CGPA in the top 7% among all students of IIT Delhi (2015)
- **National Standard Examination** Top 1% in Karnataka in Physics (NSEP) and Astronomy (NSEA) (2014, 2015)
- **Runner Up, HP CodeWars (India)** A competitive coding national level competition with over 100 teams (2014)
- **KVPY Fellowship** Received scholarship to pursue research from Dept. of Science and Technology by G.o.I. (2014)
- **NTSE Scholarship** Awarded after 2-tier evaluation: National Council for Educational Research & Training (2011)
- **ICAS, by Macmillian & UNSW Global** International Rank 1 in Science for two consecutive years (2009, 2010)
- **Winner, Indian Robotics Olympiad** Represented India at the World Robotics Olympiad held at Japan (2008)

Major Projects

Summer Internship - WorldQuant Research — May 2019 - July 2019

Devised utility operators for intraday (5 min) strategies to control behavior, reduce risk and regulate market impact
Augmented strategies with technical indicators to maintain Sharpe & turnover, & minimize intra-strategy correlation
Created 3 distinct operators for multi-factor exposure-based trade strategies using conic optimization with MOSEK
Found 1k+ pairs cointegrated stocks through Johansen Test and utilized mean reversion for trade position calculation

3D Human Pose Estimation (Keras [Python]) — Prof Rahul Garg, January 2019 - Jan 2020

Programmed a novel multi-modal Deep model for 3D Tracking (24 joints); outperforms SotA (1.3% better)
Improved both natural (Human3.6M) & synthetic (SURREAL) datasets; using Coordinate Conv. & Sequence Models
Tracked 25 distinct Yoga poses of 75 subjects with occlusions & unnatural extensions not possible with SotA

Finite Element Analysis (Python) — Prof Anurag Sharma, June 2018 - November 2018

Designed finite element solver for electromagnetic partial differential equations to compute scalar stationary field waveguide solutions in photonics for 6 different geometrical configurations and 20+ refractive index distributions
Incorporated self-adjusting triangular mesh sizing for denser approximation at boundaries for accurate modelling

Technical Skills

Programming: C, C++, C#, Python, Java, Go, Bash, Git, MATLAB, HTML5/CSS, JavaScript, SQL
Libraries: TensorFlow, Keras, PyTorch, OpenCV, NLTK, Pandas, Scikit-learn

Course Projects & Independent Projects

Early Detection of Carcinoma in Liver (MATLAB) Prof Amit Mehndiratta, September 2017 - May 2018

Innovated algorithm for liver segmentation from MRIs employing layer-based region growing across stack (71% DC)
Collaborated with Medical Imaging Lab, IITD to produce a toolbox for cancer detection, analyzing segmented image
Clinical prospects in early diagnosis and therapeutic monitoring of patients prone towards Hepatocellular Carcinoma
Abstract titled Automated Segmentation of Lesions in Liver Using T1 MR Imaging presented at ISMRM, 2018

Fast Abstractive Summarization (Pytorch [Python]) Prof Mausam, April 2019

Developed a multi sentence selection and rewriting tool, implementing encoder-abstractor-decoder RL based network
Improved abstractiveness (5% more novel n-grams) on CNN/Daily Mail Dataset, by multi-sentence input abstractor

Convolution Neural Networks (Tensorflow [Python]) deeplearning.ai, January 2019

Used YOLOv2 algorithm to build a multiple car detector, using bounding boxes and non-max suppression
Implemented the Neural Style Transfer algorithm, using a pretrained VGG-19 mode to generate style images
Created a face-recognition, using FaceNet algorithm and modelling a triplet loss for encoding face image

WebAssembly Analysis and Tracing (WebAssembly / JavaScript) Prof Smruti Ranjan Sarangi, Nov 2019

Analysed the performance of WebAssembly vs Native code (Polybench suite compiled with emscripten)
Analysis using Wasabi Toolkit (execution time, instruction mix & count and hot code indentification)
Experimented with modern browsers (Chrome, Firefox, Safari) as well as multiple Optimization Levels
Generated the dynamic instruction trace of WebAssembly and translated it to it's equivalent x86 format

Xv6 extension & functionality (C) Prof Smruti Ranjan Sarangi, March 2019

Worked in a group, extending functionality of Xv6, include IPCs (unicast, multicast) & creating distributed algorithm
Optimized Maekawas & Jacobis algorithm for mutual exclusion & steady heat distribution, up to 1000+ grids sizes
Formulated Kubernetes based containers with process, memory & file system isolation & virtual process scheduler

Two-level Priority Cache (C++) Prof Preeti Panda, June 2020

Developed a simulation for two-level cache memory, using high/low priority + LRU replacement policy
Created dynamic size scaling, using indicator bits & associativity, with exception handling & corrupted data access

Extra Curricular Activities

Team Lead, The Indian Economist December, 2016 - August, 2017

- Managed a 30+ team of associates, responsible for editing & publishing over 500+ news articles per month
- Single-handedly managed allocation and sequencing of articles, including social media and SEO parameters
- Received 4 promotions in 9 month period, awarded a letter of recommendation for contributions

House Representative, Board for Student Welfare (BSW) April, 2016 - April, 2017

- Managed and inducted 1500+ freshman students, to ease their transition to a new college life at IIT Delhi
- Organized 12 workshops, 6 seminars and 9 camps for the development of 12,000+ students in various fields
- Awarded Outstanding Contribution in Hostel Management for exemplary performance by Udaigiri House