Shikhar Jaiswal

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GitHub : https://github.com/ShikharJ

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IIT Patna

Computer Science & Engineering

Major GPA : 9.07/10.0

Overall GPA : 8.66/10.0

Honours & Achievements
Hyperlinks at appropriate places

- Achieved *98.71%* percentile in JEE Advanced (previously IIT-JEE) 2016 among 200,000 candidates
- Achieved *99.54%* percentile in JEE Main (previously AIEEE) 2016 among 1,200,000 candidates
- Achieved *99.13%* percentile in National Entrance Screening Test (NEST) 2016 among 40,000 candidates
- Recipient of the Kishore Vaigyanik Protsahan Yojana Scholarship in 2016 (*top 1400* students out of 100,000)
- Recipient of CBSE Award for Community Service - Human Rights and Social Equality 2013

Research Experience

Research Intern - Microsoft Research India
Summer & Fall '20

Mentors: Dr. Prateek Jain, Senior Principal Researcher & Dr. Harsha Simhadri, Principal Researcher

- Implemented various RNNPool-based face detection models, making use of neural network quantization and sparsification through SeeDot (MSR India's in-house compiler for low resource devices).
- Additionally deployed the models on ARM Cortex-M3/M4 class micro-controllers in under 190 KBs of RAM and 160 KBs of Flash usage, while achieving a latency of 10 seconds per frame for monochromatic QVGA images.

Visiting Academic Researcher - University of Southern California
Summer '19

Mentor: Prof. Benjamin D. Nye, Director of Learning Sciences - Institute for Creative Technologies

- Developed and deployed a variant of the active learning algorithm with weighted density policy for the SMART-E project for detecting user engagement with tutoring systems, funded by U.S. Office of Naval Research.
- Applied feature engineering to develop a set of generalizable engagement metrics for cross-system compatibility, and tackling cold start and automated annotation problems in play-persona environments.
- Achieved ~90% classification accuracy over a set of 5 distinct user groups with as little as 25 unlabelled samples.

Industrial & Open Source Experience

Open Mainframe Project Intern - The Linux Foundation
Summer '18

Mentor: Wolfgang Engel, SUSE Linux GmbH

- Built and deployed *6 software packages* compatible with s390x architecture for *SUSE Linux Enterprise Servers (SLES 12 and SLES 15)* on the *SUSE Package Hub* using *Open Build Service (OBS)* platform.
- Additionally worked on removing dependency issues and updated the entire *Haskell stack* on the SLES 12 channel.

Software Development Intern - HackerRank
Summer '18

Manager: Harishankaran Karunanidhi, Co-Founder and CTO

- Shipped crash and memory leak fixes, thread-safe control abstractions and build improvements for *HackerRank*'s state-of-the-art mission-critical Code Checker.
- Applied custom mandatory access control abstractions for secure code execution under production environment.

Google Summer of Code - Mlpack
Summer '18

Mentor: Marcus Edel

- Deployed implementations of Generative Adversarial Networks (GAN, Deep Convolutional GAN and Wasserstein GAN) and Restricted Boltzmann Machines (RBM and Spike and Slab RBM), achieving ~1.5x speed (single core aggregate) over *Sklearn*'s and *Tensorflow*'s implementations for similar accuracy of generated data.
- Added Cross Entropy, Layer Normalization, Bilinear Interpolation, Atrous and Transposed Convolution Layers.

Google Summer of Code - SymEngine
Summer '17

Mentor: Isuru Fernando & Sumith Kulal

- Improved the overall infrastructure of *SymEngine*, an efficient, standalone C++ Computer Algebra System (CAS), and refactored its Python wrapper *SymEngine.py* for cross-compatibility.
- Introduced SymEngine as an optional core for SymPy, and *PyDy*, a multi-body dynamics tool-kit for speeding up their backend computations to the order of ~70x.

INDEPENDENT PROJECTS

Image Transfiguration using CycleGAN — *Deep Learning*

· Implemented an algorithmic pipeline in C++, to morph an image domain into another image domain, in a fluid way using Cycle-Consistent Adversarial Networks (Jun-Yan Zhu et al. 2018).

· Network can be trained to generate natural landscapes from Claude Monet's works, SVHN from MNIST and more.

Movie Recommendation Engine — *Recommender Systems*

· Developed a movie recommendation engine in Python utilizing a convex combination of multiple methods (proceeding from R. Salakhutdinov et al. 2007), achieving comparable accuracy against the Netflix CineMatch Benchmark.

· Implemented User-User and Item-Item based Collaborative Filtering methods on MovieLens 10M Dataset.

Interactive Path-Invariant Traffic Forecasting — *Deep Learning*

· Implemented novel deep learning architectures for accurate path-independent traffic inflow and outflow forecasting between two 5x5 sq. km. regions using the GreenTaxi dataset for the city of New York.

· Customized a previously existing web-based user interface for marking source and destination regions on an interactive map layout and querying the associated traffic.

Gestures Alive — *Image Processing*

· Used OpenCV and NumPy to build a gesture recognition app using web-cam to detect and track hand gestures.

· Gestures are processed and matched with pre-defined custom gestures to produce identification output.

MENTORING

Google Summer of Code - Mlpack   *2019*

· Responsible for code review and guidance of two students under 'Essential Deep Learning Modules' project.

Institute Student Mentorship Program   *2018 - 2020*

· Academic guide to four freshmen year students over the period of two years.

POSITIONS OF RESPONSIBILITY

SymEngine & Mlpack Collaborator   *2017 - Present*

· Member of the push-access and code review team.

NJACK Coordinator, Computer Science Club   *2017 - 2019*

· Responsible for organizing various programming related activities and talks in the institute.

KEY COURSES

Theoretical	Programming and Data Structures*, Algorithms, Discrete Mathematics, Switching Theory, Formal Languages and Automata Theory, Computer Graphics, Artificial Intelligence, Introduction to Network Science*, Foundations of Machine Learning, Natural Language Processing*, Introduction to Deep Learning* & Advanced Machine Learning*
Labs	Programming and Data Structures, Algorithms*, Switching Theory*, Innovative Design, Databases, Computer Architecture*, Operating Systems, Computer Networks
Systems	Databases, Computer Architecture, Operating Systems* & Computer Networks
Mathematics	Real and Complex Analysis, Linear Algebra, Differential Equations, Probability Theory and Random Processes, Optimization Techniques & Abstract Algebra
	*Awarded **AA** grade (*either among top 4 students or top 5% of the class, whichever tougher*)