

RISHABH GOYAL

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EDUCATION

Year	Degree/Certificate	Institution, City	%/GPA
2014-Present	B.Tech, Computer Science and Engineering	Indian Institute of Technology, Kanpur	9.9/10.0
2014	AISSE (Class 12 CBSE)	St. Columbas School, New Delhi	97 %
2012	AISSE(Class 10 CBSE)	St. Columba's School, New Delhi	10.0/10.0

ACADEMIC ACHIEVEMENTS AND AWARDS

- Among 40 students across India, to be awarded the prestigious **SN Bose Scholarship** 2017
- Awarded **Outstanding Freshman** 2014-15 by the Student's Gymkhana, IIT Kanpur
- Received the **Academic Excellence Award** 2014-15 for outstanding academic performance at IIT Kanpur
- Received the **Academic Excellence Award** 2015-16 for outstanding academic performance at IIT Kanpur
- Achieved **99.9487 percentile** in mathematics proficiency test conducted by CBSE
- Awarded the **Lal Bahadur Shastri Award** 2014 for best all-round performance in high school
- Awarded the **KVPY fellowship** 2012 by the Department of Science and Technology, Government Of India
- Awarded the **NTSE Scholarship** 2010 by the Government Of India
- **Ranked 8th** in the **Junior Science Talent Search Examination(JSTSE)**, 2011
- Emerged runners-up in the **code.fun.do Hackathon** 2015, organized by Microsoft.

PUBLICATIONS

CSGNet: Neural Shape Parser for Constructive Solid Geometry, Gopal Sharma, Rishabh Goyal, Difan Liu, Subhransu Maji, Evangelos Kalogerakis (*IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2018*)

RESEARCH PROJECTS

Neural Shape Parser for Constructive Solid Geometry MAY'17 - NOV'17

Dr. Subhransu Maji and Dr. Evangelos Kalogerakis, UMass Amherst

- Contributed towards developing an algorithm to predict programs for reconstructing 2D and 3D shapes given as input, based on the principles of Constructive Solid Geometry (CSG)
- Designed a language to represent the visual programs and developed an accompanying renderer to parse programs and produce the corresponding output.
- An RNN was trained on an artificial dataset of randomly generated image-program pairs and fine-tuned using domain-specific shapes such as logos, using policy gradient methods

Generative Models for Resource-constrained Machine Learning on IoT Devices AUG'17 - PRESENT

Dr. Piyush Rai, IIT Kanpur

- Conceptualized a generative algorithm to learn a few low dimensional prototypes along with their corresponding labels to represent large datasets for the purpose of performing k-Nearest Neighbors.
- Implemented the algorithm using Edward and reduced the model to less than 1% of its original size with comparable and in some cases better performance on some benchmark datasets.

Semantic Segmentation of Images and Point Clouds NOV'16 - MAR'17

Dr. Gaurav Pandey, IIT Kanpur

- Surveyed various deep learning and CRF based semantic segmentation algorithms
- Introduced an autoencoder branch in the fully convolutional network (FCN) for semantic segmentation to help recover local spatial information in deeper layers
- Implemented the algorithm using Tensorflow and showed improved performance over FCN

COURSE PROJECTS AND OTHER SELECTED RESEARCH

Automatic Image Annotation

SEP'16 - NOV'16

Dr. Piyush Rai, IIT Kanpur

- Re-modelled the FastTag algorithm for automatic image annotation using deep learning methods
- Experimented with kernelization of the FastZeroTag algorithm and learnt embeddings for each class using matrix factorisation techniques
- Applied Deep Gaussian Processes to solve the problem of multi-label learning

Finding Visually and Semantically Similar Scenes in a Large Set of Images

NOV'15 - JAN'16

Programming Club, IIT Kanpur

- Implemented a two-step, PCA based algorithm to accomplish the task of finding semantically similar images in a large dataset of images
- Assigned classes based on reconstruction error using principal components of each class and found nearest neighbours in low dimensional space of the assigned category

Compiler for the ADA Programming Language

JAN'17 - APRIL'17

Dr. Amey Karkare, IIT Kanpur

- Developed a compiler to convert code in ADA to x86 assembly using PLY in Python
- Provided support for basic arithmetic, I/O, arrays, conditional statements, loops and functions

Operating Systems: Extending NachOS

AUG'16 - NOV'16

Programming Club, IIT Kanpur

- Extended the standard system call library of NachOS operating system
- Implemented process scheduling algorithms like Round Robin, Shortest Job First and Non-preemptive
- Implemented page replacement algorithms such as Random Page Allocation, FIFO, LRU and LRU Clock.

Ride-Sharing Web Application for The Campus Community

OCT'16-NOV'16

Dr. Piyush P. Kurur and Dr. Satyadev Nandkumar, IIT Kanpur

- Developed a Django based web application enabling the campus community to share transportation
- Created a forum where reviews of various cab agencies and drivers could be recorded and viewed

RELEVANT COURSEWORK

Artificial Intelligence: Machine Learning Techniques, Bayesian Machine Learning, Visual Recognition, Multi-Agent Systems

Cognitive Science: Introduction to Psychology, Human Cognitive Processes, Neurobiology, Cognitive Linguistics*, Computational Cognitive Science*

Mathematics: Multivariate Calculus, Linear Algebra, Complex Variable Analysis, Partial Differential Equations, Probability and Statistics, Discrete Mathematics, Abstract Algebra, Stochastic Processes*, Linear Programming and Spectral Graph Theory*

Theory: Data Structures and Algorithms, Theory of Computation, Logic in Computer Science

Systems: Fundamentals of Computing, Compiler Design, Computer Organization, Operating Systems, Computer Networks

*ongoing courses shall be completed before May '18

TECHNICAL SKILLS

Languages: C/C++, Python, Matlab/Octave, Bash, Verilog, HTML, CSS

Tools: GNUPlot, L^AT_EX, AutoCAD, Git, Scikit-Learn, Tensorflow, PLY(Lex/Yacc), Edward

POSITIONS OF RESPONSIBILITY AND EXTRA-CURRICULAR ACTIVITIES

Tutor, Introduction to Programming, IIT Kanpur

JAN'17-PRESENT

- Responsibilities include conducting weekly tutorial sessions, setting exams and assignments, and supervising the TAs.

Secretary, Student's Gymkhana Library, IIT Kanpur

JULY'15-MAY'16

- Helped manage and efficiently run the Student's Gymkhana Library.
- Organized occasional events such as book discussions and book exchanges.

Member, Enactus, IIT Kanpur

AUG'15-DEC'15

- Volunteered to help economically backward sections of society by way of social entrepreneurship
- Participated in project Agaaz, by organizing the sale of products such as jewelery and lamp-shades manufactured using recycled paper by women of nearby villages

Member, Lawn Tennis Team, IIT Kanpur

JUL'14-DEC'15

- Won Silver medal at Sportech, IIT Delhi and Bronze medal at Sangram, IIT Roorkee as part of the 4-member institute tennis team
- Emerged as winner of Fresher's Inferno '14 and Josh '15 organized at the institute level