Naman **Biyani**

SOPHOMORE UNDERGRADUATE · COMPUTER SCIENCE AND ENGINEERING

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Research Interests

Computer Vision and Probabilistic Machine learning with special focus on Deep Generative Models, Video Synthesis, 3d Computer vision and Semi-supervised Learning

Education

Indian Institute of Technology, Kanpur   *Kanpur, India*
BTECH IN COMPUTER SCIENCE AND ENGINEERING   *Jul. 2018 - Apr 2022 [Expected]*
- Cumulative Grade Point/CGPA: 8.7 out of Max 10.0 (Currently)

Sri Sri Academy   *Kolkata, West Bengal*
SECONDARY SCHOOL   *April 2010 - April 2018*
- Indian School Certificate Examination, ISC(Class XII): 97.5(percentage)
- Indian Certificate of Secondary Education, ICSE(Class X): 97.4(percentage)

Skills

Experienced	Python, C, C++, Haskell, Bash
Exposure	Octave, R, Julia, Rust
Frameworks	Pytorch, Tensorflow, Keras, NLTK, SkLearn
Web	Django, Javascript, HTML, CSS, Selenium
Utilities	Linux shell utilities, Git, Lex&Yacc, SQL, MongoDB, OpenCV, LaTeX, Vim, Verilog

Work Experience

Research Intern   *CRCV, University of Central Florida*
MENTOR - DR YOGESH RAWAT   *May'2020 - November'2020*
- Did a literature survey on the state of the art methods for Video Synthesis, Video Prediction and View independent Networks for Novel view sythesis of Images and Videos.
- Implemented various novel approaches for Conditional Video synthesis using action-descriptions on NTU-RGB+D, UCF-101 and Penn Action video datasets using Pytorch framework .
- Did evaluation of the results from various models and its comparision from the State of the Art methods on the basis of Frechet Video distance, Inception score, PSNR and SSIM.
- **Submitted work in CVPR2021.**

Projects

Bitgrit Data Science Contest   *Inter IIT Tech Meet 2019-20*
[GITHUB REPO]   *December, 2019*
- Involved in creating and running efficient models to find labels for test dataset , analysing dataset and working for new innovative and impactful ideas for all three rounds.
- Judged **2ⁿᵈ** among all IITs participating in the competition.

Modern Cryptology   *Course Project*
PROF. MANINDRA AGARWAL, IIT KANPUR,   *Jan 2020 - June 2020*
- Implemented cryptanalysis of Substitution cipher, Block substitution cipher, Substitution-Permutation cipher.
- Also analysed special cases of cryptanalysis of DES(differential cryptanalysis), AES(SASAS attack), RSA with low exponent(coppersmith attack).
- Learnt and worked through different attacks on weaker version on KECCAK hashing.

A Study in GANs   *Programming Club, IIT Kanpur*
[GITHUB REPO]   *January 2019 - July 2019*
- Studied Neural convolutional neural networks in depth and implemented special architecutures (ResNET, DenseNET, VGG,etc) using Pytorch framework .
- Did a basic literature survey on Generative networks and then studied GANs , implemented basic GANs and DCGANs on MNIST and CIFAR-10 dataset using Pytorch and TorchGAN(Framework for training of GANs).
- Implemented Class Conditioned GANs like CGAN, ACGAN and InfoGAN on CelebA , FashionMNIST and Anime dataset and compared the results using different losses and metrics .
- Implemented Style Transfer GANs like DiscoGAN, CycleGAN and StarGAN on CelebA dataset using Pytorch and TorchGAN .
- Implemented special GANs like SRGAN and SAGAN .
- Tried implementing a YAML parser and dataloader for TorchGAN Framework.

Voting App using blockchains
Microsoft Codefundo competition
[GITHUB REPO]
August - September 2019
- Learnt blockchains and the cryptography behind the security of blockchains.
- Made a voting app using Microsoft Azure Blockchain services for a more secure election.

Probabilistic Machine Learning
Programming Club, IIT Kanpur
[GITHUB REPO]
May 2019 - August 2019
- Deep dived into Probabilty distributions(specially Gaussians), Bayes Theorem, Information theory and the major differences between Frequentist and Probabilistic approach of machine learning
- Studied and implemented Bayesian Linear Regression(on Boston House-price Dataset), Expectataion Maximization algorithm(on MNIST dataset), Probabilistic Principal Componenent analysis(on MNIST dataset) and Variational Inferenece (On Boston house-price dataset)
- Deep dived into Bayesian Matrix Factorization and implemented Recommender system Probabilistic Bayesian Matrix Factorization using Gaussian and Poisson priors on MovieLens-100K dataset and then compared the results .
- Implemented Online EM algorithms (Incremental and stepwise) and compatred their results with batch EM algoritm . Also studied about Stochastic Variational Inference in brief .
- Studied about Advances in Variational Inference like Black Box Variational Inference and the tricks used to reduce its variance . Implemented Variational Autoencoders on MNIST dataset and compared the results using the reparameterization trick .

Haskell Scrabble Solver
Programming Club, IIT Kanpur
[GITHUB REPO]
January 2019 - August 2019
- Learnt the concepts of functional programming through Haskell, one of the most widely used functional programming languages .
- Deep dived into the concepts of Type theory, Currying , Recursion, Immutability, File Systems, Pattern Matching and Laziness of Haskell
- Made a Scrabble Solver in Haskell (A Two Player version and a PlayWIthComputer version) which used Lexicograhical Search, Regex-type functions(wriiten from scratch) and Quick Sorts as the major algorithms .

Reinforcement Learning and its apllications in Atari Games
Self Project
[GITHUB REPO]
January 2019 - April 2019
- Studied basics of Reinforcement Learning through David Silver Lectures and few portions of Sutton and Bartol's book on RL.
- Solved Dennybritz's excercises of Reinforcement Learning on topics Dynamic Programming, Monte-Carlo Learning , Temporal Difference Learning , Value Function Approximation , SARSA , Q-Learing and Policy Gradient methods .
- Implemented DQN and A3C reinforcement learning algorithms on Breakout and Pong Atari Games and trained it the models to a descent level and then compared the results.

Relevant Courses

Fundamentals of Computing	Discrete Mathematics	Computer Organistaion
Data Structures and Algorithms	Software Development and operations	Modern Cryptology
Logic in Computer Science	Linear Algebra and ODE	Real Analysis
Probability and Statistics(*)	Operating Systems(*)	Introduction to machine learning(*)
Theory of Computation(*)	Probabilistic Machine Learning(r)	Introduction to Machine Learning(@)

∗: Ongoing   r: Part of Reading Group

Relevant Courses CPI: 9.6

Achievements

2019	**Academic Excellence Award**, For exceptional Academic performance in freshman year in IIT Kanpur
2018	**All India Rank 198**, Joint Entrance Examination Advance, 200,000 candidates
2018	**All India Rank 379**, Joint Entrance Examination Mains, 1.5 million candidates
2018	**All India Rank 6**, West Bengal Joint Entrance Examination
2017	**All India Rank 285**, KVPY Scholarship Awardee

Positions of responsibilty

Coordinator
IIT Kanpur
SPECIAL INTEREST GROUP IN MACHINE LEARNING(SIGML)
July 2020 -
- One of the four Coordinators of the SIGML, the Institute forum for student researchers in ML.
- Responsible for delivering and conducting talks on current research and special topics in ML

Project Mentor
IIT Kanpur
PROGRAMMING CLUB
April 2020 - July 2020
- Mentored 15 freshmen for a Model-Zoo project to make a repository of implementations of 31 state of the art Deep Learning models in Pytorch & Tensorflow.
- Mentored 20 freshmen for a project to learn about Artificial Neural Networks and its applications.

Secretary
IIT Kanpur
PROGRAMMING CLUB
April 2019 - April 2020
- Responsible for conducting activities and competitions for campus community and conducting lectures and workshops on different topics for interested students .

Miscellaneous
- Presented my project on Probabilistic Machine learning at Student Academic Conference, InterIIT Tech Meet 2019.
- Contributed to Open Source projects like Torchgan, Openwhyd.