NIRMA UNIVERSITY
INSTITUTE OF TECHNOLOGY

Shivam Patel

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EDUCATION

NIRMA UNIVERSITY
BTech in Computer Engineering
Expected May 2020 |Gujarat,India

ST. XAVIER'S LOYOLA HALL
Grad. May 2016|Ahmedabad, India

LINKS

Github:// **Shivamshaiv**
LinkedIn:// **shivam-p-8b7b3585**
Quora:// **Shivam-Patel-32**

SKILLS

PROGRAMMING

Over 10000 lines:
• Python • C • C++ • Java
• Mathematica • Matlab • Javascript
Over 2000 lines:
• CUDA • Hadoop • CSS
• PHP • Android
Deep Learning:
• Tensorflow • Keras • Caffe
• Pytorch • PySpark • TfLearn
Operating systems:
• Windows • Unix • Linux
Familiar:
AS3 • iOS • Assembly • MySQL
Design tools:
• Adobe Photoshop • SolidWorks
• Blender • CorelDraw

COURSEWORK

ONLINE

Introduction to MATLAB Programming
Practical Programming in C:MIT
Programming Paradigms:Stanford
Introduction to Algorithms: MIT
Cryptography I & II :Stanford
Artificial Intelligence:MIT
(And over 120 others)

OPEN SOURCE PROJECTS

TensorFlow : Feature addition
Keras : Feature addition
OpenCV 3:Feature addition
DeepCell : Feature addition
tfRetinanet : Converted to tf.keras
GTText : Optimization
Matplotlib : Bug Fixes
Project Jupyter : Bug Fixes
Mozilla : Front End
(And so many more ...)

INVITATIONS

CALIFORNIA INSTITUTE OF TECHNOLOGY (CALTECH), STANFORD UNIVERSITY |Deep Learning for Biological imaging
May 2018|Pasadena,California,USA

Invited by Prof David Van Valen at Caltech for research in implementation of novel deep learning techniques in single cell imaging experiments. Our lab collaborated with Prof Marcus Convert's Lab at Stanford University for the collection of live microscopic cell imaging data.I worked on designing novel approaches for cell detection and cell segmentation .This included the modifications of existing algorithms for optimum results and I also proposed a segmentation neural network which outperforms the current state of the art for cell segmentation.

MASSACHUSETTS INSTITUTE OF TECHNOLOGY |Statistical Machine Learning
June 2017|Cambridge,Massachusetts,USA

Invited by Prof. Gilbert Strang for research work in mathematical formulation of deep learning models - methods to formalize neural networks using statistical tools and tensor decomposition methods. We gave theoretical reasons for the unreasonable effectiveness of deep architectures from shallow ones. Was invited to write a chapter in his upcoming book.

INDIAN INSTITUTE OF TECHNOLOGY BOMBAY |Selected Speaker by FOSSEE
29 to 30 November 2017| Powai India

Selected as speaker in the international conference on Python in Scientific Programming (Scipy 2017) , conducted a workshop titled "Next Generation Number Theory and numeric optimization" which explored unsolved problems in number theory and gave a glimpse of how modern optimization techniques and machine learning can pave paths into solving them. I also conducted a talk on Experimental Mathematics-Its scope, reach and displayed some python libraries created by me .

INSTITUTE OF MATHEMATICAL SCIENCES |Invited by director Prof Balasubramanian
19 to 21 January 2014 | Chennai, India

Invited to discuss the progress made by him in q -series, prime counting functions and algorithms related to finding closed form expressions for integrals.Discussed novel methods in computing the number theoretic partition function and the methods in asymptotic number theory as a whole. Also took a seminar titled " Computation of Some Integrals" for the Faculties of the Institute"

TATA INSTITUTE OF FUNDAMENTAL RESEARCH | Invited by Professor Dipendra Prasad
8 to 10 Oct 2013 | Mumbai , India

Invited to present and discuss my research work in Ramanujan mathematics , more specifically analytical number theory. Explored various properties on application of computer aided mathematical research with an emphasis on conjecture verification, automated mathematical proving along with pattern recognition.

ACHIEVEMENTS

ICM 2014 -SEOUL | Youngest person to get abstract accepted

13 to 21 August 2014

- Abstract titled "New Families of Rogers Ramanujan Continued fractions" was accepted International Congress of Mathematics at age 15.

ANNUAL STATE CONFERENCES | Invited Twice as a Speaker

14th Nov 2013 & 25th Dec 2016

- Delivered a lecture on "Ramanujan Mathematics" and on "PI Matters" in 50th and 53th Annual State Mathematics Conference respectively.

TED TALKS | Invited twice as a Speaker

22 April 2017

- Delivered a Tedx talk on "Classrooms Beyond Boundaries" exploring themes of online education,the future and role of distributed computing projects.
- Delivered a second Tedx talk on "The AI:Dilemma" exploring the past present and future of artificial intelligence with an emphasis on medicine and appealed the doctors to collaborate with computer scientist to shape a better future of medical AI.

ERDOS NUMBER 2 | Youngest person to receive

- Collaborated with the Hungarian mathematician Mih´aly Bencze for "Asymptotic analysis on primes in a certain form" to receive Erdos number of 2.

COMPUTATION OF π | Highest computation without GPU

- Computed 3.3 trillion decimal digits of π .

INDUSTRY EXPERIENCE

QUIPH |Natural Language Processing and Computer Vision Intern

Worked on a problem that involved tracking fast moving objects. Devised an algorithm based upon neural networks like architectures along with genetic algorithms and implemented it on the hardware using OpenCV and embedded C . It gave tracking efficiency of about 97Another project was automatic language detection which I employed Recurrent Neural Networks and CNNs for an algorithm and implemented it with a system having over 200 languages and trained it with 108GB dataset it gives better than state of the art accuracy and I wrote a paper which is under review.

SUSTLABS, IIT BOMBAY |Data Science Intern

Worked on the development of an IOT based smart metering device to collect electricity consumption data to over 100 times every second. Developed and implemented algorithms to improve the analysis and feedback from the billions of data points collected.

MISCELLANEOUS

OTHER NOTABLE ACCOMPLISHMENTS |Scholarships,Honours,Felicitations

- Felicitated by The Income Tax Bar Association as " Promising Gujarati"
- Received the responsibility to develop only existing Ramanujan museum in the world" which from the government of Tamil Nadu.
- Given rare access to the original handwritten manuscripts of Srinivas Ramanujan to read , study and examine for 4 days during his visit at Indian Institute of Mathematical research.
- The world record of highest number of decimal digits of π calculation on a GPU uaided computer.
- Invited by IIT Bombay as a speaker in international conference on Python in Scientific Programming (Scipy 2017).

COLLABOARATIVE RESEARCH PROJECTS

ULTRA CRYOGENIC ATOM ANALYSIS |MIT, Harvard University

Developing Computer Vision techniques based on state of the art machine learning models , for the analysis, noise reduction and segmentation an of images of ultra-cold atoms from the Noble Prize winning experiments in the lab of Prof. Wolfgang Ketterle , collaborating with Prof Martin Zwierlein at MIT-Harvard Center for Ultracold Atoms.

BURN PROGNOSIS USING DEEP LEARNING |Stanford University
Working on the improvement of the current deep learning models in early burn diagnosis , using innovative architectures like use of fully connected layers and their variants on the BURNED dataset provided by Stanford University . Also under the guidance of Orion Despo working for multiburn image analysis.

GLOBAL CLIMATE DATA ANALYSIS |Berkeley Earth(Lawrence Berkeley National Laboratory)
Implementing data mining techniques -to mine the climate data from various parts of web . Along with this also Developing innovative analysis and comparison methods for interpretation and presentation of the data.Working with and under the guidance of Dr Robert Rhode.

DEEP LEARNING POWERED FINANCIAL MATHEMATICS |University of Toronto
Working with team of undergraduates in the Statistics department of University of Toronto , for the applications of deep learning algorithms in extremely dynamic and financial applications . Tested various methods in prediction of stocks , rates of currencies, cryptocurrencies currently focusing on Algo Trading with deep learning.

POLARIMETRIC DATA ANALYSIS FROM RISAT-1 |ISRO (Indian Space Research Organization)
Working on developing tools to store , process understand the polarimetric big data obtained by the satellite . Deploying various algorithms for the segmentation of the images converted from the data. Also implemented an improved version of Wishart Classifier which outperforms the state of the art methods of object and oil spill detection .

CS PROJECTS

Golly	Co-creator	Open source platform for cellular automata aided with various rules.
Powder Toy	Developer	A 2-D sandbox particle stimulator game written in Lua.
Gazebo	Programmer	Contributed in programing this massive open sourse robotics project.
Algoodo	Contributor	A 2-D physics stimulator
Blender	Contributor	Added efficient hair rendering algorithm
SKData	Contributor	Added to this library of Machine Learning and Statistics
FANN	Contributor	Fast Artificial Neural Network Library which implements multilayer ANNs in C.

MATHEMATICS AND COMPUTING PROJECTS

Computation of π	Computed **3.3 Trillion Decimal** Digits- Discovered a quaternary converging recurrence algoriths.
Ramanujan methods	Discovered multiple families of Ramanujan type hyper geometric series for π and their generalization.
GIMPS	Involved in the discovery of last 2 Mersenne Primes through the Great Internet Mersenne Prime Sear
PrimeGrid	Discovered the currently the 2^{nd} largest repunit prime and several other types .
OEIS	Contributed over 4200 sequences in the Online Encyclopedia of Integer Sequences.
Orbit@Home	Developing statistical models to identify the best places to identify near-Earth asteroids.
Mathematica	Developed over 10 demonstrations on the Wolfram CDF Player coding in Mathematica .
Wikipedia	Contributed in over 2000 articles in Wikipedia, Wikia and Wiki Quotes.

INVITED TALKS

Scipy India 2017	Delivered a talk and conducted a workshop titled Next Generation Number theory and numeric optimiz
Data Science Week	Conducted a 5 day workshop on Mathematical and Implementational aspects of Data Science.
St Xaviers College	Delivered a talk on "Chess Meets Mathematics" which is on game theory aided with Machine learning.
Techfest IEEE	Conducted a two days workshop covering the basics to the advanced level of Data science in Python.
St Xaviers College	Two hour talk on "Internet and Mathematics"on various internet aided tools for effective mathematical
Tedx Nirma	Delivered a TEDx talk titled "Classrooms beyond Boundaries" on the impact of online education and co

· · · And in many other conferences , gatherings and meet-ups.

BOOKS WRITTEN

- Glimpses of Ramanujan's mathematics - Under Review in American Mathematical Association .
- Mathematics of Nature and Nature of Mathematics -Writing it with Amarnath Krishnamurti.

PUBLICATIONS

- ”LangDetectNet:Spoken Language Detection using parallel trainable Deep RCNN Architectures.” GPU Technology Conference 2018 , San Jose,CA,USA.
- ”Next Generation Compressed Domain Video Hashing Using Deep Learning and Nvdia GPU” with Ekta Jayswal , GPU Technology conference 2018,San Jose,CA,USA.
- ”Computational Methods for Obtaining Unconditional Bounds for the Ramanujan’s Inequality on $\pi^2(x)$, P.C Vaidya National Conference of Mathematics 2018
- “Disproof of a conjecture on d(N)” , Octagon Mathematical Magazine Volume 22. No. 1 April, 2014.
- “AM-GM –HM Triples”, Octagon Mathematical Magazine. -Vol 2 No.2 Oct 2014 .
- ”S Union P is negated by F then d – Octagon Mathematical Magazine. -Vol 2 No.2 Oct 2014 .
- “Classification of number theoretic sequences involving primes and special functions “ published in Octagon Mathematical Magazine. -Vol 2 No.2 Oct 2014
- Does there exits proof with S* ”
- “Closed forms of some logarithmic integrals with irrational exponents ” published in Octagon Mathematical Magazine.-
- “Asymptotic analysis on primes in a certain form - as conjectured by M. Bencze” with M. Bencze published in Octagon Mathematical Magazine.
- “Exact formula for the number of primes in the form 4n+3 ≤ x in terms of the Riemann R function”published in Octagon Mathematical Magazine-
- ”Representation Non Perfect Squares by Triangular numbers” published in Octagon Mathematical Magazine.- Oct 2014
- Legal:Illegal Chess Games” published in Octagon Mathematical Magazine.- Oct 2014
- ”Impossibility of construction of Fibonacci and Lucas Magic Squares (OQ. 4661)” published in Octagon Mathematical Magazine.- Oct 2014
- Application divergent Mellin transform in evaluation of series and limits of sequences” published in “The Indian Journal of Pure and Applied Mathematics
- Developed software for the article ”Maxillary and Mandibular Arch Perimeter Prediction Using Ramanujan’s Equation for the Ellipse-In vitro Study ” published in British Journal of Medicine Medical Research- Sep 2016.