Priyanka Nath

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Education

KIIT University *(formerly Kalinga Institute Of Industrial Technology)* – Bhubaneshwar, India *July, 2015 - Present*
Bachelor of Technology, Information Technology *Current GPA: 8.75 / 10.0*

South Point High School – Kolkata, India

Senior School Certification Examination, (Grade 12) *June, 2015 - 76.2*
Stream: Science with Computer Science as additional subject

Secondary Examination, (Grade 10) *May, 2013 - 87.42%*

Publications

Nath, Priyanka, Sumran Kilam, and Aleena Swetapadma. **"A machine learning approach to predict volatile substance abuse for drug risk analysis."** In Research in Computational Intelligence and Communication Networks (ICRCICN), 2017 Third International Conference on, pp. 255-258. IEEE, 2017.

Kumari, Divya, Sumran Kilam, Priyanka Nath, and Aleena Swetapadma. **"Prediction of alcohol abused individuals using artificial neural network."** International Journal of Information Technology 10, no. 2 (2018): 233-237.

Kumari, Divya, Priyanka Nath, Sumran Kilam, and Aleena Swetapadma. **"Volatile Substance Abuse: A Nearest Neighbor Based Analysis."** In International Conference on Innovative Technologies in Engineering (ICITE), 2018.

Experience

Indian Statistical Institute – Kolkata, India *May, 2018 - July, 2018*
Advisor - Prof. Bimal Kumar Roy
Research Intern at R. C. Bose Centre for Cryptology and Security, Indian Statistical Institute

Indian Statistical Institute – Kolkata, India *May, 2017 - July, 2017*
Advisor - Prof. Ansuman Banerjee
Research Intern under the *Summer Internship Program in Cryptology 2017*, R. C. Bose Centre for Cryptology and Security, Indian Statistical Institute (funded by Microsoft Research India).

Projects

Bias Verification Of Riverst Cipher (RC-4) Keystream - Indian Statistical Institute *May, 2018 - July, 2018*
- Implemented a Rivest Cipher 4 (RC4) in Python and showed that the second byte of the keystream generated by the pseudorandom generator is biased towards zero with a probability which is twice the expected value
- Created a sample set of 10,000,000 cipher texts using randomly generated 32 bit keys
- Calculated the probability distribution of each byte over the range 0 to 255
- Plotted the data to verify that the bias in the rest of the keystream as predicted by the paper

Artificial Neural Networks Implementation On The Game 'Snake!'
- Developed a popular arcarde game 'Snake!' in Python using the PyGame library
- Extracted features by generating random moves and recording their results in the game, whether they were favourable or not.
- Trained an Artificial Neural Network through supervised learning to predict moves for optimal scoring and survival of the snake

Linux System Call Analysis – Indian Statistical Institute *May, 2017 - July, 2017*
- Developed an OS system call pattern matching & analysis application for Linux to detect software vulnerabilities.
- Using inputs generated by an automated fuzzer, American Fuzzy Lop (AFL), to detect malicious binaries.
- Summer internship project, funded by the Defence Research and Development Organisation (DRDO), Government of India.

Volatile Substance Abuse (VSA) Risk Analysis
- Built an Artificial Neural Networks model using Lavenberg Marquardt algorithm in Matlab to predict VSA use of individuals based on their five factor personality model, demography, etc.

Principal Component Analysis using GPUs
- Used QR decomposition to convert a set of observations of possibly correlated variables into a set of values of linearly uncorrelated variables called principal components(PCA).
- Implemented dimensionality reduction by applying PCA on Fischer's Iris dataset using C.
- Optimized the compute-intensive process by parallelizing it in CUDA-C by using GPUs.

Bookmarkz: A Social Bookmarking App
- Developed a social bookmarking web application using Django framework where an user can create an account,share bookmarks, vote on shared bookmarks, add or remove tags, interact through comments, etc.
- Hosted using the Heroku platform

Vigenère Cipher Decoder
- Built a Vigenère Cipher Decoder which can solve for unkown Vigenere Cipher keys and then decrypt encrypted cipher text encrypted using a predicted key
- Applied cryptanalysis (Kasiki Analysis) to predict key-lengths. Using those lengths with the frequency distribution data of letters in the English alphabet, 5 probable keys are evaluated for decryption.

Naive Bayes Classifier
- Implemented a Naive Bayes Classifier from scratch for handwritten digits using Python.
- Tested classifier on the MNIST handwritten digit dataset to have an accuracy of 64.3%.

SpaceTurtle: An Introduction to Turtle Programming
- Designed a teaching kit comrpising simple interactive games to introduce kids to programming and encourage them to solve problems through logical thinking.
- Won second prize in the Mozilla Hello Web hackthon, sponsored by Rotary International in association with the Mozilla Learning initiative

MysticSquare: An Android Game
- Made a Mystic-Square (also known as 15 puzzle) game for Android using Android Studio.

Technical Skills

Programming – Coded mainly in **C, Python.** Proficient in coding with C++ and Java.
Web – HTML, CSS, Javascript. **OS –** Linux, Windows.
Developement Tools – Android Studio, Android SDK, SQL (MySQL, Oracle), scikit, Matlab, Latex.

Relevant Courses Taken

Linear Algebra, Data Structures & Algorithms, Object Oriented Programming, Probability & Statistics, Discrete Mathematics, Computer Networking, Operating Systems, Database Management Systems.
MOOCs – Machine Learning (by Andrew Ng), Cryptography I (by Dan Boneh).

Honors & Achievements

- Secured 4th position among 11,000 participants in the 4th CSI National Programming Contest organised by the Computer Society Of India.
- Won 2nd place in HelloWeb Hackathon 2016 hosted by the MozillaBBSR Club by designing a teaching kit to introduce kids to programming.
- Secured the highest grade "O" in Object Oriented Programming, Web Technology and Computer Networks as part of my B.Tech curriculum.
- Secured a perfect score (100%) in Mathematics in state-wide Secondary Examination, 2013 among 1,020,000 students.
- Awarded Chitroprobha Upadhi Certification by Bengal Music College, Kolkata, India in 2012 on completing a 6–year course on Painting.
- Selected as one of 20 student judges from MP Birla group of schools for the cultural committee MP Birla Puja Utkarsh Samman 2014.