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

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.

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.

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.

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 Rivest Cipher (RC-4) Keystream - Indian Statistical Institute *May, 2018 - July, 2018*
- Implemented a RC-4 cipher in Python and proved 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 dataset of 10,000,000 cipher texts using randomly generated 32 bit keys and computed the probability distribution of each byte.
- Verified the bias in the keystream by doing a graph analysis. Plotted the data to verify the bias in the rest of the keystream as per the works of Sengupta et al.

Vulnerability Analysis of Linux System Calls – 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.

Drug Risk Analysis
- Applied supervised learning using Artificial Neural Networks(ANN) to classify an individual as a user or non-user of VSA and alcohol, based on a five-factor personality model. Predicted alcohol users with accuracy of 98.7% and VSA users with accuracy of 81%.
- Experimented with the number of neurons and hidden layers to predict the last time of use of VSA users with 71.9% accuracy and alcohol users with a 49.1% accuracy.
- Increased the accuracy of time of VSA drug use prediction to 96.4% by implementing k-Nearest neighbours classification.

Principal Component Analysis using GPUs
- 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.
- Applied k-means clustering using scikit to verify that the reduction in the number of features did not compromise the information stored in the dataset.

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

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

Vigenère Cipher Decoder
- Built a Vigenère Cipher Decoder which can solve for unknown Vigenère Cipher keys and then decrypt encrypted cipher text encrypted using a predicted key.
- Applied cryptanalysis techniques (Kasiki Analysis) to predict key-lengths. Using the predicted key-lengths along with the frequency distribution data of letters in the 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 comprising 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 hackathon, 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. **Machine Learning Tools –** scikit, Matlab, R.
Development Tools – Android Studio, Android SDK, SQL (MySQL, Oracle), 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 2017 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 statewide 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.