

# Priyanka Nath

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## Education

- Stony Brook University (SUNY Stony Brook)** – New York, USA *August, 2019 - Present*  
*Master of Science (Computer Science)*
- KIIT University (formerly Kalinga Institute Of Industrial Technology)** – Bhubaneswar, India *July, 2019 - 8.79 / 10.0*  
*Bachelor of Technology, Information Technology*
- South Point High School** – Kolkata, India *June, 2015*  
*Senior School Certification Examination, (Grade 12)*

## Experience

- Amazon.com, Inc.** - Bengaluru, India *March, 2019 - August, 2019*  
Software Development Engineering Intern, Amazon Web Services.
- 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

- API-Level Metrics for Amazon Elasticsearch Service** - Amazon Web Services *March, 2019 - August 2019*  
- Evaluated existing metrics for Amazon Elasticsearch Service (search-engine as a service, part of Amazon Web Services) and their limitations.  
- Prepared and presented a comparative study in support of newly proposed metrics based on requirements, scalability, resource cost, performance impact and data pipeline latency.  
- Designed and implemented 19 new API-level metrics for monitoring, faster diagnosis and root-causing of problems in clusters running the service, thereby improving service availability and customer experience.
- Drug Risk Analysis using ANNs**  
- Applied supervised learning using Artificial Neural Networks (ANN) to classify an individual as a drug/alcohol user or not, based on a five-factor personality model. Predicted alcoholism with 98.7% accuracy and volatile substance abusers with 81% accuracy.  
- Experimented with the number of neurons and hidden layers to predict the last time of use of drugs with 71.9% accuracy and alcohol with a 49.1% accuracy.  
- Optimized prediction of recency of drug use and increased accuracy to 96.4% by implementing k-nearest neighbors classification.
- Vulnerability Analysis of Linux System Calls** – Indian Statistical Institute *May, 2017 - July, 2017*  
- Developed an operating 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.
- 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.

- 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.

**Valid Move Prediction On The Game "Snake!"**

- Developed a popular video arcade game "Snake!" using the PyGame library.
- Extracted features by generating random moves and recording their impact on the game environment.
- Modelled two Artificial Neural Networks to predict moves for optimal scoring and survival of the snake.

**Technical Skills**

**Programming** – Coded mainly in **C, Python**. Proficient in coding with C++ and Java.

**Web** – HTML, CSS, JavaScript. **OS** – Linux, Windows. **Development Tools** – SQL (MySQL, Oracle), Latex.

**Machine Learning Tools** – scikit, MATLAB, R, TensorFlow, sklearn, matplotlib, pandas, seaborn.

**Relevant Courses Taken**

Data Science Fundamentals, Computer Vision, Natural Language Processing, Cryptography, Linear Algebra, Data Structures & Algorithms, Object Oriented Programming, Probability & Statistics, Discrete Mathematics, Computer Networking, Operating Systems, Database Management Systems.

**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.

**Honors & Achievements**

- Secured 4<sup>th</sup> position among 11,000 participants in the 4th CSI National Programming Contest 2017 organised by the Computer Society Of India.
- Won 2<sup>nd</sup> place in HelloWeb Hackathon 2016 hosted by the MozillaBBSR Club by designing a teaching kit to introduce kids to programming.
- 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.