Sanchari Biswas

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EDUCATION

Temple University — Philadelphia, PA
PhD in Computer and Information Science, CGPA: 3.75/4.0 — May 2026

University of Maryland — College Park, MD
MS in Telecommunications. GPA: 3.78/4.0 — May 2017

Techno India
B. Tech in Electronics and Communications Engg. GPA: 8.44/10.0 — Salt Lake, Kolkata, India, June 2013

WORK EXPERIENCE

Comcast Cable Corporation — Philadephia, PA
Quality Assurance Analyst — September 2018 – June 2020

- Engineered automation and manual tests for platform stability of Smart Network Platform (SNP) in Cucumber and Java in order to ensure quality, security, and stability of new developments as well as existing features.
- Investigated, resolved, and monitored for any issues tending to hamper the Software Development Life Cycle.
- Regulated routers and switches from vendors - Cisco, Juniper, Aruba, and Ciena to add to a repository of functionalities SNP can perform.

United Airlines Llc. — Des Plaines, IL
Network Analyst II — July 2017 – September 2018

- Configured, regulated and troubleshot a network of over 5000 devices (Cisco and Aruba routers, controllers, switches, ASA 5505 and 5525 firewalls, F5 ATM (BIG-IP), Multiplexers, Voice Switches, and Wireless Access Points)
- Monitored the interfaces and supporting devices (power supply, UPS, user desktops and laptops, Cisco VoIP phones, printers) in the entire network on a global scale
- Worked with Network Engineers in implementing both major and minor network layout changes, like implementing new devices, rerouting links, discontinuing old devices, ensuring connectivity all throughout the changes

TEACHING EXPERIENCE

Temple University — Philadelphia, PA
Graduate Teaching Assistant — August 2022 – Present

- Supervising labs of undergraduate students in designing solutions in Java, discussions about cybersecurity and its impact on society, and learning and implementing protocols
- Preparing lecture slides and creating examination, project, and quizzes for the curriculum
- Cultivating a positive, organized learning atmosphere by maintaining a fun and interactive classroom that is clean, organized, developmentally appropriate and engaging

University of Maryland — College Park, MD
Graduate Teaching Assistant — August 2016 – May 2017

- Assisted Dr. Kazim Ruhi in the Graduate level course in Operations Research
- Solved problems, such as finding locations to put in new base stations amongst pre-existing ones, through the implementation of tools such as Analytic Solver Platform
- Helped students with coursework and evaluated their performances in the course using MS Excel

SKILLS

Network Protocols: (CCNA/JNCIA) IPv4/v6, RIP, HTTP, OSPF, BGP, EIGRP, TCP/IP, ICMP, ICMPv6, DHCP, DNS, SNMP, CDP, SSL, ARP, SSH, Telnet, UDP, FTP, TFTP, NTP, RADIUS, TACACS+, VPN, Ethernet802.3

Tools/Platforms: Cisco devices, Juniper devices (SRX 240 series), Aruba devices, Mininet, Wireshark, Eclipse IDE, Putty, WinSCP

Programming Languages: Cisco IOS, Juniper OS, JAVA, C, Python, Linux, MATLAB, SQL, Cucumber, PostGreSQL

PUBLICATIONS

Design and Implementation of a Strong Representation System for Network Policies

2022 International Conference on Computer Communications and Networks (ICCCN)

Fangping Lan, Sanchari Biswas, Bin Gui, Jie Wu, Anduo Wang
Policy information in computer networking today, such as reachability objectives of a controller program running on a Software Defined Network (henceforth referred to as SDN) or Border Gateway Protocol (henceforth referred to as BGP) configurations independently set by autonomous networks, are hard to manage. This is in sharp contrast to the relational data structured in a database that allows easy access. This paper asks why cannot (or how can) we turn network policies into relational data. One difficulty to such an approach is that a policy does not always translate to a definite network snapshot, but rather is fully described only when we include all the possible network states it admits. We propose relational policies that, while capable of representing and manipulating sets of network states in exactly the same way as a single one, form a strong representation system and accurately capture the information in a policy with the usual Structured Query Language (henceforth referred to as SQL) interface. We demonstrate how, like relational database improves application productivity and enables rapid innovation, relational policies allow us to extend the elegant solutions that the database community developed, to mediate multiple data sources in order to address long-standing challenges and new opportunities for autonomous policy making in the distributed networking environment. We also show the feasibility of relational policies by evaluation on synthetic policies and realistic network topologies.

CURRICULUM PAPERS

A Comparison of Various Forecasting Models in Predicting Indian Rainfall from Spatio-temporal Data

The country of India has been fraught with hydrological draughts. The prediction of Indian rainfall is not only scientifically challenging but also crucial owing to the planning and execution strategies agriculturally and otherwise. There exist a number of works on this prediction, some using Artificial Neural Networks (ANNs) and Multiple Linear Regression (MLR) models. In this work [1], we decide upon ten of the prevalent data mining models: K-Nearest Neighbor (which is our baseline model), Logistic Regression, Decision Tree, Support Vector Machines, Random Forest, Extra Trees, Gradient Boosting, XGBoost, LightGBM, and CatBoost. We then analyze the performances of these models based on precision scores, recall scores, and F1 measures. We then pick the top two performers and hypertune the parameters for both of them. Now, gaining a clearer idea, we take a theoretical and operational approach to analyze both the models and, in conclusion, decide on the optimum model based on performance, overhead, and other such factors. In our work, we have achieved F1 measures of 0.95 for LightGBM and XGBoost before hyperparameter tuning. Our baseline K-Nearest Neighbor has an F1 measure of 0.72. After hyperparameter tuning, we get an F1 measure of 0.99 for XGBoost and 0.97 for LightGBM. However, XGBoost takes approximately ten times more time to train than LightGBM and also needs much more resources. Based on the other important criteria, such as latency and overhead, we choose LightGBM as our model of choice, since in those aspects, it bypasses XGBoost by far.

Trait Prediction using Deep Learning

Trait or phenotype prediction is one of pivotal tasks in the field of Genome-Wide Association Studies (GWAS). GWAS involves scanning genetic markers across genomes in order to find associations of genetic variants and human phenotypes. Despite numerous ongoing research in this field, understanding the genetic contribution to complex phenotypes still remains an open problem. In our paper, we propose a transformer model to perform quantitative phenotype prediction. We also propose a novel embedding method for the categorical data as a part of our transformer architecture, which can be utilized in other domains as well. Experimental results indicate that our model performs significantly better than baselines, on yeast dataset, for the traits that have considerably complex interactions.

An Inspection into Denial of Service and Distributed Denial of Service Attacks

In a client-server ecosystem, perpetrators may try to perform disruptive actions by flooding the server with malicious requests, causing it to slow down, and even stop functioning. If just a single perpetrator is causing the attack, the kind of attack is termed as a Denial of Service attack, in short DoS. If it is multiple perpetrators, the kind of attack is termed a Distributed Denial of Service attack, (DDoS). This paper provides a detailed view of DoS attacks, DDoS attacks, their types, and brief information on countermeasures.