Emmanuel Obeng Frimpong

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Education

Hanbat National University **March 2021 – December 2022**

Master of Science: Information and Communications Engineering, ***GPA: 4.400/4.500*** *Daejeon, South Korea*

Kwame Nkrumah University of Science and Technology **September 2015 – May 2019**

Bachelor of Science: Telecommunication Engineering, ***GPA: 3.85/4.0 (WES)*** *Kumasi, Ghana*

Relevant Coursework

- Linear Algebra
- Convex Optimization (current class)
- Probability and Statistics
- Information Theory
- Signal Processing for Wireless Communications

Skills

Technical: Wireless Communication, Physical Layer Security, Machine/Deep Learning

Programming: Python, Matlab, Latex, C&C++

Frameworks & Libraries: TensorFlow/Keras, Pytorch, Scikit-Learn, Pandas, Numpy, SciPy, Matplotlib, Pandas

Statistics: Power BI, Tableau Software, Microsoft Excel, Trello (Project Management)

Hardware & Design: NI USRP, GNU Radio Companion, Linux Scripting

Competitive Edge: Excellent problem solving abilities, self-motivated and results oriented

Research and Teaching Experience

Intelligent Communications and Information Security Lab **March 2021 – Current**

Graduate Research Assistant *Daejeon, South Korea*

- Currently working on Vulnerability Analysis in Multiuser MIMO networks
- Researched deep learning end-to-end wireless communication and physical layer security
- Reviewed relevant research papers and theory
- Reproduced results in highly-ranked research papers, relevant to our project, with *MATLAB* or *Python*
- Mentored undergraduates on developing a deep learning based AI Chatbot, Hayanmind Inc. Project

Faculty of Electrical and Computer Engineering, KNUST **September 2019 – August 2020**

Teaching and Research Assistant *Kumasi, Ghana*

- Worked as Optical communication lab assistant, assisted undergraduates during lab sections and provided ready access to all experimental data to my supervisor.
- Tutored and graded the following courses: Optical Communications Network, Data Communications Network, Mobile and Satellite Communication Systems.
- Conducted literature reviews, prepared reports and presentations for tutorials and discussions.
- Supervised undergraduate research project.

Huawei Authorized Information and Network Academy **November 2019 – June 2020**

Tutor *Kumasi, Ghana*

- Tutored undergraduates in these key computer networking areas: Internet Switching, Routing Architecture, Network Security, Internet Protocols – DHCP, IPV6, FTP, Telnet.

Npontu Technologies Limited **June 2018 – August 2018**

Machine Learning Intern *Accra, Ghana*

- Researched on machine learning applications in banking, finance and Insurance sector.
- Worked with supervisor to develop a model that could detect fraudulent banking activities in Ghana.
- Collaborated with product development team to identify opportunities to implement trained models which showed increased efficiency in general performance.

Work Experience

Npontu Technologies Limited **June 2020 – September 2020**

Internship Coordinator and Liaison *Accra, Ghana*

- Led interns in the data science department to work on implementing sentiment analysis model
- Spent a month on feature engineering to make our model algorithm effective
- Integrated sentiment analysis model in business and commercial platforms and achieve 95% accuracy
- Tutored 50 interns on a certification course titled: Introduction to Project Management Certification

Ghana Broadcasting Corporation **June 2017 – August 2017**

Summer Intern *Accra, Ghana*

- Worked with Engineers to support and enhance live signal transmissions at Uniiq FM.
- Worked with supervisor from the Master Control Room to ensure timed transmission to all GBC television channels.

Projects

Unified Design of Physical Layer Security and Machine Learning for 5G Wireless Systems **December 2021**

- Implemented an end-to-end learning approach for physical layer security in Gaussian Multiple Access Wiretap Channel
- Designed a loss function that controls secrecy, reliability and user-priority
- Proposed training approach that guarantees secrecy performance
- Implemented secrecy by introducing randomness in transmission using coset and a modified kmeans algorithm

Generation of Orbital Angular Momentum Waves using circular slot and patch antennas **April 2019**

- Aim was to design an antenna that could exploit a new degree of freedom in transmission other than time, frequency and space.
- Used HFSS software to designed two Uniform Circular Array antennas each with 8 antenna elements.
- Calculated and designed patch and slot antennas for the antenna array.

Machine Learning in Banking, Finance and Insurance Sector **June 2018**

- Aim was to apply Machine Learning to solve pressing issues in banking and finance sector
- Performed feature engineering on data set to suite the Ghanaian banking chain
- Collaborated with product development team on a machine learning model that detects possible fraudulent activities.
- Analyzed performance improvement for trained model integration.

Relevant Awards/Certifications

Udemy: Machine Learning, Deep Learning and Bayesian Learning **January 2022**

Huawei Certified Network Associate, Routing and Switching **April 2019**

Provost's Award for Excellent students (Undergraduate) **Mar.2019, Oct.2018, Oct.2017**

Publications

Emmanuel Obeng Frimpong, Taehoon Kim, Inkyu Bang, 'Deep Learning Approach for Physical Layer Security in Guassian Multiple Acess Wiretap Channel.' *ICT Express, Elsevier.* [under review]

Leadership / Extracurricular

Reviewer, AyaPrep Ghana Limited **February 2020 - April, 2020**

Career Fair Liaison, Npontu Technologies Limited **March 2020**

Member, Ghana Engineering Students' Association Project Committee, KNUST **Sept. 2018 – April 2019**

Organizing Secretary, Outreach Committee of Ghana Methodist Students' Union - KNUST **March 2019**

Team Lead, Machine Learning in Banking and Finance Project, Npontu Tech. **July 2018 – August 2018**