Ronald Doku

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ACADEMIC RECORD

Howard University, DC   **August 2017 – till date**
- **PhD in Computer Science**
- **Expected completion date: May 2020**

Howard University, DC   **August 2013 – May 2016**
- **Master of Science in Computer Science**

Howard University, DC   **August 2009 – May 2013**
- **Bachelor of Science in Computer Science**

RESEARCH INTERESTS

Cybersecurity, Blockchain, Big Data, Natural Language Processing, and Artificial Intelligence.

SUMMARY

My research focus is on big data security using the blockchain as the underlying technology. My interests also lie in the application of Machine Learning and Natural Language Processing in cybersecurity. I have experience in software development with object-oriented languages. I am currently seeking opportunities in cybersecurity, blockchain and machine learning.

TECHNICAL PROFICIENCIES

Programming Languages: Java, Python, C/C++, Solidity.

CONFERENCE ARTICLES

1. **Doku, Ronald**, and Danda Rawat. "Pledge: a private ledger based decentralized data sharing framework." Proceedings of the Annual Simulation Symposium. Society for Computer Simulation International, 2019.

2. **Doku, Ronald**, Danda B. Rawat and Chunmei Liu, "Towards Federated Learning Approach to Determine Data Relevance in Big Data," IEEE 20th International Conference on Information Reuse and Integration for Data Science, July 30 - August 1, 2019. Los Angeles, California, USA.

3. **Doku, Ronald,** et al. "Fusion of Named Data Networking and Blockchain for Resilient Internet-of-Battlefield-Things" 2020 17th IEEE Annual Consumer Communications & Networking Conference (CCNC). IEEE, 2020**.**

4. **Doku, Ronald** et al. "FLBC: Edge Intelligence via a Federated Learning Blockchain Network." *2020 IEEE International Conference on Communications (ICC)*. IEEE, 2020. (Under review)

5. **Doku, Ronald,** Danda Rawat, and Liu Chunmei. "A Decentralized Data Sharing Approach to Event Based Encryption" IEEE INFOCOM 2020-IEEE Conference on Computer Communications. IEEE, 2020 (Under Review).

6. **Doku, Ronald**, et al. "LightChain: On the Lightweight Blockchain for the Internet-of-Things." 2019 IEEE International Conference on Smart Computing (SMARTCOMP). IEEE, 2019.

JOURNAL ARTICLES

1. Rawat, Danda B., **Ronald Doku**, and Moses Garuba. "Cybersecurity in Big Data Era: From Securing Big Data to Data-Driven Security." IEEE Transactions on Services Computing (2019).

2. Rawat, Danda B., Vijay Chaudhary, and **Ronald Doku**. "Blockchain: Emerging Applications and Use Cases." arXiv preprint arXiv:1904.12247 (2019).

3. Rawat, Danda, **Ronald Doku**, Abdulhamid Adebayo and Charles A. Kamhoua "Fusion of Blockchain and NDN for Privacy aware Secure Vehicle-to-Everything Communications" IEEE Communications Magazine (Under Review).

BOOK CHAPTER

1. **Doku, Ronald**, and Danda B. Rawat. "Big Data in Cybersecurity for Smart City Applications." Smart Cities Cybersecurity and Privacy. Elsevier, 2019. 103-112.

WORK EXPERIENCE

Grad Research Assistant, Howard University, Washington DC   **(August 2017 –)**

Accomplishments/Key Learning
• Reading and Writing Skills
• Critical Thinking and Analytic Skills
• Data Analysis Skills
• Research Skills
• Presentation Skills
• Creativity Skills

Summer Intern, Consensys, Washington, DC   **(June 2018 – August 2018)**

Accomplishments/Key Learning
• Blockchain
• Decentralized App Development
• Solidity

Co-Op, IBM Research, Almaden, California   **(August 2016 – July 2017)**

Accomplishments/Key Learning
• Developed a virtual machine placement tool to automate the deployment and placement of VMs on hosts.
• Cloud Computing.
• Dev-Ops.

Howard University Transportation Research Center, DC   **(September 2014 – May 2016)**

Accomplishments/Key Learning
• Web Content Management (Joomla).
• System Administration
• Powershell

Summer Intern, IBM Austin, Texas   **(June 2014 - August 2014)**

Accomplishments/Key Learning
• Scrum Methodology.
• Agile Development techniques
• Successfully implemented an image compare tool to detect differences between two images. The WebSphere UI team for testing purposes is now using the tool.

Summer Intern, EMC Corporation, RTP, North Carolina   **(June 2013 -August 2013)**

Member of the Continuous Integration Testing team
Accomplishments/Key Learning
• Project Management
• Agile Development techniques
• Part of a team that contributed to the transition from an older error reporting system to a newer one (Konductor to Automatos X)

Intern, Institute for Creative Technologies, Playa Vista, CA   **(May 2012- Aug 2012)**

Internship required the development of a movie dialogue system.
Accomplishments/Key Learning
• Designed and implemented an algorithm for the dialogue system.
• Finished the project on time.
• Documented the stages of the Software Development life cycle and wrote a user guide.

Summer Intern, University of Illinois, Urbana-Champaign   **(May 2011 - July 2011)**

Worked on a DHS sponsored project. The summer program consisted of intensive classes in the mathematical foundations of Data Sciences, tutorials on advanced Data Science topics. Project

involved using tweets for crime and event detection with in specific geographical areas.

Accomplishments/ Key Learnings

• User Interface Design. (Designed the project website).
• Machine Learning.
• Natural Language Processing.

Summer Intern, Zane Networks LLC, Silverspring, Maryland (May 2010 - August 2010)

Accomplishments/Key Learning

• Database Management.
• Content Management Systems (Drupal).

THESIS/DISSERTATION TOPICS

- Master's Thesis: A Hybrid Machine Translation Approach to Detect Emotions from Text: This thesis deals with extracting emotions from textual data and the techniques used in achieving it.
- PhD Dissertation: Security Engineering with Distributed Ledger Technology for Decentralized Data Sharing: A blockchain based decentralized data storing platform that only accepts data it deems relevant.

PROJECTS

Event-Based Encryption: Humans plan their lives based on events that will happen in the future. Anticipating expected events and planning for it is a natural phenomenon that makes up the fabric of human existence. As such, the possibility of letting future events trigger the decryption of a message is a form of an encryption mechanism we deem to be significant in today's information age. In this project, I propose an encryption technique termed Event-Based Encryption (EBE). EBE attempts to decrypt future messages after an event has been confirmed. I approach this by introducing a decentralized data sharing network powered by the blockchain technology that confirms the occurrence of events using proven cryptographic techniques such as ElGamal cryptosystem, Feldman Verifiable Secret Sharing, and Pedersen Distributed Key Generation.

(*Side Project*) **Simple-Concept:** The ability to effectively communicate and explain simple ideas is an important skill to acquire. This project aims to provide positive reinforcements to users of the system who desire to improve their comprehension and communication skills. We approach this by presenting a concept to the user (usually in the form of a short video, an animation or common-knowledge concepts). The user is allotted a time frame where he/she is expected to comprehend the given concept. After the time lapses, the user attempts to explain the concept simply. Our machine learning model analyzes the user's explanation to provide feedback to the user. This model has been trained on a myriad of data acquired from the speeches of effective communicators. Furthermore, the model is an aggregated shared model that learns from other users, which implies it is constantly improving. The system also provides an avenue for people to study new concepts. The best explanations of concepts (machine learning, recursion, dynamic programming, etc.) are suggested to users based on their queries.