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RESEARCH

Interests	Computer Networks Security · Machine Learning · Cloud Computing · Software Engineering · Computer Vision
Areas	Artificial Intelligence · Information Systems · Computer Vision and Pattern Recognition · Computer Networks and Communications · Electrical and Electronic Engineering · Analytical Chemistry

RESEARCH SUMMARY

73	807	14	19	1.36	23%
Publications	Citations	h-index	i10-index	Field-weighted impact	World top 10%

Counted from the 73 publications listed below, 2005–2025. Field-weighted impact is the mean over the 56 works scored for it; 1.00 is the world average for works of the same field, type and year. 13 of the 56 papers scored for it are among the world's most cited tenth for their field, type and year.

POSITIONS

Associate Professor 2022–present
Computer Science, Kwame Nkrumah University of Science and Technology (KNUST), Kumasi, Ghana

PUBLICATIONS

Journal articles 68

1. Othniel Amoani Lartey, John Kwao Dawson, Richard Opoku, Stephen Oppong, **Frimpong Twum** (2025). A proposed blockchain technology approach for securing IoT-enabled renewable and grid metering systems. *International Journal of Sustainable Energy*. https://doi.org/10.1080/14786451.2025.2597047
2. Michael Owusu-Adjei, James Ben Hayfron-Acquah, **Twum Frimpong**, Abdul-Salaam Gaddafi (2025). An AI-based approach to predict delivery outcome based on measurable factors of pregnant mothers. *PLOS Digital Health*. https://doi.org/10.1371/journal.pdig.0000543
3. **Frimpong Twum**, Charlyne Carol Eyram Ahiable, Stephen Opoku Oppong, Linda Banning, Kwabena Owusu-Agyemang (2025). Employing transfer learning for breast cancer detection using deep learning models. *PLOS Digital Health*. https://doi.org/10.1371/journal.pdig.0000907
4. Umar Sayibu, Michael Asante, Gaddafi Abdul-Salam, **Twum Frimpong** (2025). Fraud Prediction and Prevention in Mobile Money Payment Systems (MMPS): A Systematic Literature Review of Text-Based Detection Methods. *Security and Communication Networks*. https://doi.org/10.1155/sec/8913715
5. **Frimpong Twum** (2025). SmartGuard: An Improved Leaky Bucket Algorithm-Based Secure and Scalable Congestion Control Framework for the Edge-Cloud Continuum. *Journal of Information Systems Engineering & Management*. https://doi.org/10.52783/jisem.v10i54s.11139
6. Nicodemus Songose Awarayi, **Frimpong Twum**, James Ben Hayfron-Acquah, Kwabena Owusu-Agyemang (2024). A Neural Architecture Search CNN for Alzheimer's Disease Classification. *ECTI Transactions on Computer and Information Technology (ECTI-CIT)*. https://doi.org/10.37936/ecti-cit.2024184.255728

7. Nicodemus Songose Awarayi, **Frimpong Twum**, James Ben Hayfron-Acquah, Kwabena Owusu-Agyemang (2024). A bilateral filtering-based image enhancement for Alzheimer disease classification using CNN. *PLoS ONE*. https://doi.org/10.1371/journal.pone.0302358

8. **F Twum**, JB Hayfron-Acquah (2024). Compression, and Genetic Algorithm. *Proceedings of Ninth International Congress on Information and Communication Technology: ICICT 2024, London, Volume 10*. https://books.google.com/books?hl=en&lr=&id=I6Q4EQAAQBAJ&oi=fnd&pg=PA307&dq=info:i2kaUmWg2KEJ:scholar.google.com&ots=ChLZFgaxA-&sig=oXVO7uyup6kGFDtbvqOdrmtJLzE

9. John Kwao Dawson, **Frimpong Twum**, James Benjamin Hayfron Acquah, Yaw Marfo Missah (2024). Cryptographic Solutions for Data Security in Cloud Computing:. *Journal of Cyber Security and Mobility*. https://doi.org/10.13052/jcsm2245-1439.1324

10. Richard Apau, Michael Asante, **Frimpong Twum**, James Ben Hayfron-Acquah, Kwame Ofosuhene Peasah (2024). Image steganography techniques for resisting statistical steganalysis attacks: A systematic literature review. *PLoS ONE*. https://doi.org/10.1371/journal.pone.0308807

11. Kwadwo Asante, Yaw Marfo Missah, **Frimpong Twum**, Michael Asante (2024). Network-centric Optimal Hybrid Sensing Hole Recovery and Self- Healing in IPV6 WSNs. *International Journal of Wireless & Mobile Networks*. https://doi.org/10.5121/ijwmn.2024.16605

12. **Twum Frimpong**, James Benjamin Hayfron Acquah, Yaw Marfo Missah, John Kwao Dawson, Ben Beklisi Kwame Ayawli, Philemon Baah, Samuel Akyeramfo Sam (2024). Securing cloud data using secret key 4 optimization algorithm (SK4OA) with a non-linearity run time trend. *PLoS ONE*. https://doi.org/10.1371/journal.pone.0301760

13. Fuseini Inusah, Yaw Marfo Missah, Ussiph Najim, **Frimpong Twum** (2023). Agile neural expert system for managing basic education. *Intelligent Systems with Applications*. https://doi.org/10.1016/j.iswa.2023.200178

14. **F Twum**, JBH Acquah, Y Missah (2023). Ensuring Data Confidentiality and Privacy in the Cloud using Non-Deterministic Cryptographic Scheme. *International journal of computer science and network security: IJCSNS*. https://scienceon.kisti.re.kr/srch/selectPORSrchArticle.do?cn=JAKO202322852774688

15. John Kwao Dawson, **Frimpong Twum**, James Benjamin Hayfron Acquah, Yaw Marfo Missah (2023). Ensuring confidentiality and privacy of cloud data using a non-deterministic cryptographic scheme. *PLoS ONE*. https://doi.org/10.1371/journal.pone.0274628

16. John Kwao Dawson, **Twum Frimpong**, James Benjamin Hayfron Acquah, Yaw Marfo Missah (2023). Ensuring privacy and confidentiality of cloud data: A comparative analysis of diverse cryptographic solutions based on run time trend. *PLoS ONE*. https://doi.org/10.1371/journal.pone.0290831

17. Yaw Marfo Missah, Fuseini Inusah, Ussiph Najim, **Frimpong Twum** (2023). Evaluating Agile Neural Educational System for Effective Resource Management. *SAGE Open*. https://doi.org/10.1177/21582440231214843

18. Owusu-Adjei Michael, James Ben Hayfron-Acquah, **Twum Frimpong**, Gaddafi Abdul-Salaam, Owusu-Debrah Nicholas, Kofi Fofie (2023). Imbalanced Dataset and Optimization Technique Use for Disease Treatment Default Prediction. *The International Journal of Science & Technoledge*. https://doi.org/10.24940/theijst/2023/v11/i5/st2305-005

19. Michael Owusu-Adjei, James Ben Hayfron-Acquah, **Twum Frimpong**, Gaddafi Abdul-Salaam (2023). Imbalanced class distribution and performance evaluation metrics: A systematic review of prediction accuracy for determining model performance in healthcare systems. *PLOS Digital Health*. https://doi.org/10.1371/journal.pdig.0000290

20. Fuseini Inusah, Yaw Marfo Missah, Ussiph Najim, **Frimpong Twum** (2023). Integrating expert system in managing basic education: A survey in Ghana. *International Journal of Information Management Data Insights*. https://doi.org/10.1016/j.jjimei.2023.100166

21. Michael Owusu-Adjei, James Ben Hayfron-Acquah, **Frimpong Twum**, Gaddafi Abdul-Salaam (2023). Machine Learning Modeling of Disease Treatment Default: A Comparative Analysis of Classification Models. *Advances in Public Health*. https://doi.org/10.1155/2023/4168770

22. John Kwao Dawson, **Frimpong Twum**, James Benjamin Hayfron Acquah, Yaw Marfo Missah (2023). PRISMA Archetype-Based Systematic Literature Review of Security Algorithms in the Cloud. *Security and Communication Networks*. https://doi.org/10.1155/2023/9210803

23. **Frimpong Twum** (2023). Productivity of onion (Allium cepa L.) as influenced by composted poultry manure and fishpond waste in an aquaponics-based food system. *Ghana Journal of Agricultural Science*. https://www.researchgate.net/profile/Clement-Oppong-Peprah/publication/376890120_Productivity_of_onion_Allium_cepa_L_as_influenced_by_composted_poultry_manure_and_fishpond_waste_in_an_aquaponics-based_food_system/links/658e03f90bb2c7472b182c1d/Productivity-of-onion-Allium-cepa-L-as-influenced-by-composted-poultry-manure-and-fishpond-waste-in-an-aquaponics-based-food-system.pdf

24. **Frimpong Twum**, M Missah (2023). Reconnoitering security algorithms performance in the cloud: Systematic literature review based on the PRISMA archetype. *Journal of Theoretical and Applied Information Technology*. https://scholar.google.com/scholar?cluster=12915261970145967308&hl=en&oi=scholarr

25. David DODOO-ARHIN, **Frimpong Twum**, James Ben Hayfron-Acquah, Yaw Marfo Missah (2022). A Novel Computer Vision Model for Medicinal Plant Identification Using Log-Gabor Filters and Deep Learning Algorithms. *Computational Intelligence and Neuroscience*. https://doi.org/10.1155/2022/1189509

26. **F Twum**, JB Hayfron-Acquah, YM Missah (2022). An enhanced RSA algorithm using Gaussian interpolation formula. *International Journal of Computer Aided Engineering and Technology*. https://doi.org/10.1504/ijcaet.2022.123996

27. **Frimpong Twum**, Emmanuel Mawuli Lagoh, Yaw Missah, Najim Ussiph, Emmanuel Ahene (2022). Cold Boot Attack on Encrypted Containers for Forensic Investigations. *KSII Transactions on Internet and Information Systems*. https://doi.org/10.3837/tiis.2022.09.013

28. YM Missah, U Najim, **F Twum** (2022). Data mining and visualisation of basic educational resources for quality education. *International Journal of Engineering Trends and Technology*. https://www.researchgate.net/profile/Fuseini-Inusah/publication/366627117_Data_Mining_and_Visualisation_of_Basic_Educational_Resources_for_Quality_Education/links/63abf9f7c3c99660ebad7532/Data-Mining-and-Visualisation-of-Basic-Educational-Resources-for-Quality-Education.pdf

29. John Kwao Dawson, **Frimpong Twum**, James Hayfron Acquah, Yaw Marfo Missah (2022). Ensuring Privacy and Confidentiality of Data on the Cloud Using an Enhanced Homomorphism Scheme. *Informatica*. https://doi.org/10.31449/inf.v46i8.4305

30. Martha T. Teye, Yaw Marfo Missah, Emmanuel Ahene, **Twum Frimpong** (2022). Evaluation of Conversational Agents: Understanding Culture, Context and Environment in Emotion Detection. *IEEE Access*. https://doi.org/10.1109/access.2022.3153787

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32. **Frimpong Twum**, Yaw Marfo Missah, Stephen Opoku Oppong, Najim Ussiph (2022). Textural Analysis for Medicinal Plants Identification Using Log Gabor Filters. *IEEE Access*. https://doi.org/10.1109/access.2022.3196788

33. Emmanuel Ahene, Mark Ofori-Oduro, **Frimpong Twum**, Joojo Walker, Yaw Marfo Missah (2021). Efficient Authentication Protocol and Its Application in Resonant Inductive Coupling Wireless Power Transfer Systems. *Sensors*. https://doi.org/10.3390/s21248245

34. Fuseini Inusah, Yaw Marfo Missah, Najim Ussiph, **Frimpong Twum** (2021). Expert System in Enhancing Efficiency in Basic Educational Management using Data Mining Techniques. *International Journal of Advanced Computer Science and Applications*. https://doi.org/10.14569/ijacsa.2021.0121148

35. Stephen Opoku Oppong, **Frimpong Twum**, James Ben Hayfron-Acquah, Yaw Marfo Missah (2021). Medicinal Plant Identification using Gabor Filters and Deep Learning Techniques: A Paper Review. *Journal of Computer Science*. https://doi.org/10.3844/jcssp.2021.1210.1221

36. Nana Kofi Ahoi Appiah-Badu, Yaw Marfo Missah, Leonard K. Amekudzi, Najim Ussiph, **Twum Frimpong**,

Emmanuel Ahene (2021). Rainfall Prediction Using Machine Learning Algorithms for the Various Ecological Zones of Ghana. *IEEE Access*. https://doi.org/10.1109/access.2021.3139312

37. **Frimpong Twum**, J. B., J. K. (2020). A Comparative Study of Existing Cloud Security System Models as against an Implementation of the CDDI Model Dubbed SecureMyFiles System. *International Journal of Computer Applications*. https://doi.org/10.5120/ijca2020919765
38. Michael Ametepe, Dominic Asamoah, **Frimpong Twum** (2020). Evaluating the Impact of Full Virtualized High- Performance Computing Platform on Large Scale Scientific Data using Quantum Espresso. *International Journal of Computer Applications*. https://doi.org/10.5120/ijca2020919856
39. **Frimpong Twum**, J. B., Morgan-Darko William (2019). A Proposed Enhanced Transposition Cipher Algorithm based on Rubik's Cube Transformations. *International Journal of Computer Applications*. https://doi.org/10.5120/ijca2019918323
40. **Frimpong Twum**, J. B., J. K. (2019). A Proposed New Framework for Securing Cloud Data on Multiple Infrastructures using Erasure Coding, Dispersal Technique and Encryption. *International Journal of Computer Applications*. https://doi.org/10.5120/ijca2019918681
41. Mohammed Tee, **Frimpong Twum** (2019). An Improved VoIP using Adaptive Multirate Encoder (AMR). *International Journal of Computer Applications*. https://doi.org/10.5120/ijca2019919428
42. Umar Sayibu, **Frimpong Twum**, Issah Baako (2019). Delivering a Secured Cloud Computing Architecture and Traditional IT Outsourcing Environment via Penetration Tools in Ghana. *International Journal of Computer Network and Information Security*. https://doi.org/10.5815/ijcnis.2019.11.06
43. Boaz Ahulu, **Frimpong Twum**, J. B. (2019). Mapping Cases of Tuberculosis Distribution and Treatment Outcomes using Geographical Information System - The Case of Birim Central Municipality, E/R - Ghana. *International Journal of Computer Applications*. https://doi.org/10.5120/ijca2019918349
44. Edward Kwadwo, James Ben, **Frimpong Twum** (2018). An Enhanced Elliptic Curve Cryptosystem for Securing Data. *International Journal of Computer Applications*. https://doi.org/10.5120/ijca2018917688
45. Oppong-Twum Francis, **Frimpong Twum**, J. B. (2018). Binary Image Segmentation through the Carl Friedrich Gauss Equation. *International Journal of Computer Applications*. https://doi.org/10.5120/ijca2018916969
46. JB Hayfron-Acquah, **F Twum** (2018). Comparative analysis of codeigniter and laravel in relation to object-relational mapping, load testing and stress testing. *International Research Journal of Engineering and Technology (IRJET)*. https://www.academia.edu/download/85341687/IRJET-V5I2322.pdf
47. Promise R., J. B., **F. Twum** (2018). Mitigating Computer Attacks in a Corporate Network using Honeypots: A Case Study of Ghana Education Service. *International Journal of Computer Applications*. https://doi.org/10.5120/ijca2018916836
48. Richard Okoampa-Larbi, **Frimpong Twum**, J. B. (2017). A Proposed Cloud Security Framework for Service Providers in Ghana. *International Journal of Computer Applications*. https://doi.org/10.5120/ijca2017912722
49. JB Hayfron-Acquah, **F Twum** (2017). An Efficient and Secure One Way Cryptographic Hash Function with Digest Length of 1024Bits. *International Journal of Computer Science and Information Security*. https://scholar.google.com/scholar?cluster=13899022645116607 17&hl=en&oi=scholarr
50. **F Twum**, JB Hayfron-Acquah (2017). Reed-Solomon Decoding Simplified for Programmers. *International Journal of Computer Science and Information Security*. https://www.academia.edu/download/52033409/32_Paper_311216127_IJCSIS_Camera_Ready_255-260.pdf
51. Richard Apau, J. B., **Frimpong Twum** (2016). A Modified High Capacity Video Steganography Technique Based On Spatial Domain Method, Asymmetric Cryptography and Huffman Code Algorithms. *Communications on Applied Electronics*. https://doi.org/10.5120/cae2016652390
52. **Frimpong Twum**, J. B., W. W., R. K. (2016). A Proposed Algorithm for Generating the Reed-Solomon Encoding Polynomial Coefficients over GF(256) for RS[255,223]8,32. *International Journal of Computer Applications*. https://doi.org/10.5120/ijca2016912342
53. **F Twum**, JB Hayfron-Acquah (2016). A proposed algorithm for generating the Reed-Solomon Encoding

Polynomial Coefficeints over GF (256) for RS [255,223] 8, 32. *International Journal of Computer Applications*. https://www.academia.edu/download/52136166/twum-2016-ijca-912342.pdf

54. Akpah Sylvester, Michael Asante, **Frimpong Twum** (2016). An Improved Computer Network Access Control using Free BSD PFSENSE: A Case Study of UMaT Local Area Network. *Communications on Applied Electronics*. https://doi.org/10.5120/cae2016652396
55. JB Hayfron-Acquah, **F Twum** (2016). An efficient symmetric cipher algorithm for data encryption. *Int Res J Eng Technol*. https://www.academia.edu/download/54582100/IRJET-V3I5345.pdf
56. Richard Apau, J. B., **Frimpong Twum** (2016). Enhancing Data Security using Video Steganography, RSA and Huffman Code Algorithms with LSB Insertion. *International Journal of Computer Applications*. https://doi.org/10.5120/ijca2016910156
57. **Frimpong Twum**, Kwadwo Asante, Michael Asante (2016). Implementation of Network Services on IPV6 Networks. *International Journal of Computer Applications*. https://doi.org/10.5120/ijca2016909788
58. Omar Safianu, **Frimpong Twum**, J. B. (2016). Information System Security Threats and Vulnerabilities: Evaluating the Human Factor in Data Protection. *International Journal of Computer Applications*. https://doi.org/10.5120/ijca2016910160
59. **F Twum** (2016). PERFORMANCE ENHANCEMENT OF 4G NETWORKS USING NETWORK CODING. *International Journal of Computer Science and Information Security (IJCSIS)*. https://www.academia.edu/download/52136107/PERFORMANCE_ENHANCEMENT_OF_4G_NETWORKS_U_4.pdf
60. **F Twum**, JB Hayfron-Acquah (2016). Reed Solomon encoding: simplified explanation for programmers. *International Journal of Computer Science and Information Security (IJCSIS)*. https://www.academia.edu/download/52136249/Reed_Solomon_Encoding_Simplified_Explana.pdf
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62. Felix Appiah, J. B., Joseph K., **Frimpong Twum** (2015). A Tool Selection Framework for Cross Platform Mobile App Development. *International Journal of Computer Applications*. https://doi.org/10.5120/ijca2015905246
63. Adu AdolphSedemYaw, **Frimpong Twum**, J. B. Hayfron-Acquah, Joseph K. Panford (2015). Cloud Computing Framework for E-Health in Ghana: Adoption Issues and Strategies: Case Study of Ghana Health Service. *International Journal of Computer Applications*. https://doi.org/10.5120/20836-3545
64. J Hayfron-Acquah, **F Twum** (2015). Detecting Data Leakage in Cloud Computing Environment (A Case Study of General Hospital Software). *International Journal of Scientific Engineering and Applied Science (IJSEAS)*. https://scholar.google.com/scholar?cluster=17515283182227409178&hl=en&oi=scholarr
65. JB Hayfron-Acquah, **F Twum** (2015). Hash-Based Random Salt Password Authentication in Two Servers. *International Research Journal of Engineering and Technology (IRJET)*. https://www.academia.edu/download/80694081/IRJET-V2I5145.pdf
66. **Frimpong Twum**, Kwaku Ahenkora (2012). Internet Banking Security Strategy: Securing Customer Trust. *Journal of Management and Strategy*. https://doi.org/10.5430/jms.v3n4p78
67. JB Hayfron-Acquah, **F Twum** (2010). Mitigating computer attacks in a corporate network using honeypots: a case study of ghana education service. *International Journal of Computer Applications*.
68. **Frimpong Twum**, E Owusu-Dabo (2005). Blood pressure patterns in rural, semi-urban and urban children in the Ashanti region of Ghana, West Africa. *BMC Public Health*. https://doi.org/10.1186/1471-2458-5-114

Conference papers 5

1. Richard Apau, **Frimpong Twum**, Michael Asante (2024). A Secure and High Embedding Capacity Image Steganography Scheme Using Image Enhancement Technique, Compression, and Genetic Algorithm. *Lecture notes in networks and systems*. https://doi.org/10.1007/978-981-97-5441-0_27
2. Richard Apau, Michael Asante, **Frimpong Twum** (2023). A Multilayered Secure Image Steganography Technique for Resisting Regular-Singular Steganalysis Attacks Using Elliptic Curve Cryptography and Genetic Algorithm. *Lecture notes in networks and systems*. https://doi.org/10.1007/978-981-99-4932-8_39
3. Vincent Amankona, **Frimpong Twum**, James Ben Hayfron-Acquah (2021). A Framework for Securing Data by using Elliptic Curve Cryptography and Reed Solomon Coding Schemes. *2021 International Conference on Electrical, Computer and Energy Technologies (ICECET)*. https://doi.org/10.1109/icecet52533.2021.9698759
4. Stephen Opoku Oppong, **Frimpong Twum**, James Ben Hayfron-Acquah, Yaw Marfo Missah (2021). Hybrid Approach to Medicinal Plant Leaf Image Enhancement Using Contrast Limited Adaptive Histogram Equalization and Homomorphic Filter. *2021 International Conference on Electrical, Computer and Energy Technologies (ICECET)*. https://doi.org/10.1109/icecet52533.2021.9698460
5. Kwadwo Asante, **Twum Frimpong**, Yaw Missah, Michael Asante (2021). Network-Centric Optimal Hybrid Mobility Scheme for IPv6 Wireless Sensor Networks. *2021 International Conference on Electrical, Computer and Energy Technologies (ICECET)*. https://doi.org/10.1109/icecet52533.2021.9698636