MAHMOUD DARWICH, PhD

Email: darwicma@mountunion.edu

TEACHING EXPERIENCE

Assistant Professor of Computer Science **August 2022 - Present**
University of Mount Union, Alliance Ohio

- Teach courses including but not limited to:
  - CSC 370 Operating Systems
  - CSC 360 Computer Networks
  - CSC 320 Algorithms and Data Structures
  - CSC 310 Database Theory and Implementation
  - CSC 220 Programming Problem-Solving II in Java
  - CSW 123 Introduction Web Development

Adjunct Faculty Computer Science (Online) **April 2023- Present**
National University, San Diego, CA

- Teach courses including but not limited to:
  - CSC 242 Introduction to Programming Concepts
  - CSC 252 Programming in C++
  - CSC 262 Programming in JAVA
  - CSC 272 Advanced Programming in JAVA
  - CSC 335 Data Structures and Algaorithms
  - CSC 436 Computer Communication Networks
  - CSC 443 Mobile App Development

Adjunct Faculty (Online) **August 2019- Present**
Navajo Technical University, New Mexico

- Teach courses including but not limited to:
  - IT 142 Web Design Concepts
  - IT 218 Algorithms and Data
  - IT 270 Web Standards
  - IT 375 JavaScript Core Skills
  - CYB 101 Introduction to Cybersecurity

Assistant Professor of Computer Science **August 2019 – May 2022**
Bloomsburg University of Pennsylvania

- Teach a variety of online and in-person classes including:
  - WDD 120 Introduction to Web Programming,
  - COMPSCI 115 Python Programming,
  - COMPSCI 122 Java Graphical Interface,
  - COMPSCI 121 Introduction to Object-Oriented Programming Java,
  - COMPSCI 357 Principles of Database
- Select, prepare, and maintain resources for current courses

- Develop teaching materials and curricula for new courses
- Actively participate in department efforts to plan, develop, and revise various programs in an effort to increase student retention

Assistant Professor of Information Technology **August 2017- May 2019**
Navajo Technical University, New Mexico

- Taught a variety of classes including:
  - IT 142 Web Design Concepts
  - IT 218 Algorithms and Data
  - IT 270 Web Standards
  - IT 375 JavaScript Core Skills
- Supported the Information Technology Department's degree and certificate programs
- Supervised and mentored students and provided updated information regarding degrees and certificates within their educational tract
- Participated in the planning, coordination, and organizing of student internships
- Developed online courses in the learning management system Moodle

EDUCATION

Doctor of Philosophy in Computer Engineering
December 2017
University of Louisiana at Lafayette, Louisiana, USA

Master of Science in Computer Engineering **December 2013**
University of Louisiana at Lafayette, Louisiana, USA

Bachelor of Engineering in Electrical Engineering **June 2006**
Beirut Arab University, Beirut, Lebanon

RESEARCH INTERESTS AND EXPERIENCE

My research interests encompass Video Streaming, Cloud Computing, Internet-of-Things, and Machine Learning.
I focus on optimizing video streaming costs and architectures in cloud environments. My work includes developing algorithms to reduce transcoding expenses and enhance viewing experiences, with practical applications for major video service providers. In Cloud Computing, I address dynamic resource provisioning using predictive analytics and machine learning to optimize server utilization and minimize latency. Additionally, my research explores the integration of IoT devices with cloud platforms for real-time data processing and smart applications. Machine Learning underpins much of my work, enhancing video streaming quality and cloud resource management through predictive models and optimization algorithms.

PROFESSIONAL EXPERIENCE

Graduate Assistant, System Administration Assistant
2013 - 2017
Center for Advanced Computer Studies, University of Louisiana at Lafayette

- Assisted students and faculty members in troubleshooting various software and hardware issues
- Coordinated with system administrators to troubleshoot issues
- Reimaged computer operating systems

Site Electrical Engineer at Saudi Oger (Construction Firm)
2008 - 2012
Saudi Oger, Jeddah, Saudi Arabia

- Managed the installation of low-voltage systems
- Participated in the testing and commissioning electrical installations
- Reviewed electrical drawings to ensure site executability and conformity within project scope and specification

PUBLICATIONS

Book Chapter

- Li, X., **Darwich, M.**, Bayoumi, M., & Salehi, M. A. (2021). Cloud-Based Video Streaming Services: A Survey. *Advances in Computer, Elsevier.* https://doi.org/10.1016/bs.adcom.2021.01.003

Journal Publications

- Essel, E., Abdelhamid, A., **Darwich, M.**, Khalifa, F., Lacy, F. and Ismail, Y., 2024. High-Fidelity Machine Learning Techniques for Driver Drowsiness Detection. International Journal of Computing and Digital Systems, 16(1), pp.1-11. **DOI:** http://dx.doi.org/10.12785/ijcds/XXXXXX
- **Darwich, M**., Bayoumi, M. Video quality adaptation using CNN and RNN models for cost-effective and scalable video streaming Services. Cluster Comput (2024). https://doi.org/10.1007/s10586-024-04315-8
- **Darwich M**, Taghreed Alghamdi, Kasem Khalil, Yasser Ismail, and Magdy Bayoumi. "Cost-optimized cloud resource management for video streaming: Arima predictive approach." Cluster Computing (2023): 1-15. https://doi.org/10.1007/s10586-023-04135-2

- **Darwich M.**, Ismail Y., Darwich T., and Bayoumi M, (2022). Cost Minimization of Cloud Services for On-Demand Video Streaming. *The Springer Nature Computer Science*. https://doi.org/10.1007/s42979-022-01140-x
- Ismail, Y., Hammad, M., **Darwich, M.**, & Elmedany, W. (2021). Homeland security video surveillance system utilizing the internet of video things for smart cities. *IET Computers & Digital Techniques*, *15*(4), 302–319. https://doi.org/10.1049/cdt2.12014
- **Darwich, M**., Salehi, M. A., Beyazit, E., & Bayoumi, M. (2019). Cost-Efficient Cloud-Based Video Streaming Through Measuring Hotness. *The Computer Journal*, *62*(5), 641–656. https://doi.org/10.1093/comjnl/bxy057
- Li X., Joshi Y., **Darwich M.**, Landrenau B., Amini Salehi M., Bayoumi M. (2018). Performance Analysis and Modeling of Video Transcoding Using Heterogeneous Cloud Services. *IEEE Transactions on Parallel and Distributed Systems*. vol. 30, no. 4, pp. 910-922. http://doi.org/10.1109/TPDS.2018.2870651

Conference Papers

- K. Khalil, T. Mohaidat, **M. Darwich**, A. Kumar and M. Bayoumi, "An Efficient Hardware Design of CoAP Protocol for The Internet of Things," *2024 IEEE 17th Dallas Circuits and Systems Conference (DCAS)*, Richardson, TX, USA, 2024, pp. 1-5, **DOI:** 10.1109/DCAS61159.2024.10539896
- **M. Darwich**, K. Khalil and M. Bayoumi, "Smart Streaming: Deep Learning Applications in Video Streaming Optimization," *SoutheastCon 2024*, Atlanta, GA, USA, 2024, pp. 22-27, **DOI:** 10.1109/SoutheastCon52093.2024.10500209
- **M. Darwich**, K. Khalil and M. Bayoumi, "Optimizing QoE in IoT-Based Video Streaming through Deep Learning Algorithms," *2024 International Conference on Artificial Intelligence in Information and Communication (ICAIIC)*, Osaka, Japan, 2024, pp. 052-057, **DOI:** 10.1109/ICAIIC60209.2024.10463417
- **Darwich, M**, Kasem Khalil, Yasser Ismail, and Magdy Bayoumi. "Deep Learning-Driven Video Summarization on the Cloud: A Pathway to Efficient Storage and Quick Access." In 2023 IEEE 16th International Symposium on Embedded Multicore/Many-core Systems-on-Chip (MCSoC), pp. 360-365. IEEE, 2023. 10.1109/MCSoC60832.2023.00060
- **Darwich, M**, Kasem Khalil, and Magdy Bayoumi. "Optimizing Video Streaming Costs in the Cloud: A CNN Approach." In 2023 International Conference on Information Technology and Computing (ICITCOM), pp. 125-130. IEEE, 2023. 10.1109/ICITCOM60176.2023.10441903
- **Darwich, M**, Kasem Khalil, and Magdy Bayoumi. "Enhancing Video Storage Efficiency in the Cloud: Machine Learning-Driven Optimization Strategies." In 2023 International Conference on Information Technology and Computing (ICITCOM), pp. 119-124. IEEE, 2023. 10.1109/ICITCOM60176.2023.10442879

- **Darwich, M**, and Magdy Bayoumi. "LSTM Network Assisted Content Caching at the Edge for Video on Demand." In 2023 IEEE 5th International Conference on Cybernetics, Cognition and Machine Learning Applications (ICCCMLA), pp. 493-496. IEEE, 2023. 10.1109/ICCCMLA58983.2023.10346904
- **Darwich, M**, Taghreed Alghamdi, and Magdy Bayoumi. "Deep Learning-Enabled Efficient Storage and Retrieval of Video Streams in the Cloud." In 2023 IEEE 8th International Conference on Smart Cloud (SmartCloud), pp. 99-104. IEEE, 2023. 10.1109/SmartCloud58862.2023.00026
- **Darwich, M**, Taghreed Alghamdi, and Magdy Bayoumi. "Deep Learning Approach for Cost and Storage Optimization of Video Streaming in Cloud Environments." In 2023 IEEE 8th International Conference on Smart Cloud (SmartCloud), pp. 80-85. IEEE, 2023. 10.1109/SmartCloud58862.2023.00022
- **Darwich, M**, Kasem Khalil, Yasser Ismail, and Magdy Bayoumi. "Edge computing for efficient storage and low-latency video streaming in cloud environments." In 2023 IEEE International Conference on Artificial Intelligence, Blockchain, and Internet of Things (AIBThings), pp. 1-5. IEEE, 2023. 10.1109/AIBThings58340.2023.10292469
- **Darwich, M**, Kasem Khalil, Yasser Ismail, and Magdy Bayoumi. "Adaptive Video Streaming: An AI-Driven Approach Leveraging Cloud and Edge Computing." In 2023 IEEE International Conference on Artificial Intelligence, Blockchain, and Internet of Things (AIBThings), pp. 1-5. IEEE, 2023. 10.1109/AIBThings58340.2023.10292484
- **Darwich, M**, Kasem Khalil, Yasser Ismail, and Magdy Bayoumi. "Predictive Storage Management for Cloud-Based Video Streaming Using ML ARIMA Model." In 2023 IEEE 66th International Midwest Symposium on Circuits and Systems (MWSCAS), pp. 274-278. IEEE, 2023. 10.1109/MWSCAS57524.2023.10405915
- **Darwich, M**, Kasem Khalil, Yasser Ismail, and Magdy Bayoumi. "Enhancing cloud-based video streaming efficiency using neural networks." In 2023 IEEE International Conference on Omni-layer Intelligent Systems (COINS), pp. 1-5. IEEE, 2023. 10.1109/COINS57856.2023.10189314
- **Darwich M**., (2022). Machine Learning Technique Predicting Video Streaming Views to Reduce Cost of Cloud Services. *2022 IEEE* 8th *Virtual World Forum on Internet of Things* 10.1109/WF-IoT54382.2022.10152250
- **Darwich, M**., Ismail, Y., Darwich, T., & Bayoumi, M. (2021). Improving Hierarchy Storage for Video Streaming in Cloud. *2021 IEEE* 7th *Virtual World Forum on Internet of Things*. http://doi.org/10.1109/WF-IoT51360.2021.9595722
- **Darwich, M**., Ismail, Y., Darwich, T., & Bayoumi, M. (2020). Cost-Efficient Storage for On-Demand Video Streaming on Cloud. *2020 IEEE 6th World Forum on Internet of Things (WF-IoT)*. https://doi.org/10.1109/WF-IoT48130.2020.9221374

- **Darwich, M**., Beyazit, E., Salehi, M. A., & Bayoumi, M. (2017). Cost-Efficient Repository Management for Cloud-Based On-demand Video Streaming. *2017 5th IEEE International Conference on Mobile Cloud Computing, Services, and Engineering (MobileCloud)*, 39–44. https://doi.org/10.1109/MobileCloud.2017.23
- **Darwich, M.**, Abdelgawad, A., & Bayoumi, M. (2016). A Survey on the power and robustness of FinFET SRAM. *2016 IEEE 59th International Midwest Symposium on Circuits and Systems (MWSCAS)*, 1–4. https://doi.org/10.1109/MWSCAS.2016.7869953

TECHNICAL SKILLS

- Programming languages and mathematical packages such as Matlab, Java, Python, and SQL
- Markup languages such as HTML, CSS, and JavaScript
- Computer-aided design such as Cadence
- Learning Management Systems such as D2L, BlackBoard, and Moodle
- Systems such as JMPPro 13, Linux (Centos, Ubuntu), Mac OS, and Windows OS

SCHOLARLY ACTIVITIES

- Peer-reviewer in several journal articles including:
  - The Computer Journal, UK
  - Sustainable Computing: Informatics and Systems, Elsevier
  - IEEE Transactions on Biomedical Circuits and Systems
  - IEEE Transactions on Circuits and Systems I: Regular Papers
  - IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems
  - Hindawi Advances in Multimedia and Journal of Renewable Energy
  - Track Chair at the 6th Virtual International IEEE Conference WF-IoT 2020
- Track Chair at the 8th Virtual International IEEE Conference WF-IoT 2022
- Track Chair at the 28th Virtual International ICECS Conference 2021
- Track Chair at the 7th Virtual International IEEE Conference WF-IoT 2021
- Track Chair at the 6th Virtual International IEEE Conference WF-IoT 2020

DEPARTMENT AND UNIVERSITY SERVICE

- Member of the Computer Science Program Assessment Committee
- Math Adjunct Search and Screen Committee member
- President's Commission on Diversity and Inclusion Committee
- Department Representative at the Teaching and Learning Enhancement Center

- Tenure-Track Computer Science Search and Screen Committee member, University of Mount Union Fall 2022
- Committee Chair, Associate Applied Science Cybersecurity Curriculum developping, Navajo Technical University (Curriculum was accredited by Higher Learning Commission HLC in Fall 2022)

REFERENCES

- **Ahmed Abdelgawad, Professor**
  School of Engineering & Technology
  Central Michigan University
  abdel1a@cmich.edu

- **Yasser Ismail**, **Associate Professor**
  Electrical Engineering Department
  Southern University and A&M College
  yasser_ismail@subr.edu

- **Kasem Khalil, Assistant Professor**
  Ole Miss Engineeting
  The University Of Mississippi
  kmkhalil@olemiss.edu