Raafat Elfouly

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Associate Professor of Computer Science

Inspiring Leader and Team Builder, Open minded, Versatile, Result driven professional with 28+ years of industrial and academic experience. More than Ten successful developed products with proven positive technical and financial impact. Proven Excellent Research and Development Skills, with more than 40 publications and two patents. Excellent experience in Wireless sensor networks design and optimization, Machine learning, Embedded systems, and Energy Management Systems.

Core Competencies

* Track record of Creative, Research and Development, Independent Thinking Leading to Novel Products * Detailed Oriented * Managing Multiple Stakeholders and Driving Cross-Functional Technical Projects and Accomplish Goals* Energized Solving Customer Challenges and Business Problems* Excellent Presentation and Teaching Skills * Excellent Research & Development
* Machine learning, SAS, Robotics, AI, Embedded Systems Product Development * Software Project Management * Embedded Systems Code Optimization/Review* Energy Management Systems (EMS) * Remote Monitoring Systems (RMS)

Experiences and Achievements

8/2016- Present   Associate Professor of Computer Science, Rhode Island College:
Teaching different computer science courses (practical, hands on experience and real projects implementation) such as AI, Machine Learning, Real Time Embedded Software (C and Assembly), Algorithms (parallel and sequential), Data Structures, Computer Architecture, and Programming Languages (JAVA and Python).

Improved students programming skills and knowledge (of Algorithms and data Structures) through close evaluation and code review for all my students' programs. And advising them on the best methods/tools for SDLC, designing, coding, documenting, testing, and debugging their programs.

Created a team of undergraduate students with exceptional skills in research, mainly in real time systems developments, optimization and performance improvements, and published two papers on High performance computing, and Image processing, using SIMD implementation on Intel and ARM.

Advising Ph.D. students at UCONN in Real Time Systems, High Speed Embedded Underwater Wireless Sensor Networks, Machine Learning, Feature Extraction and Data Reduction Techniques.

Motivate students to join professional communities by being advisor of ACM and UPE chapters RIC.

Selected Achievements:
- Developed Data Science program at RIC
- Developing Machine learning certificate with SAS
- First time Machine learning real projects at RIC.
- Most Valuable Professor award (MVP) Fall 2018

- First RIC graduates with Real Time and Embedded Systems Experience.
- First RIC graduates with Parallel Algorithms and Parallel Programming Experience
- Started Bioinformatics Bachelor of Science
- First time undergraduate student publishing two papers (SIMD portable code for Intel and ARM)
- Improved and updated CS course content and skills while being Chair of CS curriculum committee and a member of CS advisory Board
- Helping in spreading and educating community members in IT, by being a member of "Tech Collective Academic Advisory Panel"

2006- 2018   Founder and CEO of Edge Technology Inc.
Founder of the first regional Remote Energy Management Systems Company. Product innovation and development for the first state of the art system for Remote Monitoring System (RMS) for Public Street Lighting Network. My Systems were deployed and are still control more than 250K public street poles.
Formed an outstanding multidiscipline team (Software Communications, Power, and Hardware), in addition to marketing team and production team.
Grew The company from 5 employees in 2006 to 50 in 2011, with delivered projects of more than $6 M.
Our systems are regionally recognized by Ministry of Communications, and Ministry of Electricity.

Selected Contributions:
- Outstanding Business Development, Expanded the company to other countries and creating awareness and interest in my products
- Won and delivered more than 70 tenders for RMS ($6 M)
- First regional patent for Web based Streel Lighting System.
- **RMS Products developed and proven benefits:**
    - Slashed energy consumption by 40 % using my Building Energy Management System (BEMS)
    - Slashed monthly energy bill by 35% and improved power quality using my Web based Industrial Power Quality Monitoring System
    - Slashed energy consumption by 45% and operation cost by 65% using my Wireless Street Lighting Management System
- 2nd Best innovative and creative company in Egypt 2012.
- Successfully Wearing multiple hats: inventor, architect, project manager, Business development, technical lead, product development, and CEO

2002- 2015 Assistant Professor of Computer Engineering. Faculty of Engineering, Cairo University:
Teaching (practical, with hands on experience) different computer engineering courses, such as Embedded Systems, Robotics, Parallel Programming (PVM, MPI, and Multithreading), Algorithms (Parallel and Sequential), Parallel Computer Architecture, and Programming Languages (C and C++).

Developed Working Systems: in Real Time Systems Optimization and Performance, Wireless Sensor Networks, Remote Monitoring Systems (RMS) and Robotics.

Selected Contributions:
- Founder of Embedded Software group in Egypt.(First graduated group formed embedded Group in IBM Egypt, which was later changed to Valeo Egypt)
- Introduced Parallel Programming
- Best master thesis in Cairo University (2009)
- Published more than ten research papers.

2004 – 2009   E-Gov Program Director UNDP:
Process reengineering, digital transformation (E-Gov) in many Egyptian governmental institutions.
Most of my systems are still in use.

Slashing time to establish company from 40 days to three days by process reengineering and using workflow systems in Ministry of Investment.
Reducing service time from one week to one hour by automating Commercial Registry Authority.
One Stop shop implementation in Chamber of Commerce.
Tender Management, my team had six project managers and 40 employees, total projects 50 MEGP.

Selected Contributions, Digital transformation for:
- Slashing company establishment to three days (from 40) Ministry of Investment
- Reducing Service time to one hour (from 7 Days) Commercial Registry Authority
- One Stop Shop Cairo Chamber of Commerce

2005-2008   Embedded Software Director SySDSoft Inc.:
Product development for Wi-Max base station and subscriber station.
Slashed execution time to 200Ms to meet real time requirements.

Selected Contributions:
- Product development Wi-Max Full Stack
- Reducing execution time to 200 MS (from 500MS)
- Created and Introduced Coding guidelines docs/best practices for Embedded Systems.
- Company was later Acquired by Intel Egypt
- Built an outstanding embedded programming team

2000-2001 Consultant, ABB Robotic Technology Group:
Engine Cutting Robot path planning and programming with accuracy 0.03 mm.
Project achieved and delivered on time Using Robot Studio (SW)
Selected Contributions:
- Increased Group Productivity by Starting a weekly follow up meeting with all Project Managers.
- Project delivered as desired to BMW

Education   Ph. D. in Computer Science and Engineering, University of Connecticut, USA
               M.S. in Computer Science and Mathematics, Cairo University, Egypt
               B.S. in Electronic and Communications Engineering, Cairo University, Egypt

Products Developed:
- Building Energy Management System (BEMS) 2016
- Web based Factory Power Quality Monitoring System 2013
- Web Based Smart Meter Reading System, 2012
- Wireless Street Lighting Management System 2010
- Wi-Max Full Stack Embedded Software 2007

Systems Developed:
- E-Gov Systems: Automating General Authority for Investment, Commercial Registry Authority, Cairo Chamber of Commerce, and Ministry of Finance.
- Fleet Management System 2008

Patents
1- "Lighting and Outdoor Signs Management System and Load Management System for Low and Medium Tensions," No. 2010/1854-EGPatent.
2- "Underwater Acoustics Sensor Networks", filed June 2019

Computer Skills:
- Machine learning Using SAS
- Languages: C, C++, Java, .Net, Python, VB, PASCAL, RPG, and Prolog, Assembly languages (Intel, Motorola, and MIPS)
- IDE: MS Visual Studio and Eclipse, Jupyter Notebook
- SDLC: Water fall model, V-Shape and Agile (Scrum).
- Embedded: Multithreading, Real Time Scheduling, Memory Management, Watchdog Timers, Power Aware Coding.
- Version Control: Source Safe, Git
- Operating systems: Windows, Linux, and Unix
- Tools/packages: SAS, Intel V-Tune, OrCad, Keil, and Matlab, Mathematica, MSOffice,
- Communication Protocols: WI-Max, Zig BEE, RS232, Modbus, Profibus, RS485, Profinet and Power Line Communications (PLC).
- Processors/Microcontroller: AVR, ATMEL, Zilog- 80, Intel, DSP (Shark Arch) and ARM.
- Lab skills: Oscilloscope, Logic Analyzer, Digital Multimeters, Interfacing Techniques, bread board, and Soldering
- Other Experience: Non-Destructive Testing (NDT), Ultrasonic Imaging, Air Traffic Control.
- Project Management: PMP course/Book.

Recognition and Merit Awards

- Most Valuable Professor, Rhode Island College, Fall 2018
- Ministry of communication and information Technology: 2nd Place in "Best Innovative Companies" Egypt, 2012.
- Cairo University, Best Master Thesis, 2009.
- University of Connecticut: Post-Doctoral Fellowship 2000
- University of Connecticut: Pre-Doctoral Fellowship 1999
- University of Connecticut: Graduate Student Fellowship1998
- University of Connecticut: Research Assistant Scholarship 1995-1998
- Cairo University: Graduate Scholarship 1990-1994
- Cairo University: Excellent Student Awards 1985-1990

Publications

- H. Aldosari, R. Elfouly, R. Ammar," Optimal Artificial Neural Network Model for Prediction of Oil and Gas Pipelines Defect Length", The 2020 International Conference on Computational Science and Computational Intelligence (CSCI'20), Dec 2020.
- H. Aldosari, R. Elfouly, R. Ammar, "Evaluation of Machine Learning Based Regression Techniques for Prediction of Oil and Gas Pipelines Defect Length", The 2020 International Conference on Computational Science and Computational Intelligence (CSCI'20), Dec 2020.
- A. Elenazi, R. Elfouly, R. Ammar, "Queue Analysis for Probabilistic Cloud Workflows", The 2020 IEEE International Symposium on Signal Processing and Information Technology (ISSPIT).

- H. Albarakati, R. Elfouly, R. Ammar, , "Optimal Localization of Multi-Computer Architecture for Large-Scale Underwater Wireless Sensor Networks", The 2020 IEEE International Symposium on Signal Processing and Information Technology (ISSPIT).

- A. Elenazi, R. Elfouly, R. Ammar,"Cost Minimization Algorithm for Provisioning Cloud Resources') The 2020 IEEE International Symposium on Signal Processing and Information Technology (ISSPIT).

- M. Alsulami, R. Elfouly, R. Ammar, "Deployment of Multiple Computing Systems in Underwater Wireless Sensor Networks", The 2020 IEEE International Symposium on Signal Processing and Information Technology (ISSPIT).

- H. Albarakati, R. Elfouly, R. Ammar, 'Efficient Topology of Multilevel Clustering Algorithm for Underwater Sensor Networks', IEEE International Symposium on Signal Processing and Information Technology (ISSPIT-2020).

- M. Alsulami, R. Elfouly, R. Ammar, 'A Modified K-Medoids Algorithm for Deploying a Required Number of Computing Systems in a Three Dimensional Space in Underwater Wireless Sensor Networks", The 2020 IEEE International Symposium on Signal Processing and Information Technology (ISSPIT-2020).

- H. Aldosari, R. Elfouly, R. Ammar, "Performance of New Monitoring Architectures for Underwater Oil/Gas Pipeline using Hyper-Sensors", 2020 IEEE Symposium on Computers and Communications (ISCC)

- H. Aldosari, R. Elfouly, R. Ammar, "A New Monitoring Architecture for underwater Oil/Gas Pipeline using Hyper sensors". 35th ISCA International Conference on Computers and Their Applications (CATA 2020) March 2020

- H. Albarakati, R. Elfouly, R. Ammar, "'Geometry-Assisted Multi Surface-Gateways Placement Topologies for Underwater Sensor Networks", The 2019 IEEE International Symposium on Signal Processing and Information Technology (ISSPIT) December 2019.

- M. Alsulami, R. Elfouly, R. Ammar, "'Ideal Number of Computers for Real-Time Underwater Computing Systems", The 2019 IEEE International Symposium on Signal Processing and Information Technology (ISSPIT) December 2019.

- H.Albarakati, R. Elfouly, R. Ammar, "Real-Time Decision for Underwater Big Data Application Using the Apriori Algorithm", IEEE Symposium on Computers and Communications (ISCC), June 2019, Barcelona, Spain.

- A. Elenazi, R.Elfouly, R.Ammar," Transformation of Cloud Workflow Graphs into Computational Models", IEEE Symposium on Computers and Communications (ISCC), June 2019, Barcelona, Spain.

- H.Albarakati, R. Elfouly, R. Ammar, "Weighted Record Sample for Seismic Monitoring Underwater Application", Proceedings of 34th International Conference on Computers and Their Applications(CATA 2019), pages 99-106. And published in EPiC Series in Computing, volume 58, March 2019

- P. Zamojski, R. Elfouly "Developing Standardized SIMD API between Intel and ARM NEON", The 2018 International Conference on Computational Science and Computational Intelligence (CSCI'18: December 13-15, 2018, Las Vegas, USA).

- A. Elenazi, R.Elfouly, R.Ammar," Analytical Performance Modeling of Non-Deterministic Cloud Workflows Using CSM" 2018 IEEE International Symposium on Signal Processing and Information Technology (ISSPIT).

- P. Zamojski, R. Elfouly "Creating a Compiler Optimized In-line able Implementation of Intel SVML SIMD Intrinsics", CAINE 2018, October 2018.

- H.Albarakati, R. Elfouly, R. Ammar " Real-Time Underwater Computing System", 2018 IEEE Symposium on Computers and Communications (ISCC), Brazil 2018

- A. Elenazi, R.Elfouly, R.Ammar " Modeling Cloud Workflows using Computation Structure Model", The 33rd ISCA International Conference on Computers and Their Applications (CATA 2018) March 19-21, 2018, Las Vegas, Nevada, USA.

- H.Albarakati, R. Elfouly, R. Ammar, H. Alymani "Real Time Underwater Embedded System Architecture". 2017 IEEE International Symposium on Signal Processing and Information Technology (ISSPIT).

- H.Albarakati, R. Ammar, R. Elfouly, "Reconfigurable Underwater Embedded Systems Architectures" 22nd IEEE Symposium on Computer and Communications (ISCC 2017) July 3-6 , Greece, 2017

- A. Alsheikhy, R. Ammar, R. Elfouly, M. Alharthi " Power Consumption and Energy Estimation in Smart Phones" International Journal of Advanced Engineering, Management and Science (IJAEMS) ISSN:2454-1311, October 2016

- Alsheikhy, R. Elfouly, M. Alharthi, R. Ammar and A. Alshegaifi, "An Effective Real-Time Dynamic Scheduling Approach for Periodic Tasks", 5th International Journal of Computing and Instrumentation Engineering (IJCCIE) Vol3 Issue 2, 2016, ISSN 2349-1469

- A. Alsheikhy, R. Ammar, R. Elfouly, M. Alharthi and A. Alshegaifi, "An Efficient Dynamic Scheduling Algorithm for Periodic Tasks in Real-Time Systems Using Dynamic Average Estimation", 21st IEEE Symposium on Computers and Communication (ISCC 2016) – 20th IEEE Symposium on Computers and Communications, Messina, Italy, June, 2016.

- A. Alsheikhy, R. Elfouly, M. Alharthi, R. Ammar and A. Alshegaifi, "An Effective Real-Time Dynamic Scheduling Approach for Periodic Tasks", 5th International Conference on Advances in Engineering Sciences and Applied Mathematics (ICAESAM'2016), Hong Kong, May, 2016.

- Hesham Alymani, Raafat Elfouly, et al, " A Heuristic Approach for Underwater Sensing and Processing Deployment", The 11th International Computer Engineering Conference, December 2015, Cairo, Egypt.

- A. Alsheikhy, R. Elfouly and R. Ammar, "An Improved Dynamic Round Robin Scheduling Algorithm Based on a Variant Quantum Time", 2015 11th International Computer Engineering Conference (ICENCO), pp. 98-104, Cairo, Egypt, December 2015

- Seham A. Aly, Raafat S. Elfouly, Hoda Baraka "Extended KALMAN Filtering and Interacting Multiple Model for Tracking Maneuvering targets in Sensor Networks" Seventh Workshop on Intelligent Solutions in Embedded Systems, Italy. June 2009.

- Mohamed M. Abdelhalim, Raafat Elfouly "Fast and Compact ASIC Implementation of SFlash New Signature Scheme". International Journal of Security and Its Applications. Vol.3 No.4 October 2009.

- Seham A. Aly, Raafat S. Elfouly, Hoda Baraka "Real Time Localization Algorithm for Maneuvering Targets in Non-Uniform Sensor Networks" 13th International Conference on Aerospace Science and Aviation Technology, ASAT- 13, May 2009.

- Mostafa M. Hassan, Amir F. Atiya, Neamat ElGayar, Raafat Elfouly "Novel Ensemble Techniques for Regression with Missing Data". Journal of New Mathematics and Natural Computation, World Scientific Publishing Company CIEF 35 2008.

- Menrit S. Fahmy, Amir F. Atiya, Raafat Elfouly "Adaptive Fingerprint Classification For Biometric Fusion". 10th International Conference on Enterprise Information systems (ICEIS 2008). Vol. PRIS2008.

- Mostafa M. Hassan, Amir F. Atiya, Raafat Elfouly "A New Multidimensional Penalized Likelihood Regression Method", International Joint Conference on Neural Networks (IJCNN2008) as part of 2008 IEEE World Congress on Computational Intelligence (WCCI2008).

- Menrit S. Fahmy, Amir F. Atiya, Raafat Elfouly "Biometric Fusion Using Enhanced SVM Classification". IIH-MSP 2008.

- Mostafa M. Hassan, Amir F. Atiya, Neamat ElGayar, Raafat Elfouly "Regression in the Presence Missing Data Using Ensemble Methods", International Joint Conference on Neural Networks (IJCNN2007), August 2007, Orlando, Florida, USA.

- Arafat Hegazy, Ahmed Darwish, Raafat Elfouly "Reducing µTESLA memory requirements", The Second International Conference on Systems and Networks Communications , ICSNC 2007, August 25-31, 2007 - Cap Esterel, French Riviera, France.
- Ahmed A. Gamil, Raafat Elfouly, Nevin Darwish "Stock Technical Analysis using Multi Agent and Fuzzy Logic", The 2007 International Conference of Computational Intelligence and Intelligent Systems, World Congress on Engineering, London, U.K., 2-4 July, 2007.
- Arafat Hegazy, Ahmed Darwish, Raafat Elfouly "Reversed Message Authentication Code Chain Broadcast (RMCB) Protocol", Wireless and Optical Communications, WOC 2007, May 2007, Montreal, Canada.
- Ahmed Gamil, Raafat Elfouly "Stock Technical Analysis using Fuzzy Logic", The 2nd Indian International Conference on Artificial Intelligence, Pune, India, December 2005
- Raafat S. Elfouly, Reda A. Ammar, and Howard A. Sholl , "Prediction of Inner and Outer Diameter Flaws Using Ultrasonic Pipe Inspection System" ", 15th International Conference on Computers and Their Applications ,pp. 368-372, March 29-31, 2000, New Orleans, Louisiana.
- Raafat Elfouly, Howard Sholl, Reda Ammar, and Dominic Pagano, "A New Approach of Ultrasonic Beam Edge Tracking and Strip Generation for Ultrasonic Inspection Systems", The 12th International Conference on Computer Applications in Industry and Engineering (CAINE-99), pp. 133-137, Atlanta, Georgia, November 4-6, 1999
- "Real Time Pipe Inspection System ", Ph. D., Computer Science and Engineering Department, University of Connecticut, November 1999.

- "Design and Implementation of a General Purpose Fuzzy Logic Computer System ", M.S., Mathematics and Computer Science Dept., Faculty of Engineering, Cairo University. May 1994.

- Raafat S. Elfouly, Nevin Darwish "A General Purpose Fuzzy Logic Based Computer System", ISSR, Cairo University, Vol. 21, No. 2, 1993.