Ahmad A. Ababneh, PhD

Electrical Engineering

Email: a.ababneh@gmail.com , aaababnah@just.edu.jo

Tel: +962-79-560-4536

Academic Qualifications:

- PhD Electrical Engineering Kansas State University, USA Dec. 2010
  Thesis: Sensor Deployment in Detection Networks- A Control Theoretic Approach.
  Advisor: Prof. Bala Natarajan
- MS Electrical Engineering Arizona State University, USA July, 2007
  Thesis: New Sequential Bayesian Filtering Algorithms and Architectures.
  Advisor: Prof. Antonia Papandreou & Chaitali Chakrabarti
- BS Electrical Engineering Mutah University, Jordan June, 2003

Employment Record:

- Vice Dean (Sep, 2018-2019)
  Deanship of Scientific Research, Jordan University of Science and Technology, Irbid, Jordan.
- Associate Professor (Nov, 2017-Present)
  Electrical Engineering Dept., Jordan University of Science and Technology, Irbid, Jordan.
- Assistant Dean (Aug, 2016-Dec, 2016)
  Faculty of Engineering, Jordan University of Science and Technology, Irbid, Jordan.
- Assistant Professor (Aug, 2011-Nov, 2017)
  Electrical Engineering Dept., Jordan University of Science and Technology, Irbid, Jordan.
- Assistant Professor (Jan,2011-July, 2011)
  Communication Engineering Dept., Yarmouk University, Irbid, Jordan.
- Research/ Teaching Assistant (Aug, 2007-Dec, 2010)
  Electrical & Computer Engineering Dept., Kansas State University, USA.
- Research/ Teaching Assistant (Aug, 2004-July, 2007)
  Electrical & Computer Engineering Dept., Arizona State University, USA.

Awards:

- The ECE Outstanding Graduate Research Assistant (2009-2010), ECE Dept., Kansas State University.
- Graduate research assistantship (RA) (2007-2010), ECE Dept., Kansas State University, USA.
- Graduate teaching assistantship (TA) (2009-2010), ECE Dept., Kansas State University, USA.
- Graduate research assistantship (RA) (2004-2007), EE Dept., Arizona State University, USA.

Research:

Publications:

1. **Ahmad Ababneh**, "**Error & Energy Aware Sensor Deployment for RSS Localization- A Linear Quadratic Regulator Formulation**", IEEE Sensors Journal, Under Review.

2. **Ahmad Ababneh**, "**Knapsack-Based Sensor Selection for Target Localization under Energy and Error Constraints**", IEEE Sensors Journal, Vol.21, Issue.23, 2021.

3. **Ahmad Ababneh**, Zouhair Al-Quda "**Distributed Anchor Activation Schemes for RSS Localization**", International Journal of Sensor Networks, Accepted, 2021.

4. Zouhair Al-Quda**, Ahmad Ababneh**, "Broadcast diamond channel: Transmission strategies and bounds", Journal of the Franklin Institute, Vol. 358, No. 3, pp: 2178-2193 , 2020.

5. **Ahmad Ababneh**, "**Low-Complexity Bit Allocation for RSS Target Localization**,", IEEE Sensors Journal, Vol. 19, Issue. 17, pp: 7733 – 7743, 2019.

6. **Ahmad Ababneh**, "**Density-based Sensor Selection for RSS Target Localization**," , IEEE Sensors Journal, Vol. 18, Issue. 20, pp: 8532-8540, August 2018.

7. **Ahmad Ababneh**, "**A Density-based Least Squares Formulation of the Sensor Selection Problem for RSSI Localization**," Jordan Journal of Electrical Engineering (JJEE), Tafila Technical University, Jordan, 2017.

8. **Ahmad Ababneh**, "**Target Localization Accuracy Improvement via Sensor Mobility**," International Journal of Parallel, Emergent and Distributed Systems, Taylor & Francis,2017 . DOI: 10.1080/17445760.2017.1357720 .

9. Fadi N. Zghoul , Suat U. Aye and **Ahmad Ababneh,** " **Gain and offset analysis of comparator using the bisection theorem and a balanced method**," International Journal of Electronics, http://dx.doi.org/10.1080/00207217.2016.1138543.

10. Zghoul, Fadi Nessir, Suat U. Ay, Ismail Cevik, **Ahmad A. Ababnah**, Saher A. Albatran, and Abdallah Y. Alma'aitah. "**A Novel Stochastic ADC Topology with Wide Input Range**." *Indian Journal of Science and Technology* 9, no. S1 (2016).

11. **Ahmad A. Ababneh** and Ebtessam Al-Zboun, "**EDAC: A Novel Energy-Aware Clustering Algorithm for Wireless Sensor Networks**," International Journal of Advanced Computer Science and Applications (IJACSA), 7(5), 2016. http://dx.doi.org/10.14569/IJACSA.2016.070545

12. **Ahmad A. Ababneh**, "**An Auction-Bidding Protocol for Distributed Bit Allocation in RSSI-based Localization Networks**" International Journal of Advanced Computer Science and Applications(IJACSA), 7(6), 2016. http://dx.doi.org/10.14569/IJACSA.2016.070657

13. **Ahmad Ababneh**, Fadi Zghoul, "**A Distributed Sensor Relocation Algorithm for Target Localization Problem**s", Ad Hoc & Sensor Wireless Networks, Vol. 35, 2017.

14. **Ahmad Ababneh**, Lutfa Akter and Fadi Zghoul, "**Quantizer Design for RSSI-based Target Localization in Sensor Networks**", Ad Hoc & Sensor Wireless Networks, Vol. 35, pp.319-340, 2017.

15. Pritom Mozumdar, Taynan Sabri Helal, **Ahmad Ababnah** and Lutfa Akter, "**Heterogeneous sensor deployment strategy based on optimal control theory**" Electrical Engineering and Information Communication Technology (ICEEICT), 2015 International Conference on, pp.1-6, Bangladesh, May, 2015.

16. Shurman, Mohammad M., Mamoun F. Al-Mistarihi, Amr N. Mohammad, Khalid A. Darabkh, and **Ahmad A. Ababnah**. "Hierarchical clustering using genetic algorithm in wireless sensor networks." In *Information & Communication Technology Electronics & Microelectronics (MIPRO), 2013 36th International Convention on*, pp. 479-483. IEEE, 2013.

17. **Ababnah, A.**; Natarajan, B.; , "**Sensor Deployment as an Optimal Control Problem**," Computer Communications and Networks, 2009. ICCCN 2009. Proceedings of 18th International Conference on , vol., no., pp.1-5, 3-6 Aug. 2009. (Acceptance rate 26.7%)

18. **Ababnah, A.**; Natarajan, B.; , "**Optimal Sensor Deployment for Value-Fusion Based Detection**," Global Telecommunications Conference, 2009. GLOBECOM 2009. IEEE , pp.1-6, Nov. 30 2009-Dec. 4 2009 (Acceptance rate 35%)

19. **Ababnah, A.**; Natarajan, B.; , "**Optimal Control-Based Strategy for Sensor Deployment**," Systems, Man and Cybernetics, Part A: Systems and Humans, IEEE Transactions on , vol., no.99, pp.1-8, 2010

20. **Ahmad Ababnah** and Bala Natarajan, "**Optimal control based sensor deployment incorporating centralized data fusion**", IEEE Transactions on Aerospace and Electronic Systems, Vol.46, Issue.3, pp.2086-2097, July 2011.

21. **Ahmad Ababnah** and Bala Natarajan, "**Control Theoretic Sensor Deployment Approach for Data Fusion Based Detection**", The 6th IEEE International Conference on Distributed Computing in Sensor Systems (DCOSS '10), pp92-101, June 21-23, 2010. (Acceptance rate 36%)

22. **Ahmad Ababnah** and Bala Natarajan, "**An LQR Formulation of Sensor Deployment for Decision Fusion Based Detection**", IEEE Global Communication Conference (GLOBECOM), 2010.

Interests:

- Target detection & localization
- Optimal control theory
- MIMO communications
- MIMO radar
- Bayesian filtering for target tracking
- Frequency detection
- Convex optimization

PhD Achievements:

- Proposed a novel formulation of the deployment problem using optimal control theory.
- Original formulation led to deployment algorithms that outperform other existing algorithms.
- Research work is the first to analytically address the deployment problem in decision fusion based sensor networks.

MS Achievements:

- Studied sequential Monte Carlo Bayesian filtering (particle filtering)
- Designed two novel particle filtering algorithms
- Proposed algorithms can save as much as 90% in terms of computational complexity than other existing algorithms

Master Theses Supervised:

1. Moqbel Hamood, *"A Novel User Collaborative Scheme for Non-Orthogonal Multiple Access (NOMA) Communication System ",* EE Dept., Jordan University of Science & Technology, in progress.

2. Abdu A-Malik Qayed, *"On Relay Selection for a two-hop Non-Orthogonal Multiple Access (NOMA) Network ",* EE Dept., Jordan University of Science & Technology, in progress.

3. Hussam Al-Wedian, *"A Novel Pilot Design Approach for Massive MIMO ",* EE Dept., Jordan University of Science & Technology, in progress.

4. Shatha Shwayat, , *"Solution of the Fisher Reaction Diffusion Equation using a Novel Adaptive Radial Basis Function (RBF) Collocation Method ",* Jordan University of Science & Technology, in progress. ***(Mathematics and Statistics Department)***

5. Khadija Gaafer, *"Novel Target Localization Algorithms for Sensor Networks",* EE Dept., Jordan University of Science & Technology, Irbid, Jordan 2013.

6. Thaer Al-Khateeb, *"Target Location Estimation in Mobile Wireless Sensor Networks under Energy Constraints",* EE Dept., Jordan University of Science & Technology, Irbid, Jordan 2015.

7. Ebtessam Al-Zboun, *"A Novel Energy-Efficient Clustering Protocol for Wireless Sensor Networks",* EE Dept., Jordan University of Science & Technology, Irbid, Jordan 2016.

Master Theses Defense Committee Member:

1. Sahar Al-Ahmad, *"Performance of Multihop Code Division Multiple Access Ad-Hoc Networks with Diversity Combining Techniques in k-u Fading Environments",* Jordan University of Science & Technology, Irbid, Jordan 2015.

2. Turki Al-Rashidi, *"Minimizing the Power Consumption of Wireless Sensor Networks using Spatial Correlation ", Jordan* University of Science & Technology, Irbid, Jordan 2013

Reviewer:

1. IEEE Sensors Journal
2. IEEE Transactions on Instrumentation and Measurements
3. Cluster Computing
4. Electronic Letters

Presentations:

- Novel particle filtering methods in wireless sensor networks.
- Applications of optimal control theory in wireless sensor networks.
- Convex Optimization: Fundamentals and Algorithms.
- Neural networks for target detection.
- Instantaneous frequency detection in time-frequency domain.
- Computation and Performance Tradeoff for different Particle Filtering Algorithms.

Graduation Projects Supervised:

1. Saif S. Amous, “Detection Techniques for Multiple Input Multiple Output Technology,” Jordan University of Science and Technology, JUST, Irbid, Jordan.
2. Waed Balawneh, Diaa Alzghoul and Rawan Titi, “Fire Alarm Robot,” Jordan University of Science and Technology, JUST, Irbid, Jordan.
3. Bayan Qutshan, and Abir Rahim, “Search and Rescue Vehicle,” Jordan University of Science and Technology, JUST, Irbid, Jordan.

4. Ahmad Abujazouh and Mohammad Al-Bwaliz, “Ad-Hoc On-Demand Distance Vector Routing Protocol,” Jordan University of Science and Technology, JUST, Irbid, Jordan.
5. Mohammed Al-Ahmad, Ibrahim Abed-Alghafer and Momahhed Al-Hamshari, “Smart Home System,” Jordan University of Science and Technology, JUST, Irbid, Jordan.
6. Feras Al-Natour, “Detection in MIMO Systems using a Hybrid Zero-Forcing Technique,” Jordan University of Science and Technology, JUST, Irbid, Jordan.

Courses taught:

1. Embedded Systems
2. Computer Control
3. Numerical Methods for Engineers
4. Stochastic Processes
5. Linear Algebra
6. Communication Networks

**My typical load is 12 hours/week of teaching at JUST and 8 office hours.*

7. Analog Communications
8. Digital Design
9. Data & Computer Communications
10. Electronics
11. Digital Design Lab
12. Electronics Lab
13. Circuits Lab
14. Introduction to Electrical Engineering
15. Communication Systems Lab
16. Graduate Seminar in Wireless Communications
17. Graduation Projects

Course Background:

- Optimal Control with Network Applications.
- MIMO +OFDM Communication Systems.
- Information Theory.
- Wireless Communications.
- Optical Communication
- Neural Networks
- Digital Communications
- Communication Systems
- Detection and Estimation
- Time-Frequency Analysis
- Digital Spectral Analysis
- Digital Signal Processing

References:

Khaled Mayyas, PhD
Professor, Electrical Engineering Dept.
Jordan University of Science & Technology
mayyas@just.edu.jo

Bala Natarajan, PhD
Professor, Electrical & Computer Engineering Dept.
Kansas State University

bala@ksu.edu