AFŞAR SARANLI

Department of Electrical and Electronics Engineering
Middle East Technical University **Phone: (Home) +90 312 223-2936**
Ismet Inonu Bulvari, 06531 **(Work) +90 312 210-4529**
Ankara - Türkiye **(Fax) +90 312 210-2304**
E-mail : *afsars@metu.edu.tr*

Objective:

To achieve the highest standards of teaching and research as part of the academic staff in Middle East Technical University. My current research interests include legged autonomous mobile robotics, sensor based state estimation, robot vision and pattern recognition, development, simulation and modeling of control systems; stochastic and adaptive image and signal processing.

Professional Experience:

Assistant Professor (January 2006 - Present)
Instructor (January 2005 - January 2006)
Middle East Technical University - Department of Electrical and Electronics Engineering, Ankara, Turkey.

Teaching and research activities:
Undergraduate:

- EE209 - Fundementals of Electrical and Electronics Engineering (Mech Eng, Aero Eng. Students)
- EE381 - Systems and Control
- EE302 - Feedback Systems
- EE493 - Engineering Design I
- EE494 – Engineering Design II

Graduate:

- EE586 - Artificial Intelligence
- EE501 - Linear System Theory - I
- EE555 – Stability Theory of Dynamic Systems
- EE780 – Probabilistic Techniques for Mobile Robotics

Research:

- **Research Project: BAP-2005-03-01-02** - "Data Processing and Fusion in Decentralized Sensor Networks" - *Completed*
- **Research Project: Tübitak 1001-106E089**- "Bacaklı robotlarda mobil arazi uygulamarına yönelik öz durum kestirimi ve geribeslemeli dinamik davranışlar" (Body-State Estimation and Feedback based Dynamic Behaviors in Legged Mobile Robots for Rugged Field Applications) –Completed in *December 2009*
- **Research Project: Tübitak 1001-110E120**- "Kıvrak bacaklı robotlarda gürbüz görsel algının işitsel algı desteğinde geliştirilmesi ve otonom navigasyon amaçlı uygulanması" (Acoustic perception assisted robust visual processing and perception for dynamically dextrous legged robots with application to autonomous navigation) - To be completed in September 2013

Computer Scientist – Software Engineer (June 2000 - November 2004)
Photon Dynamics Canada Inc. (formerly named Image Processing Systems (IPS) Automation Inc.), Toronto, Canada.

- Algorithm and software development for the real-time control of a multiple moving camera, glass edge automated optical inspection sub-system,

- Modeling and simulation of optical imaging channels and Fourier analog optical image processing for a flat panel LCD automated optical inspection system,
- Algorithm development and dynamic behavioral modeling of a multi-camera microscopic defect review sub-system of a flat panel LCD automated optical inspection system,
- Development of experimental plans and testing strategies for automation systems,
- Extensive experience in advanced MATLAB modeling/simulation/programming,
- Finite Elements Modeling (FEM) of physical phenomena using FEMLAB and ANSYS,
- Visual C/C++ Programming using MS Visual Studio, National Instruments Measurement Studio – LabWindows / CVI, Imaq Vision Builder.

Technical Advisor to the President (September 1995 – November 1999) – Part Time
STFA Savronik Defense Electronics Inc., Ankara, Turkey.

- Contribution in the revision and improvement of the Company's business processes.
- Contribution in Quality Assurance and Planning.
- Development of a Business Development and Marketing Database System.

Research-Teaching Assistantship (February 1995 – February 2000)
Middle East Technical University - Department of Electrical and Electronics Engineering, Ankara, Turkey.

- Founding and Management of the Digital Speech Processing Laboratory,
- Development of the C++ object-oriented speech processing and automatic speaker identification package METU-OASIS (Open-Architecture Speech Information System)
- Research and development activities in digital speech processing and automatic speaker identification (The Laboratory is a Member of the European COST-250 Project Group),
- Teaching in Digital Signal Processing by the design and assignment MATLAB projects.

Part-Time Researcher (September 1992-February 1993)
TUBITAK, *Scientific and Technological Research Council of Turkey* - Institute of Electronic Research and Development -VLSI Laboratories, Ankara, Turkey.

- Took part in VLSI system design and development activities.

Development Oriented Internship (August-September 1992)
TUBITAK, *Scientific and Technological Research Council of Turkey* - Institute of Electronic Research and Development -VLSI Laboratories, Ankara, Turkey.

- Design, prototype implementation and testing of a DTMF dial-tone generator sub-system. Experience in UNIX operating system on SUN Sparc workstations. Experience in VLSI design and simulation software tools.

Development Oriented Internship (July-September 1991)
ASELSAN, *Military Electronics Industries*, Ankara, TURKEY.

- Design and prototype implementation of a Microprocessor Controlled 8-Bit , 8 Channel Multiplexed Data Acquisition Card for IBM-Compatible Personal Computers, using INTEL 80c51 Microcontroller and peripheral circuitry. Experience in microprocessor based digital system design.

Education:

Ph.D. Degree in Electrical and Electronics Engineering (January 2000)
Middle East Technical University, Ankara, Turkey.

- Development the open architecture speech information system (OASIS). Development of a unifying theory for rank-based multiple classifier decision systems for

pattern recognition problems. Investigation of applications in automatic speaker identification and speech recognition.

M.Sc. Degree in Communications and Signal Processing (with Distinction, October 1994)
Imperial College of Science, Technology and Medicine, University of London, UK.

- Development of new Cubic B-Spline Basis Functions in Adaptive Radial-Basis Function Networks. Investigation of possible uses in the digital signal processing problems of real time system identification and time-series prediction.

B.S. Degree in Electrical and Electronics Engineering (with Honors, June 1993)
Middle East Technical University, Ankara, TURKEY.

- With course load specialization in Communication and Computer Systems.

Technical Skills:

- Solid background in Digital Signal Processing, Optimization, Optimal and Adaptive Systems, Telecommunications, Feedback Control Systems and Object Oriented Software Design
- Excellent knowledge of real-time imaging and instrument control systems including design, simulation and implementation of automated machine vision systems.
- Extensive experience with system level design, design and implementation of experimental and testing strategies, troubleshooting and diagnostics of complex instrument control systems.
- Moderate experience in modeling of physical phenomena using Finite Element Modeling (FEM) packages FEMLAB and ANSYS.
- Excellent knowledge of MATLAB Numerical Analysis, Modeling and Visualization Suite as an algorithm design and prototyping tool as well as a programming language.
- Excellent knowledge of hybrid C/C++ and MATLAB Programming.
- Excellent knowledge of C, C++, Pascal, Visual Basic and Fortran programming languages.
- Excellent knowledge of the Various Linux and MS Windows (NT/XP/7) operating systems.
- 18+ years of experience in C language programming on UNIX/Windows Operating Systems.
- 16+ years of experience in object-oriented software design and implementation using the C++ language.
- Excellent knowledge of version control systems (RCS-CVS / MS-VSS / Subversion).
- Moderate experience in SQL database programming and database design.
- Moderate experience in UNIX System Administration and Network Programming.
- Moderate knowledge of Computer Security and Cryptography.
- Experience in Microprocessor / microcontroller based system design.
- Experience in DSP processor programming.
- Experience in Java Language, ActiveX Controls, CORBA Architecture and the Universal Modeling Language (UML).
- Excellent knowledge of Office tools (OpenOffice / Word / Excel / Access / PowerPoint and variants).

Languages:

- Turkish as the native language.
- Excellent written and spoken knowledge of English and French.
- Intermediate level written and spoken Spanish.
- Beginner level German.

Personal Interests:

- Amateur Photography: Nature, Landscape and Experimental,

- Music: Amateur playing of the Drum Set and Electric Guitar,
- Camping, Hiking, Skiing, Swimming, Sailing, RC Helicopter Piloting,
- Reading in Engineering, Science, Science-Fiction, Fantasy, Nature and History.

International Patents

- Weiss, A., Saranli, A., *Improved Inspection of TFT LCD Panels using On-Demand Automated Optical Inspection Sub-System*, US Patent, No. 7,084,970, August 2006, Also filed in Japan, Taiwan, Korea.

- Weiss, A., Saranli, A., Lopatin, O., Obotnine, A., *Method and Apparatus for High-Throughput Inspection of Large Patterned Media Using Dynamically Programmable Optical Spatial Filtering*, US Patent, No. 7,041,998, May 2006, Also filed in Japan, Taiwan, Korea.

- Weiss, A., Saranli, A., Ghelman, E., Baldwin, D., *High Precision Gas-Bearing Split-Axis Stage for Transport and Constraint of Large Flat Flexible Media During Processing,* US Patent, No. 7,077,019, July 2006, Also filed in Japan, Taiwan, Korea.

- Weiss, A., Saranli, A., *Method and Apparatus for Flat Patterned Media Inspection*, US Patent, No. 7,386,161, June 2008, Also filed in Japan, Taiwan, Korea.

Publications:

Journal Publications:

- Serhat, G., Saranlı, A., "A Regionalized SIFT-Visual Attention based Approach for Robust Automatic Landmark Selection and Tracking", *Under Review*, In consideration for *Computer Vision and Image Understanding*, as of January 2012.

- Gültekin, G.K., Saranlı, A., "An FPGA Based High Performance Optical Flow Hardware Design for Computer Vision Applications", *Under Review,* In consideration for *The Journal of Signal Processing Applications*, as of January 2012.

- Aslan, G., Saranlı, A., "Characterization and calibration o MEMS inertial sensors for state and parameter estimation applications", *Revised,* In consideration for *Measurement,* as of January 2012.

- Aslan, M.Ş., Saranlı, A., "A tracker-aware detector threshold optimization formulation for tracking maneuvering targets in clutter", Signal Processing, 91(9), September 2011, pp. 2213-2221.

- Aslan, M.Ş., Saranlı, A., "Threshold optimization for tracking a nonmaneuvering target", *IEEE Transactions on Aerospace and Electronic Systems* 47(4), 2011, pp. 2844-2859.

- Ircı, A., Saranlı, A., Baykal, B., "A Study on Q-RAM and Feasible Directions Based Methods for Resource Management in Phased Array Radar Systems", *IEEE Transactions on Aerospace and Electronic Systems,* 46(4) 2010, pp. 1848-1864.

- Aslan, M.Ş., Saranlı, A., Baykal, B., "Tracker-aware adaptive detection: An efficient closed-form solution for the Neyman-Pearson case"*, Digital Signal Processing*, 20(5), September 2010, pp. 1468-1481.

- Saranlı, A., Demirekler, M., "On Output Independence and Complementariness in Rank-Based Multiple Classifier Decision Systems", *Pattern Recognition*, 34(12) (2001) pp. 2319-2330.

- Saranlı, A., Demirekler, M., "Rank-Based Multiple Classifier Decision Combination: A Theoretical Study", Journal of Advanced Computational Intelligence and Intelligent Informatics, Vol.5, No.1, February 2001, pp. 37-43.

- Saranlı, A., Demirekler, M., "A Statistical Unified Framework for Rank-Based Multiple Classifier Decision Combination", *Pattern Recognition*, 34(4) (2001) pp.865-884.

- Saranlı, A., A *Unifying Theory for Rank-Based Multiple Classifier Systems, with Applications in Speaker Identification and Speech Recognition*, Ph.D. Thesis, Middle East Technical University, Ankara, Turkey, January 2000.

- Saranlı, A., Baykal, B., "Complexity Reduction in Radial Basis Function (RBF) Networks by Using Radial B-Spline Functions", *Neurocomputing* 18, 1998, pp. 183-194.

- Demirekler, M., Saranli, A., "A Study on the Convergence Properties of Evolution Strategies(ES) with a Case Study on Finding the Global Optimum Solution of the Multi-Pulse Excitation Problem", *ELEKTRIK*, *Turkish Journal of Electrical and Electronics Engineering*, Vol. 5, No. 3, 1997.

- Saranlı, A., *Investigation of and Alternative B-Spline Basis in Adaptive RBF Networks, with Applications to System Identification and Time-Series Prediction,* M.Sc. Thesis, Imperial College, London, September 1994.

International Conference Publications:

- Ankaralı, M.M., Saranlı, U., Saranlı, A., "Control of underactuated planar hexapedal pronking through a dynamically embedded SLIP monopod", *Proceedings of IEEE International Conference on Robotics and Automation,* Anchorage-AL, USA, May 2010, pp. 4721-4727.

- Sayginer, E., Akbey, T., Yazicioglu, Y., Saranli, A., "Task oriented kinematic analysis for a legged robot with half-circular leg morphology", *Proceedings of IEEE International Conference on Robotics and Automation*, Tokyo, Japan, May 2009, pp. 4088-4093.

- Aslan, G., Saranli, A., "Characterization and Calibration of MEMS Inertial Measurement Units", in *Proceedings of 16th European Signal Processing Conference (EUSIPCO'08),* Lausanne, Switzerland, August 2008.

- Aslan, M.Ş., Saranli, A., Baykal, B., "Optimal Tracker-Aware Radar Detector Threshold Adaptation: A Closed-Form Solution", in *11th International Conference on Information Fusion (FUSION'08),* Cologne, Germany, June 2008.

- Ircı, A., Saranlı, A., Baykal, B., "Resource Allocation Modeling using Methods of Feasible Directions in Phased Array Radar Systems", accepted for publication in *IET International Conference on Radar Systems*, RADAR'07, October 15-18, 2007, Edinburgh, UK.

- Saranlı, A. "A Gaussian-Mixture Based Approach to Spatial Image Background Modeling and Compensation", in *15th European Signal Processing Conference*, (EUSIPCO'07)., September 3-7, 2007, Poznan, Poland., pp. 1457-1461.

- Saranlı, A. "Scan-Line Quality Inspection of Strip Materials Using 1-D Radial-Basis-Function Network", *International Conference on Computer Vision Theory and Applications*, 25-28 February 2006, Setubal-Portugal, pp. 19-26.

- Ircı, A., Saranlı, A., Baykal, B., "On Optimal Resource Allocation in Multi-Function Radar Systems", *IEEE Radar Conference 2006*, April 24-27, 2006, Verona-NY, USA., pp. 684-691

- Saranlı, A., Demirekler, M., "A unified view of rank-based decision combination", *Proceedings of International Conference on Pattern Recognition* (*ICPR'00*), December 2000, Tampa-FL, USA.

- Demirekler, M., Saranlı, A., "A Study on Improving Decisions in Closed-Set Speaker Identification," in *Proceedings of IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP'97)*, April 1997, Munich, Germany.

- Saranlı, A. Baykal, B., "Chaotic Time-Series Prediction and the Relocating-LMS(RLMS) Algorithm for Radial Basis Function Networks", *Proceedings of The European Signal Processing Conference(EUSIPCO'96)*, September 1996, Trieste, Italy.

National Conferences:

- Aslan, M.Ş., Saranlı, A., "An optimal radar detector threshold adaptation for maneuvering targets in clutter (Parazit yankı altında manevra yapan hedefler için bir eniyi radar sezimci eşik uyarlaması)", *Proceedings of the IEEE 17th Signal Processing and Communications Applications Conference (SIU'09),* April 2009, Antalya, Türkiye.

- Ege, E., Saranlı, A., "Performance comparison of target tracking algortihms in underwater environment (Hedef i□zleme algoritmalarının sualtı ortamındaki başarım karsılaştırması)", *Proceedings of the IEEE 16th Signal Processing and Communications Applications Conference (SIU'08),* April 2008, Didim, Muğla, Türkiye.

- Aslan, M.Ş., Saranlı, A., Baykal, B., "Development of a closed-form solution for instantaneous threshold optimization using modified riccati equation (Modified riccati denklemi kullanılarak anlık eşik optimizasyonu için bir kapalı-çözüm geliştirilmesi)", *Proceedings of the IEEE 16th Signal Processing and Communications Applications Conference (SIU'08),* April 2008, Didim, Muğla, Türkiye.

- Ircı, A., Saranlı, A., Baykal, B., "A real-time optimal resource allocation approach in a radar system (Radar sisteminde gerçek-zamanlı optimal kaynak paylaştırma yaklaşımı)", *Proceedings of the IEEE 14th Signal Processing and Communications Applications Conference (SIU'06),* April 2006, Antalya, Türkiye.

- Ege, E., Saranlı, A., "A new approach to increase performance of Rapidly-Exploring Random Trees (RRT) in mobile robotics (Mobil robotikte Hizli-Keşfeden Rastlansal A□açlarin (HKRA) performansini arttiran yeni bir yaklaşım)", *Proceedings of the IEEE 14th Signal Processing and Communications Applications Conference (SIU'06),* April 2006, Antalya, Türkiye.

- Aslan, M.Ş., Saranlı, A., Baykal, B., "Development of a MATLAB based target tracking simulation environment (Bir Matlab tabanlı hedef izleme benzetim ortamının geliştirilmesi), *Proceedings of the IEEE 14th Signal Processing and Communications Applications Conference (SIU'06),* April 2006, Antalya, Türkiye.

Theses Supervised:

- Emre Akgül, "PID and LQR control of a planar head stabilization platform", M.S. Thesis, 2011.
- Mustafa Mert Ankaralı, "Control of hexapedal pronking through a dynamically embedded spring loaded inverted pendulum template", M.S. Thesis, 2010.
- Ferit Üzer, "Camera motion blur and its effect on feature detectors", M.S. Thesis, 2010.
- Gökhan Koray Gültekin, "An FPGA based high performance optical flow hardware design for autonomous mobile robotic platforms", M.S. Thesis, 2010.
- Ayhan Özgür, "A novel mobile robot navigation method based on combined feature based scan matching and fastslam algorithm", M.S. Thesis, 2010.
- Ege Saygıner, "Modelling the effects of half circular compliant legs on the kinematics and dynamics of a legged robot", M.S. Thesis, 2010.
- Burak Bilge, "Rrt based kinodynamic motion planning for multiple camera industrial inspection", M.S. Thesis, 2009.
- Gökçen Aslan Aydemir, "Kalman filter based fusion of camera and inertial sensor measurements for body state estimation", M.S. Thesis, 2009.
- Gülhan Serhat, "Efficient detection and tracking of salient regions for visual processing on mobile platforms", M.S. Thesis, 2009.
- Murat Şamil Aslan, “Tracker-Aware Detection: A Theoretical and Experimental Study”, Ph.D. Thesis, 2009.
- Murat Aykın, “Efficient calibration of a multi-camera measurement system using a target with known dynamics”, M.S. Thesis, 2008.
- Emre Ege, “A Comparative Study of Tracking Algorithms in Underwater Environment Using Sonar Simulation”, M.S. Thesis, 2007.
- Ayhan Ircı, “On Optimal Resource Allocation in Phased-Array Radar Systems”, M.S. Thesis, 2006.

Awards:

- M.Sc. Degree with Distinction Award (Imperial College, London - October 1994).
- The British Council Fellowship (October 1993).
- Third Prize in a nationwide essay contest "The Importance of Standardization in Our Lives." organized by *Turkish National Standards Institute* (September 1989).

Affiliations:

- Member of The Institute of Electrical and Electronics Engineers (IEEE), Computer Society and Signal Processing Society.
- Former Chairman, founding member of IEEE - Middle East Technical University - Student Branch.
- Member of International Association for Pattern Recognition.
- Member of Turco-British Fellowship Club.

References:

- Reference letters and/or reference contact information is available upon request.