

Assoc. Prof. EROL ŞAHİN

Personal Information

Office Phone: [+90 312 210 5539](tel:+903122105539)

Email: erol@metu.edu.tr

Web: <http://kovan.ceng.metu.edu.tr/~erol/>

Address: ODTU Bilgisayar Muh.

International Researcher IDs

ScholarID: aO-849gAAAAJ

ORCID: 0000-0002-2993-6879

Publons / Web Of Science ResearcherID: B-1361-2016

ScopusID: 57189656417

Yoksis Researcher ID: 164803

Education Information

Doctorate, Boston University, Cognitive And Neural Systems, United States Of America 1996 - 2000

Postgraduate, Middle East Technical University, Faculty Of Engineering, Department Of Computer Engineering, Turkey
1992 - 1994

Undergraduate, Ihsan Dogramaci Bilkent University, Faculty Of Engineering, Department Of Electrical And Electronics
Engineering, Turkey 1987 - 1991

Foreign Languages

English, C1 Advanced

Dissertations

Doctorate, Visual object localization for mobile robots, Boston University, Cognitive And Neural Systems, 2000

Postgraduate, A New higher-order binary input neural unit : learning and generalizing effectively via using minimal
number of monomials, Middle East Technical University, Faculty of Engineering, Department of Computer Engineering,
1994

Research Areas

Computer Sciences, Artificial Intelligence, Computer Learning and Pattern Recognition, Neural Networks, Engineering
and Technology

Academic Titles / Tasks

Associate Professor, Middle East Technical University, Faculty Of Engineering, Department Of Computer Engineering,
2010 - Continues

Assistant Professor, Middle East Technical University, Faculty Of Engineering, Department Of Computer Engineering,

2004 - 2010

Lecturer, Middle East Technical University, Faculty Of Engineering, Department Of Computer Engineering, 2002 - 2004

Advising Theses

Turgut A. E. , Şahin E., DEVELOPMENT OF AN EXTENSIBLE HETEROGENEOUS SWARM ROBOT PLATFORM, Postgraduate, C.BİLALOĞLU(Student), 2022

ŞAHİN E., Trust attribution in collaborative robots: an experimental investigation of non-verbal cues in a virtual human-robot interaction setting, Postgraduate, A.MERİÇ(Student), 2021

Şahin E., Strike me and get marked: the conceptual, analytical and simulation model of an add-on module to deter quadrotor strikes, Postgraduate, O.ŞENYAYLA(Student), 2020

Kalkan S., Şahin E., ALET (Automated Labeling of Equipment and Tools): A Dataset for Tool Detection and Human Worker Safety Detection, Postgraduate, F.CAN(Student), 2020

ŞAHİN E., KALKAN S., A grounded and contextualized web of concepts on a humanoid robot, Doctorate, H.ÇELİKKANAT(Student), 2015

ŞAHİN E., Perception, Learning and Use of Tool Affordances on Humanoid Robots, Postgraduate, Y.ÇALIŞKAN(Student), 2013

ŞAHİN E., KALKAN S., Formation of adjective, noun and verb concepts through affordances, Postgraduate, O.YÜRÜTEN(Student), 2012

ŞAHİN E., A probabilistic geometric model of self-organized aggregation in swarm robotic systems, Doctorate, L.BAYINDIR(Student), 2012

ŞAHİN E., A developmental grasp learning scheme for humanoid robots, Postgraduate, A.KAAN(Student), 2012

ŞAHİN E., A developmental framework for learning affordances, Doctorate, E.UĞUR(Student), 2010

ŞAHİN E., Action recognition through action generation, Postgraduate, B.AKGÜN(Student), 2010

ŞAHİN E., KALKAN S., Function and appearance-based emergence of object concepts through affordances, Postgraduate, İ.ATIL(Student), 2010

ŞAHİN E., KALKAN S., Emergence of verb and object concepts through learning affordances, Postgraduate, N.DAĞ(Student), 2010

ŞAHİN E., Implementation of a closed-loop action generation system on a humanoid robot through learning by demonstration, Postgraduate, D.TUNAOĞLU(Student), 2010

ŞAHİN E., Control of a mobile robot swarm via informed robots, Postgraduate, H.ÇELİKKANAT(Student), 2008

ŞAHİN E., To flock or not to flock: Pros and cons of flocking in long-range "migration" of mobile robot swarms, Postgraduate, F.GÖKÇE(Student), 2008

ŞAHİN E., Self-organized flocking with a mobile robot swarm, Doctorate, A.EMRE(Student), 2008

ŞAHİN E., Robot planning based on learned affordances, Postgraduate, M.ÇAKMAK(Student), 2007

ŞAHİN E., Robot planing based on learned affordances, Postgraduate, M.Çakmak(Student), 2007

ŞAHİN E., Using learned affordances for robotic behavior development, Postgraduate, M.REMZİ(Student), 2007

ŞAHİN E., Towards learning affordances: Detection of relevant features and characteristics for reachability, Postgraduate, S.EREN(Student), 2006

ŞAHİN E., Direct perception of traversibility affordance on range images through learning on a mobile robot, Postgraduate, E.UĞUR(Student), 2006

ŞAHİN E., A systematic study of probabilistic aggregation strategies in swarm robotic systems, Postgraduate, O.SOYSAL(Student), 2005

ŞAHİN E., Evolving aggregation behaviors for swarm robotic systems: A systematic case study, Postgraduate, E.BAHÇECİ(Student), 2005

ŞAHİN E., Evolving aggregation behaviors for swarm robotics systems: a systematic case study, Postgraduate, E.Bahçeci(Student), 2005

Research Infrastructure Information

Şahin E., Koku A. B. , Ankaralı M. M. , Akbaş E., Cinbiş R. G. , Kalkan S., Keysan O., Turgut A. E. , Yazıcıoğlu Y., Saranlı U., et al., ROBOTICS AND ARTIFICIAL INTELLIGENCE TECHNOLOGIES APPLICATION AND RESEARCH CENTER , January 2021

Designed Programs

Ankaralı M. M. , Şahin E., Turgut A. E. , Koku A. B. , Saranlı U., Saranlı A., Keysan O., Yazıcıoğlu Y., Akbaş E., Ulusoy İ., et al., Doctorate, Robotik Lisansüstü Programı, 2021 - Continues

Articles Published in Other Journals

- I. **A Minimally Invasive Approach Towards "Ecosystem Hacking" With Honeybees**
Stefanec M., Hofstadler D. N. , Krajnik T., TURGUT A. E. , ALEMDAR H., Lennox B., ŞAHİN E., Arvin F., Schmickl T.
FRONTIERS IN ROBOTICS AND AI, vol.9, 2022 (ESCI)

Books & Book Chapters

- I. **Swarm robotics: From sources of inspiration to domains of application**
ŞAHİN E.
in: SWARM ROBOTICS, Sahin, E; Spears, WM, Editor, Springer-Verlag , pp.10-20, 2005

Refereed Congress / Symposium Publications in Proceedings

- I. **Mind the Gap! Predictive Flocking of Aerial Robot Swarm in Cluttered Environments**
ÖNÜR G., TURGUT A. E. , ŞAHİN E.
13th International Conference on Swarm Intelligence: ANTS 2022, Malaga, Spain, 10 September 2022
- II. **A Novel Time-of-Flight Range and Bearing Sensor System for Micro Air Vehicle Swarms**
BİLALOĞLU C., Şahin M., Arvin F., ŞAHİN E., TURGUT A. E.
13th International Conference on Swarm Intelligence: ANTS 2022, Malaga, Spain, 10 September 2022
- III. **Designing Social Cues for Collaborative Robots: The Role of Gaze and Breathing in Human-Robot Collaboration**
Terzioglu Y., Mutlu B., Şahin E.
ACM/IEEE International Conference on Human-Robot Interaction (HRI), Cambridge, Canada, 23 - 26 March 2020, pp.343-357
- IV. **ROS Tabanlı Bagimsiz Guvenlik Bekcisi Modulu**
KURNAZ F. C. , terzioglu y., BUYUKGOZ S., ŞAHİN E.
Türkiye Robotbilim Konferansi, İstanbul, Turkey, 12 - 14 April 2018
- V. **Yeni Bir Savunma Konsepti olarak Sürü İHA Sistemleri**
ŞAHİN E., ARIKAN K. B. , hacioğlu a., ÜRE N. K. , aslan m., TURGUT A. E. , erdener a.
Otomatik Kontrol Ulusal Toplantısı, TOK 2017, Turkey, 21 - 23 September 2017, pp.709-713
- VI. **Robotların Manipulasyon Modellerini Öğrenmek için Nesnelerin Yoğunluklarında Bağlanım**
madaan r., ŞAHİN E., paolini r., mason m. t.
TORK 2016: Türkiye Robotbilim Konferansi, İstanbul, Turkey, 2 November - 03 January 2016
- VII. **Mikro İnsansız Hava Araçlarının Kademeli Sınıflandırıcılarla Algılanması ve Mesafe Tespiti**
Gökçe F., Üçoluk G., Şahin E., Kalkan S.
Türkiye Robotbilim Konferansi, İstanbul, Turkey, 26 - 27 October 2015
- VIII. **Integrating Spatial Concepts into a Probabilistic Concept Web**
Celikkanat H., Sahin E., Kalkan S.

International Conference on Advanced Robotics (ICAR), İstanbul, Turkey, 27 - 31 July 2015, pp.259-264

- IX. **Learning and Using Context on a Humanoid Robot Using Latent Dirichlet Allocation**
Celikkanat H., Orhan G., Pugeault N., Guerin F., Şahin E., Kalkan S.
4th Joint IEEE International Conferences on Development and Learning and Epigenetic Robotics (IEEE ICDL-Epirob), Genoa, Italy, 13 - 16 October 2014, pp.201-207
- X. **Recurrent Slow Feature Analysis for Developing Object Permanence in Robots**
ÇELİKKANAT H., ŞAHİN E., KALKAN S.
IROS Workshop on Neuroscience and Robotics, 03 November 2013
- XI. **Co-learning nouns and adjectives**
Orhan G., Olgunsoylu S., Şahin E., Kalkan S.
2013 IEEE 3rd Joint International Conference on Development and Learning and Epigenetic Robotics, ICDL 2013, Osaka, Japan, 18 - 22 August 2013
- XII. **Relating affordances with verbs, nouns and adjectives Sağlarlık ile fiiller, isimler ve sıfatların ilişkilendirilmesi**
Kalkan S., Yürüten O., Şahin E.
2013 21st Signal Processing and Communications Applications Conference, SIU 2013, Haspolat, Turkey, 24 - 26 April 2013
- XIII. **Self-discovery of motor primitives and learning grasp affordances**
Ugur E., ŞAHİN E., ÖZTOP E.
25th IEEE\RSJ International Conference on Intelligent Robots and Systems (IROS), Algarve, Portugal, 7 - 12 October 2012, pp.3262-3269
- XIV. **Learning adjectives and nouns from affordances on the iCub humanoid robot**
Yürüten O., Uyanik K. F., Çalışkan Y., Bozcuoğlu A. K., ŞAHİN E., KALKAN S.
12th International Conference on Simulation of Adaptive Behavior, SAB 2012, Odense, Denmark, 27 - 30 August 2012, vol.7426 LNAI, pp.330-340
- XV. **Human and robotics hands grasping danger**
ANELLI F., NICOLETTI R., KALKAN S., ŞAHİN E., BORGHI A. M.
International Joint Conference on Neural Networks (IJCNN), Brisbane, Australia, 10 - 15 June 2012
- XVI. **Closed-loop primitives: A method to generate and recognize reaching actions from demonstration**
Parlaktuna M., Tunaoglu D., ŞAHİN E., Ugur E.
2012 IEEE International Conference on Robotics and Automation, ICRA 2012, Saint Paul, MN, United States Of America, 14 - 18 May 2012, pp.2015-2020
- XVII. **Learning to grasp with parental scaffolding**
Ugur E., Celikkanat H., ŞAHİN E., Nagai Y., Oztop E.
2011 11th IEEE-RAS International Conference on Humanoid Robots, HUMANOIDS 2011, Bled, Slovenia, 26 - 28 October 2011, pp.480-486
- XVIII. **Unsupervised Learning of Object Affordances for Planning in a Mobile Manipulation Platform**
Ugur E., ŞAHİN E., Oztop E.
IEEE International Conference on Robotics and Automation (ICRA), Shanghai, China, 9 - 13 May 2011
- XIX. **Learning affordances for categorizing objects and their properties**
Dağ N., Atıl I., KALKAN S., ŞAHİN E.
2010 20th International Conference on Pattern Recognition, ICPR 2010, İstanbul, Turkey, 23 - 26 August 2010, pp.3089-3092
- XX. **Unsupervised Learning of Affordance Relations on a Humanoid Robot**
Akgun B., Dag N., Bilal T., Atıl I., ŞAHİN E.
24th International Symposium on Computer and Information Sciences, Güzelyurt, Cyprus (Kktc), 14 - 16 September 2009, pp.253-258
- XXI. **Predicting future object states using learned affordances**
Ugur E., ŞAHİN E., Oztop E.
24th International Symposium on Computer and Information Sciences, Güzelyurt, Cyprus (Kktc), 14 - 16 September 2009, pp.414-416

- XXII. **Towards linking affordances with mirror/canonical neurons**
ŞAHİN E., ERDOĞAN S. T.
24th International Symposium on Computer and Information Sciences, Güzelyurt, Cyprus (Kktc), 14 - 16 September 2009, pp.396-403
- XXIII. **Modeling Self-Organized Aggregation in Swarm Robotic Systems**
Bayindir L., Sahin E.
IEEE Swarm Intelligence Symposium, Tennessee, United States Of America, 30 March - 02 April 2009, pp.88-89
- XXIV. **Guiding a Robot Flock via Informed Robots**
Celikkanat H., TURGUT A. E. , ŞAHİN E.
9th International Symposium on Distributed Autonomous Robotic Systems (DARS 9), Tsukuba City, Japan, 17 - 19 November 2008, pp.215-225
- XXV. **Modeling Phase Transition in Self-organized Mobile Robot Flocks**
TURGUT A. E. , Huepe C., Celikkanat H., Gokce F., ŞAHİN E.
6th Biannual International Conference on Ant Colony Optimization and Swarm Intelligence, Brussels, Belgium, 22 - 24 September 2008, vol.5217, pp.108-119
- XXVI. **Using learned affordances for robotic behavior development**
Doğar M. R. , Ugur E., Şahin E., Çakmak M.
2008 IEEE International Conference on Robotics and Automation, ICRA 2008, Pasadena, CA, United States Of America, 19 - 23 May 2008, pp.3802-3807
- XXVII. **Self-organized flocking with a mobile robot swarm**
TURGUT A. E. , Çelikkanat H., Gökçe F., Şahin E.
7th International Joint Conference on Autonomous Agents and Multiagent Systems, AAMAS 2008, Estoril, Portugal, 12 - 16 May 2008, vol.1, pp.40-47
- XXVIII. **From primitive behaviors to goal-directed behavior using affordances**
Doğar M. R. , Çakmak M., Uğur E., Şahin E.
2007 IEEE/RSJ International Conference on Intelligent Robots and Systems, IROS 2007, San Diego, CA, United States Of America, 29 October - 02 November 2007, pp.729-734
- XXIX. **Dispersion of a swarm of robots based on realistic wireless intensity signals**
Ugur E., TURGUT A. E. , ŞAHİN E.
22nd International Symposium on Computer and Information Sciences, Ankara, Turkey, 7 - 09 November 2007, pp.419-424
- XXX. **Kobot: Sürü Robot Çalışmaları için Tasarlanmış Gezgin Robot Platformu**
TURGUT A. E. , GÖKÇE F., ÇELİKKANAT H., BAYINDIR L., ŞAHİN E.
Otomatik Kontrol Ulusal Toplantısı. TOK'07, İstanbul, Turkey, 5 - 07 September 2007, pp.1-6
- XXXI. **Curiosity-driven learning of traversability affordance on a mobile robot**
Ugur E., Dogar M. R. , Cakmak M., ŞAHİN E.
6th IEEE International Conference on Development Learning, London, Canada, 11 - 13 July 2007, pp.128-133
- XXXII. **The learning and use of traversability affordance using range images on a mobile robot**
Ugur E., Dogar M. R. , Cakmak M., ŞAHİN E.
IEEE International Conference on Robotics and Automation, Rome, Italy, 10 - 14 April 2007, pp.1721-1722
- XXXIII. **Oğul Robot Sistemleri İçin Basit bir Görüntüleme Sistemi Tasarımı**
ÇELİKKANAT H., TURGUT A. E. , ŞAHİN E., KOKU A. B.
Otomatik Kontrol Ulusal Toplantısı. TOK'06, Ankara, Turkey, 6 - 08 November 2006, pp.1-6
- XXXIV. **Oğul Robot Sistemleri için Basit Bir Görüntüleme Sistemi Tasarımı**
ÇELİKKANAT H., TURGUT A. E. , ŞAHİN E., KOKU A. B.
Türk Otomatik Kontrol Ulusal Toplantısı (TOK06), Ankara, Turkey, 6 - 08 November 2006
- XXXV. **Oğul-Robot Sistemleri için Sinyalleşme Sistemi Tasarımı**
TURGUT A. E. , ÇAKMAK M., ŞAHİN E., KOKU A. B.
Türk Otomatik Kontrol Ulusal Toplantısı (TOK06), Ankara, Turkey, 6 - 08 November 2006
- XXXVI. **A macroscopic model for self-organized aggregation in swarm robotic systems**
Soysal O., ŞAHİN E.

- 2nd SAB International Workshop 2006, Rome, Italy, 30 September - 01 October 2006, vol.4433, pp.27-29
- XXXVII. **The MACS project: An approach to affordance-inspired robot control**
Rome E., Paletta L., ŞAHİN E., Dorffner G., Hertzberg J., Breithaupt R., Fritz G., Irran J., Kintzler F., Loerken C., et al.
International Seminar on Towards Affordance-Based Robot Control, Dagstuhl, Germany, 5 - 09 June 2006,
vol.4760, pp.173-179
- XXXVIII. **Swarm robotics: From sources of inspiration to domains of application**
ŞAHİN E.
SAB 2004 International Workshop, Santa Monica, CA, United States Of America, 17 July 2004, vol.3342, pp.10-20
- XXXIX. **Probabilistic aggregation strategies in swarm robotic systems**
Soysal O., Sahin E.
IEEE Swarm Intelligence Symposium, California, United States Of America, 8 - 10 June 2005, pp.325-332
- XL. **Evolving aggregation behaviors for swarm robotic systems: A systematic case study**
Bahceci E., Sahin E.
IEEE Swarm Intelligence Symposium, California, United States Of America, 8 - 10 June 2005, pp.333-340
- XLI. **Evolving aggregation behaviors in a Swarm of robots**
Trianni V., Groß R., Labella T. H. , ŞAHİN E., Dorigo M.
7th European Conference on Artificial Life, ECAL 2003, Dortmund, Germany, 14 - 17 September 2003, vol.2801,
pp.865-874
- XLII. **Swarm-bot: Pattern formation in a swarm of self-assembling mobile robots**
Şahin E., Labella T. H. , Trianni V., Deneubourg J., Rasse P., Floreano D., Gambardella L., Mondada F., Nolfi S., Dorigo M.
2002 IEEE International Conference on Systems, Man and Cybernetics, Yasmine Hammamet, Tunisia, 6 - 09 October
2002, vol.4, pp.145-150
- XLIII. **Simulation of nest assessment behavior by ant scouts**
Şahin E., Franks N.
3rd International Workshop on Ant Algorithms, ANTS 2002, Brussels, Belgium, 12 - 14 September 2002, vol.2463,
pp.274-281
- XLIV. **Towards an on-line neural conditioning model for mobile robots**
Şahin E.
6th International Work-Conference on Artificial and Natural Neural Networks, IWANN 2001, Granada, Spain, 13 -
15 June 2001, pp.524-530
- XLV. **Development of a visual object localization module for mobile robots**
Sahin E., Gaudio P.
3rd European Workshop on Advanced Mobile Robots, Eurobot 1999, Zürich, Switzerland, 6 - 08 September 1999,
pp.65-72
- XLVI. **Visual Looming as a range sensor for mobile robots**
Sahin E., Gaudio P.
5th International Conference on Simulation of Adaptive Behavior, Zürich, Switzerland, 17 - 21 August 1998,
pp.114-119
- XLVII. **Mobile robot range sensing through visual looming**
Sahin E., Gaudio P.
Joint Conference on the Science and Technology of Intelligent Systems ISIC/CIRA/ISAS, Maryland, United States Of
America, 14 - 17 September 1998, pp.370-375
- XLVIII. **A BINARY-INPUT SUPERVISED NEURAL UNIT THAT FORMS INPUT DEPENDENT HIGHER-ORDER
SYNAPTIC CORRELATIONS**
GULER M., SAHIN E.
1994 International-Neural-Network-Society Annual Meeting - World Congress on Neural Networks-San Diego,
California, United States Of America, 5 - 09 June 1994

Supported Projects

ŞAHİN E., ANKARALI M. M. , KALKAN S., SARANLI U., YAZICIOĞLU Y., CİNBİŞ R. G. , CB Strateji ve Bütçe Başkanlığı (Kalkınma Bakanlığı) Projesi, Robotik Teknolojileri Araştırma, Geliştirme ve Eğitim Merkezi (ROMER), 2019 - Continues

ŞAHİN E., TUBITAK Project, CİRAK: Montaj İscileri için Uyumlu Robot Manipulator Destegi, 2017 - Continues

Şahin E., Turgut A. E. , Alemdar H., H2020 Project, ROBOTic Replicants for Optimizing the Yield by Augmenting Living Ecosystems, 2021 - 2026

ALEMDAR H., ŞAHİN E., TUBITAK Project, Kovan 4.0: Bal Arısı (Apis Mellifera) İzleminde Yapay Zeka Temelli Nesnel Yaklaşımlar, 2022 - 2024

Bakırcıoğlu V., Şahin E., TUBITAK Project, Development of a module add-on that can make attacker position estimation for micro and mini unmanned aerial vehicles, 2021 - 2023

Şahin E., Turgut A. E. , Company, Sürü İHA Geliştirme Projesi, 2019 - 2021

Kalkan S., Şahin E., TÜBİTAK International Multi-Cooperation Project, CİRAK: Montaj İscileri için Uyumlu Robot Manipulator Destegi, 2017 - 2020

Şahin E., Yazıcı A., FP7 Project, IthruI Towards Better Robot Manipulation Improvement through Interaction, 2014 - 2016

ŞAHİN E., TUBITAK Project, İnsansı Robotlarda Sağlık Tabanlı Kavram Gelişimi ve Alet Kullanımı, 2009 - 2013

Şahin E., EU Supported Other Project, Emergence of Communication in iCub through Sensorimotor and Social Interaction http eris liralab it wiki RobotCub Open Call de 31 proje arasında 6 olup 255000 Euro'luk bir insansı robot kazandım Robot ve ilişkili proje Aralık 2009'da başladı, 2009 - 2012

Şahin E., Kalkan S., FP7 Project, ROSSI, 2008 - 2011

ŞAHİN E., TUBITAK Project, Kontrol Edilebilir Robot Oğulları, 2005 - 2010

Şahin E., Üçoluk G., FP6 Project, MACS, 2004 - 2007

Contractual Researches

Şahin E., Turgut A. E. , ATILIM Üniversitesi, Sürü İHA TKY Projesi, 2017 - 2019

Activities in Scientific Journals

Adaptive Behavior, Assistant Editor, 2008 - Continues

Swarm Intelligence, Committee Member, 2008 - Continues

Scientific Refereeing

AUTONOMOUS AGENTS AND MULTI-AGENT SYSTEMS, SCI Journal, November 2019

INTERNATIONAL JOURNAL OF ROBOTICS RESEARCH, SCI Journal, November 2019

INTERNATIONAL JOURNAL OF ADVANCED ROBOTIC SYSTEMS, Other Indexed Journal, September 2019

TUBITAK Project, 1003 - Priority Areas R&D Projects Support Program, Middle East Technical University, Turkey, August 2019

Metrics

Publication: 78

Citation (WoS): 1654

Citation (Scopus): 2161

H-Index (WoS): 16

H-Index (Scopus): 21

Congress and Symposium Activities

21st International Conference on Speech and Computer SPECOM 2019, Invited Speaker, İstanbul, Turkey, 2019

Yapay Öğrenme Yaz Okulu, Invited Speaker, İstanbul, Turkey, 2019

Türkiye Robotbilim Kongresi, Working Group, İstanbul, Turkey, 2019