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RESEARCH INTERESTS Intelligent mobile robots, autonomous vehicles, robot perception, robot learning, assistive robotics, multi-robot systems, developmental cognitive robotics, and computational neuroscience constitute my research interests. My Ph.D. study concentrated on the development of an experience-based cumulative manipulation learning framework for mobile robots. My postdoctoral research aimed at developing semi-autonomous assistive robotic manipulation technologies for the elderly and the disabled. My long term vision is to realize robots that continuously learn on the fly from every single experience they have so as to improve their future behavior, and that just work.

PROFESSIONAL EXPERIENCE **Atlas Robotics**

Co-founder & Chief Technology Officer **June 2023 - Present**

As the CTO of Atlas Robotics, I have been laying out the technical vision and managing execution to develop highly advanced autonomous forklift technology.

Locomotion, Inc.

Co-founder & Chief Technology Officer **June 2018 - April 2023**

As the CTO of Locomotion, I was overseeing the technology development efforts for advancing the frontiers of highly automated driving for commercial vehicles.

National Robotics Engineering Center

Special Faculty / Commercialization Specialist **October 2017 - August 2018**

I was one of the leads in the Autonomy Group, focusing on the planning, management, and execution of government and commercially sponsored projects that push the state-of-the-art in engineering and research.

National Robotics Engineering Center

Senior Robotics Engineer **May 2015 - October 2017**

In addition to managing engineers and developers, I designed and built various perception, mapping, pose estimation, planning, and human-machine interface components for a variety of projects.

- *Yield Estimation in Steel Production (Undisclosed)*

I have been leading the effort on perception based yield estimation in steel production process by utilizing various sensing modalities, geometric perception techniques, and machine learning.

- *FHWA Snowplow*

The goal of the program was to develop an affordable positioning and augmented reality based operator assist system for snowplow vehicles, for which I was the lead engineer. I designed and developed the software stacks for SLAM-based high-fidelity mapping, position estimation via map registration, and the human-machine interface that was composed of augmented reality overlays on a display coupled with head tracking to enable 3D visualization that would align with the physical world. Additionally, I developed various helper tools for visualization, map labeling, and automated sensor extrinsic calibration.

- *DARPA Aircrew Labor In-Cockpit Automation System (ALIAS)*

The aim of this program was to develop an intelligent co-pilot system for aircraft that would enable operation with reduced onboard crew, help reduce pilot workload, augment mission performance and improve aircraft safety. I developed modules for learning to generate motion plans from expert demonstration, generating costmaps

out of elevation data and performing motion planning on those maps, and performing visual dashboard reading and interpretation.

i Bilgişim Ltd. Corp.

Co-founder

2007 - 2011

We designed and developed various robot platforms, including omni-directional wheeled bases, upper-torso humanoids, and human-robot interaction units with expressive faces.

ACADEMIC EXPERIENCE

Carnegie Mellon University, Pittsburgh, PA USA

Postdoctoral Fellow, **Human-Computer Interaction Institute** **November 2014 - May 2015**

I led the efforts on building intuitive and expressive interfaces to interact with semi-autonomous robotic systems that are intended to assist elderly and disabled.

Postdoctoral Fellow, **The Robotics Institute** **November 2013 - November 2014**

Ranging from low level motion planning and control to high level perception and human-robot interaction, I led the design and development efforts for the software infrastructure of the Assistive Dexterous Arm (ADA) project at the **Personal Robotics Lab**. ADA is composed of a wheelchair mountable Kinova Mico manipulator and various sensors for multi-modal perception. The aim of the project is to provide disabled and elderly with a (semi-)autonomous assistive manipulation system that would improve their quality of life. I was also a member of the **Tartan Rescue** team of the **National Robotics Engineering Center**, working on the **CHIMP** robot to compete in the **DARPA Robotics Challenge**.

Carnegie Mellon University, Pittsburgh, PA USA

Visiting Scholar, **Computer Science Department**

July 2011 - January 2012

I contributed to the deployment process of the CoBot mobile service robots that utilize the symbiotic autonomy concept to overcome their limitations and navigate the multi-floor building to accomplish their tasks. Also, I analyzed the log files gathered during the deployment period to extract some important statistics regarding the robots' operations.

Boğaziçi University, Bebek, Istanbul TURKEY

Graduate Student (Ph.D.), **Department of Computer Engineering**

2007 - 2014

- *Cerberus RoboCup Standard Platform League Team member and captain* **2007 - 2010**

I mainly worked on the development of the single and multi-agent planning and behavior modules on the AIBO quadruped and the Nao humanoid robots in addition to improving the motion engines of both and developing sophisticated debugging tools. My final contribution was the development of the complete vision module for the Nao robots that could identify all important objects on the field in real-time (12ms/frame on average), while running concurrently with many other modules on a 500MHz Geode processor.

- *Team Cappadocia - Multi Autonomous Ground-robotic International Challenge* **2010**

I developed a dynamic mission planner that would coordinate the sensor and the disrupter robots in the team, compute the optimal paths for each robot, and update the assigned paths accordingly as the knowledge about the environment gets more complete and accurate so as to maximize area coverage and the number of threats neutralized while minimizing the mission completion time and the risk of losing robots.

Teaching Assistant, **Department of Computer Engineering**

2009 - 2011

- *Introduction to Robotics (undergraduate)*: I helped with the class organization, handling of the laboratory sessions, and designing of the projects assigned throughout the semester. The class covered the fundamentals of intelligent mobile robotics, including sensor and actuator modeling and calibration, basic control, probabilistic localization, task and motion planning, and various behavior architectures.

- *Autonomous Robots (graduate)*: I supervised student groups and guided them through their term projects, the aims of which were to engineer service and tour guide robots both in simulation and real world.

Computer Programming Instructor **2009 - 2012**

I taught introductory programming and OOP concepts to FESTO & Boğaziçi University Mechatronics Specialist Certification Program students using the Java language.

The University of Texas at Austin, Austin, TX USA

Graduate Student (MSCS), Department of Computer Science **2005 - 2007**

- *UT Austin Villa RoboCup 4-Legged League Team member* **2006 - 2007**

My main contribution to the team was the development of an omni-directional quadruped walking and motion engine for the AIBO ERS-7 robots. I also worked on the development of single and multi-robot behaviors and roles, programmed in Lua.

- *Austin Robot Technology & UT Austin DARPA Urban Challenge Team member* **2007**

I worked on the identification of the rectangle-like segments in the planar laser data stream, which would be further processed for the detection of the other cars in traffic. The extracted car models were particularly used for intersection management and parking purposes. Additionally, I was involved in the development of the lane detection module as well as modeling the effects of braking on the vehicle's dynamics.

Teaching Assistant, Department of Computer Science **Fall 2006, Spring 2007**

- *Foundations of Computer Science*: I helped students internalize some fundamental concepts in computer science and programming, such as data types, data structures, recursion, data abstraction and encapsulation, object oriented design and implementation, and specification and testing. The course was taught using Java.
- *Autonomous Vehicles: Driving in Traffic*: I supervised students as they were working on developing the missing software and hardware components for getting our autonomous vehicle ready for the DARPA Urban Challenge.

Research Assistant, Department of Computer Science **Spring 2006**

Working at the RoboSoccer Lab of Prof. Peter Stone, I was involved in the code overhauling for preparing the UT Austin Villa RoboCup 4-Legged League team for the competitions. My main focus was on the implementation of an omni-directional and more capable locomotion engine for the AIBO ERS-7 robots.

Marmara University,

Undergraduate Student, Department of Computer Engineering **2000 - 2005**

- *Cerberus RoboCup 4-Legged League Team member* **2004 - 2005**

Joining the team as an external student, I developed a parametric, omni-directional locomotion engine for the AIBO ERS-210 quadruped robots and optimized the gait using Evolutionary Algorithms, obtaining a 31cm/s speed, the fastest reported gait on that robot. I also helped with the development of the custom debugging and visualization tools and the improvement of the probabilistic self-localization module with some practical extension.

Intern, Department of Computer Engineering **Summer 2003**

I applied various machine learning techniques to classify ECG signals and map them to certain known heart diseases.

EDUCATION **Carnegie Mellon University**, Pittsburgh, PA USA

Visiting Scholar, Computer Science Department

- Advisor: Professor Manuela Veloso
- Area of Study: Intelligent Robotics
- Subject: Case-Based Mobile Manipulation

Boğaziçi University, Istanbul, TURKEY

Ph.D., Department of Computer Engineering

- Advisors: Professor H. Levent Akin, Professor Manuela Veloso
- Area of Study: Intelligent Robotics
- Thesis: Case-Based Mobile Manipulation

The University of Texas at Austin, Austin, TX USA

MSCS, Department of Computer Science, June 2007

- Advisor: Associate Professor Peter Stone
- Area of Study: Intelligent Robotics, Robot Soccer, Autonomous Vehicles

Marmara University, Istanbul, TURKEY

B.S., Department of Computer Engineering, June 2005

- Graduation with High Honors degree in Engineering
- Advisors: Associate Professor Haluk Topçuoğlu, Professor H. Levent Akin
- Thesis: Developing a Rapid and Stable Parametric Quadruped Locomotion for AIBO Robots

AWARDS, HONORS, AND SCHOLARSHIPS

- **Best paper** award in Computer Science Student Workshop 2013 (CSW'13)
- **Programme 2214 Scholarship** of The Scientific and Technological Research Council of Turkey (TÜBİTAK)
- **Best reviewer** award in Computer Science Student Workshop 2010 (CSW'10)
- **Best research paper** award in Computer Science Student Workshop 2010 (CSW'10)
- **Ph.D. Scholarship** of The Scientific and Technological Research Council of Turkey (TÜBİTAK)
- Completed undergraduate study with the *2nd* **highest GPA**, holding a **high-honors degree**
- **1st place** in RoboCup'05 4-Legged League Technical Challenges as a member of team Cerberus

SKILLS

- Natural Languages: Turkish (Native), English (Native level), German (Basic)
- Programming Languages: C, C++, Java, Python, Lua, .Net (C#, VB, Visual C++), Pascal, MASM, Delphi, Prolog
- Web: PHP, ASP, HTML, XML, JavaScript, SQL
- Operating Systems: Linux, Windows, Android, AperiOS
- Other: ROS, PCL, OpenRAVE, Gazebo, V-Rep, Matlab, AutoCAD, Catia, SolidWorks, 3D Studio MAX, Blender, UnrealEd, OrCAD, Proteus

SERVICE

- Organizing Committee member of the Intelligent Robotic Systems Workshop at AAAI 2013
- Organizing Committee member of the AAAI 2012 Fall Symposium: Robots Learning Interactively from Human Teachers (RLIHT)
- Member of the RoboCup Federation Internal Advisory Board
- General Co-chair, RoboCup 2011
- Founding member of the Turkish RoboCup National Committee

- Technical/Organizing Committee member of the RoboCup Standard Platform League (SPL) (2009 - 2012)
- Program Committee member / reviewer / referee for IJCAI, IEEE ICRA, IEEE/RSJ IROS, ACM/IEEE HRI, IEEE-RAS Humanoids, AAMAS, ECAI, IEEE CASE, IEEE Robotic Computing, RoboCup International Symposia, SIMPAR, ICAART, IAS, CLAWAR, AIMS, IEEE IROS-HBU, IEEE ARSO, AAAI Robotics Fellowship, AAAI Integrated Systems, AAAI Integrated AI Capabilities, AAAI DIR, AAAI AIRob, AAAI KSBT, HRI Pioneers, PROMISE-RAISE, TORC, CSW, AIJ, Autonomous Robots, IEEE SMC, IEEE TPDS, IEEE Pervasive Computing, IJACSP, JAAMAS, JETAI, IJARS, JINT, SQJO, Soft Computing, TIMC, RCIM, ASME JMD, Robotics and Autonomous Systems
- Member of Team Cappadocia, a joint effort by ASELSAN, Ohio State University, and Boğaziçi University that took the 4th place at the Multi Autonomous Ground-Robotic International Challenge (MAGIC) in 2010
- SPL Organizing Committee member of the RoboCup Mediterranean Open (2010, 2011)
- Workshop co-chair (2010) and publication co-chair (2011, 2012) of the Computer Science Student Workshop (CSW)
- Local Organizing Committee member, CLAWAR 2009
- Referee (2009) and jury member (2011, 2013) in the FIRST LEGO League Turkey Tournaments
- Cerberus RoboCup Standard Platform League robot soccer team of Boğaziçi University AI Laboratory (2003 - 2005, 2008 - 2010, team captain in 2009 - 2010)
- Member of Austin Robot Technology & UT Austin DARPA Urban Challenge Team (2007)
- UTCS - Learning Agents Research Group (2005 - 2007)
- UT Austin Villa RoboCup 4-Legged League team (2005 - 2007)
- Founder of Marmara University Faculty of Engineering AI & Robotics Society

MEMBERSHIPS

- AAAI
- IEEE, IEEE Robotics and Automation Society, IEEE Life Sciences Community

INVITED TALKS & LECTURES

- 10.03.2013 - "Intelligent Robots Beyond the Lines", METU, Ankara, Turkey.
- 27.12.2012 - "Artificial Intelligence: An Overview", Marmara University, Istanbul, Turkey.
- 11.05.2011 - "AI and Robotics", Uşak University, Uşak, Turkey.
- 01.12.2009 - "AI and Robotics", Sabancı University, Istanbul, Turkey.
- 04.04.2009 - "Embedded Systems on Linux", Yıldız Technical University, Istanbul, Turkey.
- 05.02.2009 - "Robotics Applications of AI", Kırıkkale University, Kırıkkale, Turkey.
- 26.03.2008 - "Intelligent Machines", Okan University, Istanbul, Turkey.

Magazine Articles

- Ç. Meriçli, B. D. Argall, M. Çakmak, W. B. Knox, and **T. Meriçli**. “Robots Learning Interactively from Human Teachers”. In *AI Magazine*, 2012.

Journal Articles

- **T. Meriçli**, M. Veloso, and H. L. Akin. “Push-Manipulation of Complex Passive Mobile Objects using Experimentally Acquired Motion Models”, In *Autonomous Robots*, pp. 1-13, 2014.
- **T. Meriçli**, M. Veloso, and H. L. Akin. “Improving Prehensile Mobile Manipulation Performance through Experience Reuse”, In *Advanced Robotic Systems*, 2014.
- **T. Meriçli**, M. Veloso, and H. L. Akin. “A Case-Based Approach to Mobile Push-Manipulation”, In *Journal of Intelligent and Robotic Systems*, 2014.
- H. L. Akin, Ç. Meriçli, and **T. Meriçli**. “Introduction to Autonomous Mobile Robotics using Lego Mindstorms NXT”, In *Computer Science Education*, 23(4):368-386, 2013.
- Z. Yücel, A. A. Salah, Ç. Meriçli, **T. Meriçli**, R. Valenti, and T. Gevers. “Joint Attention by Gaze Interpolation and Saliency”. In *IEEE Transactions on Systems, Man, and Cybernetics Part B*, 2012.

Refereed Conferences

- J. Forlizzi, T. Saensuksopa, N. Salaets, M. Shomin, **T. Meriçli**, and G. Hoffman. “Let’s Be Honest: A Controlled Field Study of Ethical Behavior in the Presence of a Robot”. In *IEEE International Symposium on Robot and Human Interactive Communication*, New York City, NY, USA, 2016.
- **T. Meriçli**, M. Veloso, and H. L. Akin. “Achievable Push-Manipulation for Complex Passive Mobile Objects using Past Experience”. In *12th International Conference on Autonomous Agents and Multiagent Systems (AAMAS)*, Saint Paul, Minnesota, USA, 2013.
- S. Daniş, **T. Meriçli**, and H. L. Akin. “Using Saliency-based Visual Attention Methods for Achieving Illumination Invariance in Robot Soccer”. In *RoboCup Symposium 2012: Robot Soccer World Cup XVI*, 2012.
- B. Eker, E. Özkucur, Ç. Meriçli, **T. Meriçli**, and H. L. Akin. “A Finite Horizon DEC-POMDP Approach to Multi-robot Task Learning”. In *The 5th International Conference on Application of Information and Communication Technologies (AICT)*, Baku, Azerbaijan, October 12-14, 2011.
- S. Daniş, **T. Meriçli**, Ç. Meriçli, and H. L. Akin. “Robot Detection with a Cascade of Boosted Classifiers Based on Haar-like Features”. In *RoboCup Symposium 2010: Robot Soccer World Cup XIV*, 2010.
- Ç. Meriçli, **T. Meriçli**, and H. L. Akin. “A Reward Function Generation Method Using Genetic Algorithms: A Robot Soccer Case Study”. In *9th International Conference on Autonomous Agents and Multiagent Systems (AAMAS)*, Toronto, Canada, 2010.
- B. Turhan, Ç. Meriçli, and **T. Meriçli**. “Better, Faster and Cheaper: What is Better Software?”. In *PROMISE 2010: The 6th International Conference on Predictive Models in Software Engineering*, Timisoara, Romania, 2010.
- Z. Yücel, A. A. Salah, Ç. Meriçli, and **T. Meriçli**. “Kafa Duruşu Kestirimlerinden Bakış Yönünün Türetilmesi” (In Turkish). In *SIU 2010 Sinyal İşleme Uygulamaları Çevresel Zeka ve Sosyal Sinyal İşleme Özel Oturumu*, Diyarbakır, Turkey, 2010.
- H. L. Akin, Ç. Meriçli, **T. Meriçli**, and E. Doğrultan. “Introduction to Autonomous Robotics with Lego Mindstorms”. In *Proceedings of the 12th International Conference on Climbing and Walking Robots and the Support Technologies for Mobile Machines (CLAWAR)*, Istanbul, Turkey, 9 – 11 September, 2009.
- **T. Meriçli**, Ç. Meriçli, E. Özkucur, C. Kavakhoğlu, B. Gökçe, and H. L. Akin. “Dealing with Uncertainty in Structured Environments: A Robot Soccer Case Study”. In *Proceedings of the 12th International Conference on Climbing and Walking Robots and the Support Technologies for Mobile Machines (CLAWAR)*, Istanbul, Turkey, 9 – 11 September, 2009.

- **T. Meriçli** and H. L. Akin. “Soccer without Intelligence”. In *Proceedings of the 2008 IEEE International Conference on Robotics and Biomimetics (ROBIO)*, pp. 2079 - 2084, IEEE Computer Society, Washington, DC, USA, 2009.
- **T. Meriçli**, Ç. Meriçli, and H. L. Akin. “A Robust Statistical Collision Detection Framework for Quadruped Robots”. In *RoboCup 2008: Robot Soccer World Cup XII, L. Iocchi, et al. (Eds.), LNAI Vol. 5399, 2009.*, pp. 145 - 156, 2009.
- Z. Yücel, A. A. Salah, Ç. Meriçli, and **T. Meriçli**. “Joint Visual Attention Modeling for Naturally Interacting Robotic Agents”. In *Proceedings of the 24th International Symposium on Computer and Information Sciences (ISCIS)*, Lefkosa, Northern Cyprus, 2009.
- S. Andoni, M. Sagggar, **T. Meriçli**, and R. Miikkulainen. “Extracting the dynamics of the Hodgkin-Huxley model using recurrent neural networks”. In *BMC Neuroscience*, 8(Suppl 2):P100, 2007.
- M. Sagggar, **T. Meriçli**, S. Andoni, and R. Miikkulainen. “System Identification for the Hodgkin-Huxley Model using Artificial Neural Networks”. In *Proceedings of the IEEE International Joint Conference on Neural Networks (IJCNN)*, pp. 2239 - 2244, 2007.
- K. Kaplan, B. Çelik, **T. Meriçli**, Ç. Meriçli, and H. L. Akin. “Practical Extensions to Vision-Based Monte Carlo Localization Methods for Robot Soccer Domain”. In *RoboCup 2005: Robot Soccer World Cup IX, LNCS Volume 4020*, pp. 624 - 631, 2006.

Refereed Workshops

- **T. Meriçli**, M. Veloso, and H. L. Akin. “An Experience-Based Approach to Mobile Push-Manipulation”. In *Computer Science Student Workshop*, Istanbul, Turkey, 2013. (**Best Paper Award**)
- **T. Meriçli**, M. Veloso, and H. L. Akin. “Experience Guided Achievable Push Plan Generation for Passive Mobile Objects”. In *Beyond Robot Grasping - Modern Approaches for Dynamic Manipulation, IROS’12*, Algarve, Portugal, 2012.
- **T. Meriçli**, M. Veloso, and H. L. Akin. “Experience Guided Mobile Manipulation Planning”. In *8th International Cognitive Robotics Workshop, AAAI’12*, Toronto, Canada, 2012.
- M. Veloso, J. Biswas, B. Coltin, S. Rosenthal, S. Brandao, **T. Meriçli**, and R. Ventura. “Symbiotic-Autonomous Service Robots for User-Requested Tasks in a Multi-Floor Building”. In *Cognitive Assistive Systems, IROS’12*, Algarve, Portugal, 2012.
- **T. Meriçli** and H. L. Akin. “Braitenberg Soccer”. In *Computer Science Student Workshop*, Istanbul, Turkey, 2010. (**Best Paper Award**)

Technical Reports

- H. L. Akin, **T. Meriçli**, E. Özkucur, C. Kavaklıoğlu, and B. Gökçe. “Cerberus’10 Team Description Paper”. *Technical Report*, Boğaziçi University, 2010.
- H. L. Akin, Ç. Meriçli, **T. Meriçli**, B. Gökçe, C. Kavaklıoğlu, and E. Özkucur. “Cerberus’09 Team Description Paper”. *Technical Report*, Boğaziçi University, 2009.
- H. L. Akin, E. Doğrultan, **T. Meriçli**, and E. Özkucur. “RoboAkut 2009 Rescue Simulation League Agent Team Description”. *Technical Report*, Boğaziçi University, 2009.
- H. L. Akin, Ç. Meriçli, **T. Meriçli**, B. Gökçe, C. Kavaklıoğlu, and E. Özkucur. “Cerberus’08 Aibo Team Description Paper”. *Technical Report*, Boğaziçi University, 2008.
- H. L. Akin, Ç. Meriçli, **T. Meriçli**, B. Gökçe, C. Kavaklıoğlu, E. Özkucur, and O. T. Yıldız. “Cerberus’08 Nao Team Description Paper”. *Technical Report*, Boğaziçi University, 2008.
- H. L. Akin, Ç. Meriçli, **T. Meriçli**, B. Gökçe, C. Kavaklıoğlu, E. Özkucur, and O. T. Yıldız. “Cerberus’08 Team Report”. *Technical Report*, Boğaziçi University, 2008.
- P. Stone, P. Beeson, **T. Meriçli**, and R. Madigan. “DARPA Urban Challenge Technical Report: Austin Robot Technology”. *Technical Report*, The University of Texas at Austin, Department of Computer Sciences, AI Laboratory, 2007.
- **T. Meriçli** and P. Bi. “JFun: Functional Programming in Java”. *Technical Report*, The University of Texas at Austin, Department of Computer Sciences, 2006.
- **T. Meriçli**. “Color and Illumination Independent Hand Tracking and Gesture Recognition”. *Technical Report*, The University of Texas at Austin, Department of Computer Sciences, 2006.

- P. Stone, P. Fiedelman, N. Kohl, G. Kuhlmann, **T. Meriçli**, M. Sridharan, and S. Yu. “The UT Austin Villa 2006 RoboCup Four-Legged Team”. *Technical Report UT-AI-TR-06-337*, The University of Texas at Austin, Department of Computer Sciences, AI Laboratory, 2006.
- H. L. Akın, Ç. Meriçli, **T. Meriçli**, K. Kaplan, and B. Çelik. “Cerberus’05 Team Report”. *Technical Report*, Boğaziçi University, 2005.
- H. L. Akın, H. Köse, Ç. Meriçli, K. Kaplan, B. Çelik, and **T. Meriçli**. “Cerberus’05 Team Description Paper”. *Technical Report*, Boğaziçi University, 2005.

Theses

- **T. Meriçli**. “Case-based Mobile Manipulation”. *Ph.D. Thesis*, Boğaziçi University, Department of Computer Engineering, 2014.
- **T. Meriçli**. “Developing a Rapid and Stable Parametric Quadruped Locomotion for AIBO Robots”. *B.S. Thesis*, Marmara University, Department of Computer Engineering, 2005.

Multimedia

- **T. Meriçli**, M. Veloso, and H. L. Akın. “Experience Guided Mobile Manipulation Planning”. In *AI and Robotics Multimedia Fair, AAAI’12*, Toronto, Canada, 2012. (Poster)