

YUSUF AYDIN

POSTDOCTORAL RESEARCHER

@ yaydin@ku.edu.tr

www.yusuf-aydin.com

+90 - - - - -

linkedin.com/in/yusuf-aydin-a7992a6b

Koc University, Saryyer, Istanbul

Turkey

https://orcid.org/0000-0002-4598-5558

RESEARCH INTEREST

Physical human-robot interaction (pHRI): modeling, tradeoff between transparency and stability robustness, optimal interaction controller design, fractional and integer order admittance controllers, human intent estimation and detection. Mechatronics and Robotics: dynamic modeling, control, and system identification. Machine Learning: applications to Robotics.

EXPERIENCE

Postdoctoral research fellow

Koc University, Robotics and Mechatronics Laboratory

February 2019 – Ongoing Saryyer, İstanbul

- Adaptive Interaction Controller for pHRI
- Human Intent Detection in pHRI using Deep Learning

Research assistant

Koc University, Robotics and Mechatronics Laboratory

September 2011 – February 2019 Saryyer, Istanbul

- Design, analysis, and experimental evaluation of interaction controllers for physical human-robot interaction (pHRI) systems.
- Design of simulation environment for physical human-robot interaction (pHRI) via Matlab/Simulink.
- Modeling, system identification, and control of robotic systems (UR5, Universal Robots Inc., and LBR iiwa 7 R800, KUKA Inc.).

Teaching assistant

Koc University, College of Engineering

September 2011 – February 2019 Saryyer, Istanbul

- Phys101 General Physics I: Mechanics
- Phys102 General Physics II: Electricity and Magnetism
- Mech201 Statics and Mechanics of Materials
- Mech303 Machine Design
- Mech304 Dynamic Modeling and Control
- Mech401 Mechanical Engineering Laboratory
- Mech491 Mechanical Engineering Design Project
- Mech544 Robotics

HONORS AND ACHIEVEMENTS

- TUBITAK BİDEB Scholarship for M.Sc. 2210 and Ph.D. 2211
- Koc University, Full-Merit Scholarship for M.Sc. and Ph.D.
- Dual B.Sc. degree in Mechanical & Electrical and Electronics Engineering
- Ranked within the top 0.1% in Turkey's Selection Exam for Academic Personnel and Graduate Studies (ALES)
- Honor of Vehbi Koc Scholar: To recognize high success during undergraduate studies.
- Koc University, Full-Merit Scholarship for B.Sc.
- Ranked within the top 1% in Turkey's National University Entrance Exam (OSS)

EDUCATION

Ph.D. in Mechanical Engineering

Koc University

September 2013 – February 2019

Dissertation: A Multi-Criteria Optimization Framework for Interaction Controller Design for Physical Human-Robot Interaction

Co-advisors: Prof. Cagatay Basdogan, Koc University, and Prof. Volkan Patoglu, Sabanci University.

M.Sc. in Mechanical Engineering

Koc University

September 2011 – September 2013

Thesis: A New Control Architecture for Physical Human-Robot Interaction based on Haptic Communication

Advisor: Prof. Cagatay Basdogan

B.Sc. in Electrical and Electronics Engineering

Koc University

September 2008 – August 2011

Ranked as 4th

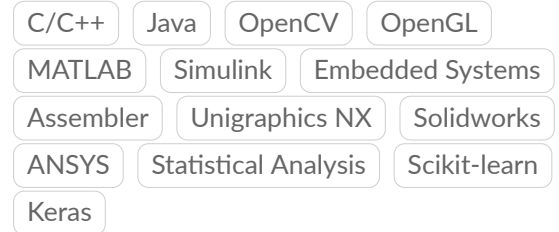
B.Sc. in Mechanical Engineering

Koc University

September 2006 – August 2011

Ranked as 3rd

STRENGTHS



LANGUAGES

English

TOEFL Score: 103



Turkish



PUBLICATIONS

Journal Articles

- Erdem, U., Aydin, Y., Basdogan, C., and Akgun, B. "Intent Prediction in Physical Human-Robot Interaction (pHRI) using Deep Learning". *to be submitted*.
- Hamad, Y. M., Aydin, Y., and Basdogan, C. "Adaptive Human Force Scaling via Admittance Control for Physical Human-Robot Interaction". *submitted to Robotics and Autonomous Systems* (2020).
- Aydin, Y., Tokatli, O., Patoglu, V., and Basdogan, C. "A Computational Multi-Criteria Optimization Approach to Controller Design for Physical Human-Robot Interaction". *accepted to IEEE Transactions on Robotics* (2020).
- Aydin, Y., Sirintuna, D., and Basdogan, C. "Towards Collaborative Drilling with a Cobot Using Admittance Controller". *accepted to Transactions of the Institute of Measurement and Control* (2020).
- Aydin, Y., Tokatli, O., Patoglu, V., and Basdogan, C. "Stable Physical Human-Robot Interaction Using Fractional Order Admittance Control". *IEEE Transactions on Haptics* 11.3 (2018), pp. 464–475.

Conference Proceedings (International)

- Sirintuna, D., Ozdamar, I., Aydin, Y., and Basdogan, C. "Detecting Human Motion Intention during pHRI Using Artificial Neural Networks Trained by EMG Signals". *submitted to IEEE International Conference on Robot and Human Interactive Communication (RO-MAN)*. 2020.
- Sirintuna, D., Aydin, Y., Caldiran, O., Tokatli, O., Patoglu, V., and Basdogan, C. "A Variable-Fractional Order Admittance Controller for pHRI". *accepted to IEEE International Conference on Robotics and Automation (ICRA)*. 2020.
- Aydin, Y., Tokatli, O., Patoglu, V., and Basdogan, C. "Fractional Order Admittance Control for Physical Human-Robot Interaction". *IEEE World Haptics Conference (WHC)*. 2017, pp. 257–262.
- Aydin, Y., Arghavani, N., and Basdogan, C. "A New Control Architecture for Physical Human-Robot Interaction based on Haptic Communication". *ACM/IEEE International Conference on Human-Robot Interaction*. 2014, pp. 122–123.

Conference Proceedings (National)

- Aydin, Y., Sirintuna, D., and Basdogan, C. "Fiziksel Insan-Robot Etkileşimi için İşbirlikçi bir Robotun Dinamik Karakterizasyonu". *Otomatik Kontrol Ulusal Toplantısı*. 2019, pp. 225–230.
- Aydin, Y., Tokatli, O., Patoglu, V., and Basdogan, C. "Fiziksel Insan-Robot Etkileşimi için Kesir Dereceli Admitans Denetleyicisi". *Türkiye Robotbilim Konferansı*. 2018, pp. 1–4.
- Erdem, U., Aydin, Y., Eteke, C., Akgun, B., and Basdogan, C. "Fiziksel Insan-Robot Etkileşiminde Yapay Öğrenme ile Insan Niyetini Algılama". *Türkiye Robotbilim Konferansı*. 2018, pp. 1–6.
- Aydin, Y. and Basdogan, C. "Insan-Robot Fiziksel Etkileşiminde Şeffaflık ve Kararlılık Arasındaki Odünleşim". *Türkiye Robotbilim Konferansı*. 2015, pp. 1–4.

Selected Talks and Technical Presentations

- Aydin, Y. "A Multi-Criteria Optimization Approach to Interaction Controller Design for Physical Human-Robot Interaction". *Bahçeşehir University, Istanbul, Turkey*. Dec. 2019.
- Aydin, Y. "Optimal Interaction Controller Design for pHRI". *Workshop on Physical Human-Robot Interaction and Its Applications, Özyeğin University, Istanbul, Turkey*. June 2019. URL: <https://fire2019.yusuf-aydin.com>.
- Aydin, Y., Tokatli, O., Patoglu, V., and Basdogan, C. "Stable Physical Human-Robot Interaction Using Fractional Order Admittance Control". *invited and presented at ToH Interactive Session at World Haptics Conference (WHC), Tokyo, Japan*. 2019.
- Aydin, Y. "Fiziksel Insan-Robot Etkileşimi için Kesir Dereceli Admitans Denetleyicisi". *invited and presented at Bogaz'da Yapay Öğrenme, Bogazici University, Istanbul, Turkey*. 2018.
- Aydin, Y. "A Haptics-Based Control Architecture for Physical Human-Robot Interaction". *invited and presented at Workshop on New Trends in Robotics, Bahçeşehir University, Istanbul, Turkey*. 2014.

PROFESSIONAL ACTIVITIES

Reviewer for Journals and Conferences

- IEEE Transactions on Robotics
- IEEE Robotics and Automation Letters
- IEEE/ASME Transactions on Mechatronics
- IEEE Transactions on Haptics
- Transactions of the Institute of Measurement and Control
- IEEE International Conference on Robotics and Automation (ICRA)
- ACM/IEEE International Conference on Human-Robot Interaction (HRI)
- IEEE International Conference on Robot and Human Interactive Communication (RO-MAN)
- Eurohaptics Conference

Member

- IEEE
- IEEE Robotics and Automation Society
- RAS Young Reviewers Program
- Technical Committee on Haptics
- Turkey Researchers of Robot Science
- TMMOB (UCTEA) Chamber of Mechanical Engineers
- TMMOB (UCTEA) Chamber of Electrical Engineers

Judge

- FIRST Robotics Competition (FRC) Istanbul & Bosphorus Regionals
- FIRST Robotics Competition (FRC) Istanbul Offseason

REFERENCES

Prof. Cagatay Basdogan

@ Koc University

✉ cbasdogan@ku.edu.tr

College of Engineering, Sariyer, Istanbul

☎ +90 212 338 1721

Prof. Volkan Patoglu

@ Sabanci University

✉ vpatoglu@sabanciuniv.edu

Faculty of Engineering and Natural Sciences
Tuzla, Istanbul

☎ +90 216 483 9604

Prof. Baris Akgun

@ Koc University

✉ baakgun@ku.edu.tr

College of Engineering, Sariyer, Istanbul

☎ +90 212 338 0924