Assoc. Prof. UĞUR TÜMERDEM

Personal Information

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International Researcher IDs
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Biography

Ugur Tumerdem received his B.Sc. degree in Mechatronics from Sabanci University, Istanbul in 2005, his M.Sc. and Ph.D. degrees in Integrated Design Engineering from Keio University, Tokyo in 2007 and 2010 respectively. He worked as a Postdoctoral Fellow at IBM Research - Tokyo. Since 2012, he is a faculty member in the Department of Mechanical Engineering at Marmara University, Istanbul. His current research interests include haptics in robotic surgery systems, with a focus on force estimation algorithms, haptic teleoperation architectures and novel mechanism design for haptic interfaces and surgical tools.

Education Information

Doctorate, Keio Üniversitesi, Graduate School Of Science And Technology, Japan 2007 - 2010
Postgraduate, Keio Üniversitesi, Graduate School Of Science And Technology, Japan 2005 - 2007
Undergraduate, Sabanci University, Turkey 2001 - 2005

Foreign Languages

English, C2 Mastery

Dissertations

Doctorate, High performance haptic teleoperation and collaboration over networks, Keio Üniversitesi, Graduate School Of Science And Technology, 2010
Postgraduate, Acceleration Consensus for Networked Robotics, Keio University, 2007

Research Areas

Machine Theory and Dynamics, System Dynamics and Control, Mechanisms, Robotics, Mechatronics, Modeling and Simulation of Dynamic Systems

Academic Titles / Tasks

Associate Professor, Marmara University, Faculty Of Engineering, Mechanical Engineering, 2022 - Continues
Assistant Professor, Marmara University, Faculty of Engineering, Mechanical Engineering, 2012 - Continues

Advising Theses

Tümerdem U., Development of a learning based trajectory tracking controller for autonomous vehicles, Postgraduate, H.ŞENER(Student), 2022
TÜMERDEM U., Development of a sensorless haptic teleoperation system for robotic minimally invasive surgery, Postgraduate, N.Yılmaz(Student), 2019
TÜMERDEM U., Development of a novel 4-DOF wrist-gripper mechanism for robotic minimally invasive surgery, Postgraduate, M.Bazman(Student), 2019

Published journal articles indexed by SCI, SSCI, and AHCI

I. **Sensorless Transparency Optimized Haptic Teleoperation on the da Vinci Research Kit**
Yilmaz N., Burkhart B., Deguet A., Kazanzides P., TÜMERDEM U.
IEEE Robotics and Automation Letters, vol.9, no.2, pp.971-978, 2024 (SCI-Expanded)

II. **Admittance Switching for Stability and Transparency in Human-Robot Collaborative Microsurgery**
Banks B., Salehizadeh M., Munawar A., Taylor R. H., TÜMERDEM U.
IEEE Robotics and Automation Letters, vol.9, no.2, pp.1891-1898, 2024 (SCI-Expanded)

III. **An Articulated Robotic Forceps Design With a Parallel Wrist-Gripper Mechanism and Parasitic Motion Compensation**
Bazman M., Yılmaz N., Tümerdem U.
JOURNAL OF MECHANICAL DESIGN - TRANSACTIONS OF THE ASME, vol.144, no.06, pp.1-12, 2022 (SCI-Expanded)

IV. **Transfer of learned dynamics between different surgical robots and operative configurations**
Yilmaz N., Zhang J., Kazanzides P., TÜMERDEM U.
INTERNATIONAL JOURNAL OF COMPUTER ASSISTED RADIOLOGY AND SURGERY, vol.17, no.5, pp.903-910, 2022 (SCI-Expanded)

V. **A unifying framework for transparency optimized controller design in multilateral teleoperation with time delays**
TÜMERDEM U., Yilmaz N.
CONTROL ENGINEERING PRACTICE, vol.117, 2021 (SCI-Expanded)

VI. **Three-channel control architecture for multilateral teleoperation under time delay**
TÜMERDEM U.
TURKISH JOURNAL OF ELECTRICAL ENGINEERING AND COMPUTER SCIENCES, vol.27, no.1, pp.120-138, 2019 (SCI-Expanded)

VII. **Multilateral teleoperation under asymmetric time delays: L-2 stability and robustness**
Tümerdem U.
INTERNATIONAL JOURNAL OF ADVANCED ROBOTIC SYSTEMS, vol.14, 2017 (SCI-Expanded)

Articles Published in Other Journals

I. **A Study on the L2 Stability and Transparency of Three Channel Control Architectures in Bilateral Teleoperation under Time Delays**
Tümerdem U.
International Journal of Advances in Engineering and Pure Sciences, vol.33, no.3, pp.455-466, 2021 (Peer-Reviewed Journal)

II. **Delay-Independent L2 Stability of Four-Channel Bilateral Teleoperators with Damping Injection**

Tümerdem U., Ohnishi K.
IEEJ Transaction on Industry Applications, vol.130, no.8, pp.953-964, 2010 (Peer-Reviewed Journal)

III. **Asymmetric Multilateral Teleoperation through Scaled Consensus Reaching on Graphs**
Tümerdem U., Shimono T., Ohnishi K.
IEEJ Transactions on Industry Applications, vol.129, no.10, pp.972-980, 2009 (Scopus)

Refereed Congress / Symposium Publications in Proceedings

I. **Learning Based Estimation of 7 DOF Instrument and Grasping Forces on the Da Vinci Research Kit**
Zhang J., Yılmaz N., Tümerdem U., Kazanzides P.
International Symposium on Medical Robotics, Georgia, United States Of America, 13 - 15 April 2022, pp.1-7

II. **Robot Force Estimation with Learned Intraoperative Correction**
Wu J. Y., Yilmaz N., TÜMERDEM U., Kazanzides P.
International Symposium on Medical Robotics (ISMR), Georgia, United States Of America, 17 - 19 November 2021

III. **Neural Network based Inverse Dynamics Identification and External Force Estimation on the da Vinci Research Kit**
Yilmaz N., Wu J. Y., Kazanzides P., TÜMERDEM U.
IEEE International Conference on Robotics and Automation (ICRA), ELECTR NETWORK, 31 May - 15 June 2020, pp.1387-1393

IV. **6-Axis Hybrid Sensing and Estimation of Tip Forces/Torques on a Hyper-Redundant Robotic Surgical Instrument**
Yilmaz N., Bazman M., Alassi A., Gur B., TÜMERDEM U.
IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), Macau, China, 4 - 08 November 2019, pp.2990-2997

V. **External Force/Torque Estimation on a Dexterous Parallel Robotic Surgical Instrument Wrist**
Yilmaz N., Bazman M., TÜMERDEM U.
25th IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), Madrid, Spain, 1 - 05 October 2018, pp.4396-4403

VI. **Development and kinematic analysis of a redundant, modular and backdrivable laparoscopic surgery robot**
Alassi A., Yilmaz N., Bazman M., GÜR M. B., TÜMERDEM U.
2018 IEEE/ASME International Conference on Advanced Intelligent Mechatronics, AIM 2018, Auckland, New Zealand, 9 - 12 July 2018, vol.2018-July, pp.213-219

VII. **Development and Kinematic Analysis of a Redundant, Modular and Backdrivable Laparoscopic Surgery Robot**
Alassi A., Yilmaz N., Bazman M., Gur B., TÜMERDEM U.
IEEE/ASME International Conference on Advanced Intelligent Mechatronics (AIM), Auckland, New Zealand, 9 - 12 July 2018, pp.213-219

VIII. **Kinematics and Tracking Control of a Four Axis Antenna for Satcom on the Move**
Hancioglu O. K., Celik M., Tümerdem U.
8th International Power Electronics Conference (IPEC-Niigata ECCE Asia), Niigata, Japan, 20 - 24 May 2018, pp.1680-1686

IX. **Kinematics and Tracking Control of a 4 Axis Antenna for Satcom on the Move**
Hancıoğlu O. K., Çelik M., TÜMERDEM U.
International Power Electronics Conference, 20 - 24 May 2018

X. **Dexterous and Back-Drivable Parallel Robotic Forceps Wrist for Robotic Surgery**
Bazman M., Yilmaz N., Tümerdem U.
15th IEEE International Workshop on Advanced Motion Control (AMC), Tokyo, Japan, 9 - 11 March 2018, pp.153-159

XI. **L-2 Stable Transparency Optimized Two Channel Teleoperation under Time Delay**

Tümerdem U., Demir M.
41st Annual Conference of the IEEE-Industrial-Electronics-Society (IECON), Yokohama, Japan, 9 - 12 November 2015, pp.1313-1320

XII. **L2 stability analysis of four channel teleoperation and experiments under varying time delay**
Tümerdem U., Ohnishi K.
IEEE AMC, Niigata, Japan, 21 - 24 March 2010, pp.643-648

XIII. **Delay independent L2 stable multilateral teleoperation with damping injection**
Tümerdem U., Ohnishi K.
IEEE ICIT, Vina-Del-Mar, Chile, 14 - 17 March 2010

XIV. **Robust Four Channel Teleoperation under Time Delay by Damping Injection**
Tümerdem U., Ohnishi K.
2009 IEEE INTERNATIONAL CONFERENCE ON MECHATRONICS, VOLS 1 AND 2, Malaga, Spain, 14 - 17 April 2009, pp.357-362

XV. **Multi-robot Teleoperation under Dynamically Changing Network Topology**
Tümerdem U., Ohnishi K.
2009 IEEE INTERNATIONAL CONFERENCE ON INDUSTRIAL TECHNOLOGY, VOLS 1-3, Melbourne, Australia, 10 - 13 February 2009, pp.780-785

XVI. **Micro-Macro Multilateral Teleoperation through Scaled Information Flow**
Tümerdem U., Ohnishi K., Shimono T.
IECON 2008: 34TH ANNUAL CONFERENCE OF THE IEEE INDUSTRIAL ELECTRONICS SOCIETY, VOLS 1-5, PROCEEDINGS, Florida, United States Of America, 10 - 13 November 2008, pp.2816-2821

XVII. **Haptic Consensus in Multilateral Teleoperation**
Tümerdem U., Ohnishi K.
2008 IEEE INTERNATIONAL SYMPOSIUM ON INDUSTRIAL ELECTRONICS, VOLS 1-5, London, United Kingdom, 30 June - 02 July 2008, pp.1652-1657

XVIII. **Acceleration consensus for networked motion control of telerobots**
Tümerdem U., Ohnishi K.
AMC 'xx08: 10TH INTERNATIONAL WORKSHOP ON ADVANCED MOTION CONTROL, VOLS 1 AND 2, PROCEEDINGS, Trento, Italy, 26 - 28 March 2008, pp.318-323

XIX. **Scaled Haptic Consensus and Multilateral Teleoperation**
TÜMERDEM U., Shimono T., Ohnishi K.
Technical Meeting on Industrial Instrumentation and Control, Japan, 01 March 2008

XX. **Haptic consensus in bilateral teleoperation**
Tümerdem U., Ohnishi K.
2007 IEEE INTERNATIONAL CONFERENCE ON MECHATRONICS, Kumamoto, Japan, 8 - 10 May 2007, pp.154-159

XXI. **Serbest Şekilli Nesnelerin Scara Robotun Görme Tabanlı Denetimi İle Manipülasyonu**
Tümerdem U.
TOK 2005, İstanbul, Turkey, 2 - 05 June 2005, pp.1-7

Supported Projects

Tümerdem U., TUBITAK Project, Minimal İnvazif Cerrahi için Kuvvet Geri Beslemeli Robotik Forseps Tasarımı ve Geliştirilmesi, 2016 - 2018
Tümerdem U., Project Supported by Higher Education Institutions, Birden Fazla Operatörle Internet Üzerinden Minimal İnvazif Robotik Cerrahi için Haptik Kontrol Sistem, 2013 - 2015

Metrics

Publication: 31

Citation (WoS): 29
Citation (Scopus): 72
H-Index (WoS): 3
H-Index (Scopus): 6

Congress and Symposium Activities

Robotics, Genetics and Criminal Law, Invited Speaker, İstanbul, Turkey, 2018

Awards

Zhang J., Yılmaz N., Tümerdem U., Kazanzides P., ISMR 2022 Best paper award, Ismr, April 2022

Non Academic Experience

Company
IBM RESEARCH - TOKYO