2015 12th International Conference on Ubiquitous Robots and Ambient Intelligence (URAI 2015)

Goyang, South Korea
28-30 October 2015
Thursday, October 29

**TA1** Computer Vision + Poster Teaser 1-1

**09:00~09:15**

**TA1-1**

*Structure from motion using a hybrid stereo-vision system*

Francois Rameau, Desire Sidibe, Cedric Demonceaux, David Fofi  
*Universite de Bourgogne, France*

**09:15~09:30**

**TA1-2**

*Obstacle Detection Using Unsynchronized Multi-Camera Network*

Rawia Mhiri¹, Hichem Maïza², St´ephanie Mousset¹, Khaled Taouit², Pascal Vasseur¹, Abdelaziz Bensrhair¹  
¹University of Rouen, France; ²University of Sfax, France

**09:30~09:45**

**TA1-3**

*Projection Mapping by Mobile Projector Robot*

Misaki Kasetani, Tomonobu Noguchi, Hirotake Yamazoe, Joo-Ho Lee  
*Ritsumeikan University, Japan*

**09:45~10:00**

**TA1-4**

*Accurate Fusing Multiple RGBD Sensors Using Geometry*

Seohyun Jeon  
*Electronics and Telecommunications Research Institute, Korea*

**10:00~10:15**

**TA1-5**

*Pedestrian Detection and Tracking in Thermal Images based on Shape Features*

Dae-Eon Kim, Dong-Soo Kwon  
*KAIST, Korea*

**P1-1~P1-14**

*Poster Teaser 1-1*

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**TA2** Localization / Positioning + Poster Teaser 1-2

**09:00~09:15**

**TA2-1**

*Autonomous detection and tracking of a surface ship using onboard monocular vision*

Yonghoon Cho, Jeonghong Park, Minju Kang, Jinwhan Kim  
*KAIST, Korea*

**09:15~09:30**

**TA2-2**

*Image-based Localization using Image Database and Local 3D Maps*

Hyungjin Kim, Kwangyik Jung, Taekjun Oh, Hyun Myung  
*KAIST, Korea*
2015 12th International Conference on Ubiquitous Robots and Ambient Intelligence (URAI)

**TA2-3**
09:30~09:45

Efficient Graph SLAM Optimization using Unit Dual-Quaternions
Jonghyuk Kim¹, Jiantong Cheng², Hyunchul Shim³
1Australian National University, Australia, 2National University of Defense Technology, China, 3Korea Advanced Institute of Science and Technology, Korea

**TA2-4**
09:45~10:00

Using dense point clouds as environment model for visual localization of mobile robot
Nathan Crombez, Guillaume Caron, El Mustapha Mouaddib
MIS laboratory, France

**TA2-5**
10:00~10:15

Sensor Data Processing Based on the Data Log System Using the Portable IoT Device and RT-Middleware
Mamoru Sekiyama, Bong Keun Kim, Seisho Irie, Tamio Tanikawa
AIST, Japan

**P1-15~P1-28**
10:15~10:29

Poster Teaser 1-2

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**TA3**
09:00~10:30 [TA3] Motion Planning and Control + Poster Teaser 1-3
Room 305A

Chair : Keizo MIYAHARA (OSAKA University, Japan)
Hyun-Taek Choi (KRISO, Korea)

**TA3-1**
09:00~09:15

Discrete Coordinate System with Isotropy for Robotic Applications
Keizo MIYAHARA
OSAKA University, Japan

**TA3-2**
09:15~09:30

Non-holonomic Path Planning of Car-like Robot using RRT*FN
Sotirios Spanogiannopoulos, Konstantinos Sirlantzis
University of Kent, UK

**TA3-3**
09:30~09:45

Wireless-Communicated Computed-Torque Control of a SCARA Robot and Two-Dimensional Input Shaping for a Spherical Pendulum
Manh-Tuan Ha, Chul-Goo Kang
Konkuk University, Korea

**TA3-4**
09:45~10:00

System Identification of Hydraulic System Using RLS Algorithm for Feedforward Position Control
Kyeong Ha Lee¹, Seung Guk Baek¹, Jong Yoon Choi¹, Jae Jun Park², Hyouk Ryol Choi¹, Hyungpil Moon¹, Ja Choong Koo¹
1SungKyunKwan University, Korea, 2KNR System Inc, Korea

**TA3-5**
10:00~10:15

Contact Motion Stabilization Using Equivalent Future Response in Synchronized Bilateral Teleoperation
Satoshi Nishimura, Seichirom Katsura
Keio University, Japan

**P1-29~P1-37, V1-1~V1-4**
10:15~10:28

Poster Teaser 1-3
09:00~10:30  [TA4] Kinematics & Control  Room 306

Chair : Seul Jung (Chungnam Univ., Korea)
       Hyun Min Do (KIMM, Korea)

**TA4-1**
09:00~09:15
An implementation of Extended Kalman filter with PI control and modeling effect reduction for precise motor speed estimation with disturbance
Minchul Shin, Dongsoo Kwon
KAIST, Korea

**TA4-2**
09:15~09:30
Power Estimation of a Battery in a Single-Wheel Mobile Robot by a Motion Analysis Approach
Sang Deok Lee
Chungnam National University, Korea

**TA4-3**
09:30~09:45
Development of controller for small-sized parallel kinematic machines in assembling mobile IT products
Hyun Min Do
Korea Institute of Machinery and Materials, Korea

**TA4-4**
09:45~10:00
Kinematic Sensitivity Analysis of a 3-DoF Decoupled Translational Parallel Mechanism with Uncertainties in the Passive Joints
Morteza Daneshmand¹, Mehdi Tale Masouleh², Gholamreza Anbarjafari¹
¹University of Tartu, Estonia, ²University of Tehran, Iran

**TA4-5**
10:00~10:15
Kinematic Analysis of Tendon Driven Robot Mechanism for Heavy Weight Handling
Shoaib Muhammad, Joono Cheong
Korea University, Korea

**TA4-6**
10:15~10:30
Featureless omnidirectional vision-based control of non-holonomic mobile robot
Youssef Alj
Guillaume Caron, France

10:45~11:45  [V1] Video Session  Room 303

Chair : Ayoung Kim (KAIST, Korea)

**V1-1**
10:45~11:00
Development of a jellyfish reconnaissance and removal robot system using unmanned aerial and surface vehicles
Donghoon Kim¹, Hangeun Kim², Sungwook Jung³, Jungmo Koo⁴, Jongheon Kim¹, Jae-Uk Shim², Hyun Myung¹
¹KAIST, Korea, ²Rastech Inc., Korea

**V1-2**
11:00~11:15
Robust real-time stereo vision system for indoor environment
Jiho Chang, Jae-Chan Jeong, Seungmin Choi
Electronics and Telecommunications Research Institute, Korea

**V1-3**
11:15~11:30
Simple Optimization Toolbox for Engineers
Jae-chan, Sunglok Choi, Jae-Yeong Lee, Ji-Wan Kim, Jae-il Choi
Electronics and Telecommunications Research Institute, Korea
### V1-4
11:30~11:45

**Planar SLAM under a Semi-Submersible Offshore Platform with an Unmanned Surface Vehicle**

Jungwook Han, Minju Kang, Yonghoon Cho, Jinwhan Kim  
*KAIST, Korea*

### 10:45~11:45 [P1] Poster Session

**Foyer of Room 303, 304**

| P1-1 | Approaches for precision brake systems by using tire pressure measurement sensors  
Dong-Hwan Shin\(^1,2\), Choong-Pyo Jeong\(^1,2\), Seonghun Lee\(^1\), Dae-Hyun Kurn\(^1\), Seung-Han Yang\(^2\)  
\(^1\)Daegu Gyeongbuk Institute of Science & Technology, Korea, \(^2\)Kyungpook National University, Korea |
| P1-2 | Balancing and Driving Control of a Single Line Play Robot on the Rope in the Air  
Myung Sik Oh, Seul Jung  
*Chungnam National University, Korea* |
| P1-3 | Human internal state recognition using modified chain-code method  
Daeha Lee  
*Electronics and Telecommunications Research Institute, Korea* |
| P1-4 | USB Assembly Strategy based on Visual Servoing and Impedance Control  
Hee-Chan Song, Min-Cheol Kim, Jae-Bok Song  
*Korea University, Korea* |
| P1-5 | Underwater Floor Pattern Matching with an Unmanned Underwater Vehicle  
Jung-Tae Kim\(^1\), Hyung-Joo Kang\(^1\), Min-Kyu Kim\(^1\), Sung-Mun Hong\(^1\), Ji-Hong Li\(^1\), Min-Jae Kim\(^2\)  
\(^1\)Korea Institute of Robot and Convergence, Korea, \(^2\)Agency for Defense Development, Korea |
| P1-6 | An RRT* Path Planning for Kinematically Constrained Hyper-redundant Inpipe Robot  
Kun Wook Lee, Ja Choon Koo, Hyouk Ryeol Choi, Hyungpil Moon  
*Sungkyunkwan University, Korea* |
| P1-7 | Improving Visual Corrosion Inspection Accuracy with Image Enhancement Filters  
Syahril Anuar Bin Idris, Fairul Azni Jafar, Seha Saffar  
*Universiti Teknikal Malaysia Melaka, Malaysia* |
| P1-8 | Link Motion Feedback based Force/Torque Servo Control of Robot Joint with Series Elasticity  
Sunkyum Yoo, Wan Kyun Chung  
*Pohang University of Science and Technology, Korea* |
| P1-9 | Modeling and Simulation of Flow Rate in Microfluidic Networks  
Young Jin Hee, Wan Kyun Chung  
*Pohang University of Science and Technology, Korea* |
| P1-10 | CAMshift Algorithm based on GeomElectronics and Telecommunications Research Institute Information for Fast Billiard Ball Tracking  
Jungkil Park, Jaebgyung Park  
*Chonbuk National University, Korea* |
| P1-11 | Graph-based SLAM Approach for Environments with Laser Scan Ambiguity  
Taekjun Oh, Hyungjin Kim, Kwangyik Jung, Hyun Myung  
*KAIST, Korea* |
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<th>Title</th>
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<td>P1-12</td>
<td>Real-time underground localization using graph pruning-augmented graph optimization for directional drilling</td>
<td>Byeolteo Park, Hyun Myung</td>
<td>KAIST, Korea</td>
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<td>P1-13</td>
<td>A Vision-based Detection Algorithm for Moving Jellyfish in Underwater Environment</td>
<td>Donghoon Kim, Hangeun Kim, Sungwook Jung, Jungmo Koo, Jongheon Kim, Hyun Myung</td>
<td>KAIST, Korea</td>
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<td>P1-14</td>
<td>Reaction Torque Minimization Method for Keeping Drilling Direction of the Hybrid Rotary Steerable System</td>
<td>Jongheon Kim, Sungwook Jung, Suyoung Choi</td>
<td>KAIST, Korea</td>
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<td>P1-15</td>
<td>Bin Picking Method Using Multiple Local Features</td>
<td>Kyekyung Kim</td>
<td>Electronics and Telecommunications Research Institute, Korea</td>
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<td>P1-16</td>
<td>A Novel Genetic Algorithm for Autonomous Assembly of Structural LEGO Bricks</td>
<td>Seung-Mok Lee, Kwang Yik Jung, Jae Woo Kim, Hyun Myung</td>
<td>KAIST, Korea</td>
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<td>P1-17</td>
<td>Color Difference between Real Faces and Facial Images from a sRGB Monitor</td>
<td>Mi-Young Cho, Young-Sook Jeong, Hyun-Suh Kim, Howard Kim</td>
<td>Electronics and Telecommunications Research Institute, Korea, Color Technology Laboratory, Korea</td>
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<td>P1-18</td>
<td>Relative Attributes with Deep Convolutional Neural Network</td>
<td>Dong-Jin Kim, Donggeun Yoo, Sunghoon Im, Namil Kim, Tharatch Sirinukulwattana, In So Kweon</td>
<td>KAIST, Korea</td>
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<td>P1-19</td>
<td>A Study of Robot Motion Planning using Information of Crowd Density</td>
<td>Seunghwan Park, Jaeil Cho</td>
<td>Electronics and Telecommunications Research Institute, Korea</td>
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<td>P1-20</td>
<td>Preliminary Results on Vision-Inertial State Estimation for SmQT System</td>
<td>Donghun Lee, Hyunsoo Yang, Dongjun Lee</td>
<td>Seoul National University, Korea</td>
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<td>P1-21</td>
<td>Lane Change and Path Planning of Autonomous Vehicles using GIS</td>
<td>Yong-Geon Choi, Kyung-II Lim, Jung-Ha Kim</td>
<td>Kookmin University, Korea</td>
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<td>P1-22</td>
<td>Design of Unmanned Vehicle Advanced Braking System using Smart Motor</td>
<td>PING-FAN JIN, Jung-Hyun Kim, Jung-Ha Kim</td>
<td>Kookmin University, Korea</td>
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<td>P1-23</td>
<td>Effective Methods to extract PPG Signals from Face using Stochastic State Space Modeling Approach</td>
<td>Chan-kyu Park, Ho-jin Choi</td>
<td>Electronics and Telecommunications Research Institute, KAIST, Korea</td>
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<td>P1-24</td>
<td>Constructing an Avatar-Based Telepresence System Using Commodity Hardware</td>
<td>Yeonjoon Kim, Sukwon Lee, Taeil Jin, Sung-Hee Lee</td>
<td>KAIST, Korea</td>
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<td>P1-25</td>
<td>Video Based Augmented Reality For Immersive Virtual Reality System</td>
<td>Young-Yong Kim, Jun-Sik Kim, Jung-Min Park</td>
<td>Korea Institute of Science and Technology, Korea</td>
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P1-26  Line Assisted Vision Applications in Structured Environments  
Kyoungdon Joo, Tae-Hyun Oh, In So Kweon  
KAIST, Korea

P1-27  Investigation of design parameters of slack enabling actuator  
Hyunki In, Haemin Lee, Useok Jeong, Brian Byunghyun Kang, Kyu-Jin Cho  
Seoul National University, Korea

P1-28  The Research on Establishment of Database for Autonomous-driving in Downtown  
Jeong-tae Park, Jun-beom Park, Jung-ha Kim  
Kookmin University, Korea

P1-29  Depth Estimation from Light Field Cameras  
Sunghoon Im, Hae-Gon Jeon, Hyowon Ha, In So Kweon  
KAIST, Korea

P1-30  A Relationship-based Model of Robot Service Personalization  
Minsu Jang, Jaehong Kim  
Electronics and Telecommunications Research Institute, Korea

P1-31  Decomposition of the Contact Force using the Contact Pressure \[ for the Haptic Augmented Reality  
Hyoungkyun Kim, Seungmoong Choi, Wan Kyun Chung  
Pohang University of Science and Technology, Korea

P1-32  Applying Disturbance Observer to the Motor Side of Flexible Joint Robots with PD Control  
Min Jun Kim, Wan Kyun Chung  
Pohang University of Science and Technology, Korea

P1-33  Probabilistic Foreground Detector for Sterile Zone Monitoring  
Ajmal Shahbaz, Ajmal Shahbaz  
University of Ulsan, Korea

P1-34  Dynamic Motion Phase Segmentation using Electromyogram  
Seongsik Park, Wan Kyun Chung  
Pohang University of Science and Technology, Korea

P1-35  Flower Classification: Training Augmentation Using Manifold Images  
Shubhra Aich, Chil-Woo Lee  
Chonnam National University, Korea

P1-36  Preliminary Control Design on Spherically-Connected Multiple-Quadrotor Manipulator System  
Juhyeok Kim, Hai-Nguyen Nguyen, Dongjun Lee  
Seoul National University, Korea

P1-37  Multiple human tracking on robot operation system  
Anh Vu Le, Kijin An, JongSuk Choi  
Korea Institute of Science and Technology, Korea
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<td>13:00-14:15</td>
<td>TB1 SLAM</td>
<td>[Invited] Aerial Inertial-SLAM: Progresses and Future Challenges</td>
<td>Jonghyuk Kim, Jinwhan Kim</td>
<td>The Australian National University, Australia; KAIST, Korea</td>
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<td>TB1-1</td>
<td>Relative navigation with passive underwater acoustic sensing</td>
<td>Yeonjoo Shim, Jisung Park, Jinwhan Kim</td>
<td>KAIST, Korea</td>
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<td>TB1-2</td>
<td>Point Feature-based Outdoor SLAM for Rural Environments</td>
<td>Dong-il Kim, Heewon Chae, Jae-Bok Song, JiHong Min</td>
<td>Korea University, Korea; Agency for Defense Development, Korea</td>
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<td>TB1-3</td>
<td>Illumination Change Compensation and Extraction of Corner Feature</td>
<td>Chansoo Park, Jae-Bok Song</td>
<td>Korea University, Korea</td>
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<td>TB1-4</td>
<td>Initial Alignment Consideration for Underwater Robot's Strapdown</td>
<td>Jung-Tae Kim, Mun-Jik Lee, Sung Chul Jee, Hyung-Ju Kang, Min-Gyu Kim, Sung-Mun Hong, Jin-Ho Suh</td>
<td>Korea Institute Robot and Convergence, Korea</td>
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<td>13:00-14:15</td>
<td>(OS 1) Navigation Technologies for Autonomous Underwater Vehicles</td>
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<td>TB2-1</td>
<td>AUV Localization Using Visual Information of Underwater Structures</td>
<td>Jongdae Jung, Hyun Myung</td>
<td>KAIST, Korea</td>
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<td>TB2-2</td>
<td>Initial Alignment Consideration for Underwater Robot's Strapdown</td>
<td>Jung-Tae Kim, Mun-Jik Lee, Sung Chul Jee, Hyung-Ju Kang, Min-Gyu Kim, Sung-Mun Hong, Jin-Ho Suh</td>
<td>Korea Institute Robot and Convergence, Korea</td>
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<td>TB2-3</td>
<td>Underwater Vehicle Localization using Angular Measurements of</td>
<td>Jinwoo Choi, Hyun-Taek Choi</td>
<td>Korea Research Institute of Ships and Ocean Engineering, Korea</td>
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<td>TB2-4</td>
<td>Underwater vertical x-z plane localization with Multi-node</td>
<td>Jinhyun Kim, Kyungmin Kwak, Daegil Park, Wan Kyun Chung</td>
<td>Seoul National University of Science &amp; Technology, Korea; Pohang University of Science and Technology, Korea</td>
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<td>TB2-5</td>
<td>Emergency Path Planning Method for Unmanned Underwater Robot</td>
<td>Yosmar Putra, Dae Gil Park, Wan Kyun Chung</td>
<td>Pohang University of Science and Technology, Korea</td>
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### TB3-1
13:00–13:15
**Feature Analysis of Interaction on Rub-impact and Oil-film Faults for a Rotor-bearing System**
Ling Xiang, Lanlan Hou  
*North China Electric Power University, China*

### TB3-2
13:15–13:30
**Vibration Suppression of the Flexible Manipulator Using Optimal Input Shaper and Linear Quadratic Regulator**
Hui Deng, Jun-Di Sun, Su-Dan Huang, Guang-Zhong Cao  
*Shenzhen University, China*

### TB3-3
13:30–13:45
**A Compound Virtual Fixture for Dexterous Space Teleoperation**
Zhengxiong Liu, Panfeng Huang, Zhenyu Lu, Jixiang Pan  
*Northwestern Polytechnic University, China*

### TB3-4
13:45–14:00
**Auxiliary Asymmetric Electronics and Telecommunications Research Institutec Dual-user Shared Control Method for Teleoperation**
Panfeng Huang, Zhenyu Lu  
*Northwestern Polytechnic University, China*

### TB3-5
14:00–14:15
**Kinesthetic Performance Analysis of Asymmetric Electronics and Telecommunications Research Institutec Dual-user Shared Teleoperation System**
Zhenyu Lu, Panfeng Huang  
*Northwestern Polytechnic University, China*

### TB4-1
13:00–13:15
**Balancing Arm Design for Variable Payload**
Jaehong Woo, Jong-tae Seo, Hoon Lim  
*Hanyang University, Korea*

### TB4-2
13:15–13:30
**A Preliminary Study on Joint to Joint Control Master Device for Single Port Laparoscopic Surgery Robot**
Seongbo Shim, Taehun Kang, Daekeun Ji, Jaesung Hong  
*Daegu Gyeongbuk Institute of Science & Technology, Korea*
TB4-3  13:30~13:45
Image-guided Robotic System for Radiofrequency Ablation of Large Liver Tumor with Single Incision
Bin Duan¹, Rong Wen¹, Chin-Boon Chng¹, Weiming Wang², Ping Liu², Jing Qin², Jonnathan Libao Peneyra¹,
Stephen Kin-Yong Chang³, Pheng-Ann Heng³, Chee-Kong Chui¹
¹National University of Singapore, Singapore, ²Chinese Academy of Sciences, China, ³National University Hospital, Singapore,
⁴The Chinese University of Hong Kong, Hong Kong

TB4-4  13:45~14:00
EMG-based Prosthetic Hand Control System Inspired by Missing-Hand Movement
Minsang Seo, Dukchan Yoon, Junghoon Kim, Youngjin Choi
Hanyang University, Korea

15:45~17:15 [TC1] Recognition  Room 303
Chair: Sungho Jo (KAIST, Korea)

TC1-1  15:45~16:45
[Invited] Unsupervised Object Discovery and Localization in Images and Videos
Minsu Cho, Suha Kwak, Ivan Laptev, Cordelia Schmid, Jean Ponce
Inria, France

TC1-2  16:45~17:00
Depth Silhouettes Context: A New Robust Feature for Human Tracking and Activity Recognition based on Embedded HHMs
AHMAD JALAL AHMAD JALAL¹, Shaharyar Kamal², Daijin Kim¹
¹Pohang University of Science and Technology, Korea, ²Kyung Hee University, Korea

TC1-3  17:00~17:15
Activity Recognition Using Eigen-joints based on HMM
Hao Xu, Yongcheol Lee, Chilwoo Lee
Chonnam National University, Korea

15:45~17:15 [TC2] Aerial Robotics + Poster Teaser 2-1  Room 304
Chair: Jaebyung Park (Chonbuk Univ., Korea)

TC2-1  15:45~16:15
[Invited] Unmanned Aerial System for First Responders
Zachary Cook, Lin Zhao, Jameson Lee¹, Woosoon Yim¹
¹University of Nevada, USA

TC2-2  16:15~16:30
Design of Quadrotor Controller for Emergency Situation using Xplane
Kyunghwan Cho¹, Jinok Shim², Taeyong Kuc¹
¹Sungkyunkwan University, Korea, ²Korea Institute of Industrial Technology, Korea

TC2-3  16:30~16:45
Remotely Controlled flight of an Insect-like Tailless Flapping-wing Micro Air Vehicle
Hoang Vu Phan, Hoon Cheol Park
Konkuk University, Korea
TC2-4
16:45~17:00
Unmanned Aerial Vehicle for Hot-spot Avoidance with Stereo FLIR Cameras
Zachary Cook, Lin Zhao, Jameson Lee, Woosoon Yim
University of Nevada, United States

P2-1~P2-14
17:00~17:14
Poster Teaser 2-1

15:45~17:15 [TC3] (OS 2-2) Intelligent Measurement, Diagnosis and Control + Poster Teaser 2-2

TC3-1
15:45~16:00
An Approach for Fall Detection of Older Population Based on Multi-sensor Data Fusion
Xiaodong Zhang
Xi’an Jiaotong University, China

TC3-2
16:00~16:15
A Novel Laser Ultrasonic Thickness Measurement Method for Metal Plate Based on Spectral Analysis
Yongqiang Liu, Shixi Yang, Chunbiao Gan
Zhejiang University, China

TC3-3
16:15~16:30
An Improved Artificial Potential Field-based Simultaneous FORward Search (Improved APF-based SIFORS) method for Robot Path Planning
Guanghui Li¹², Shuiguang Tong¹², Gang Lv¹, Renyuan Xiao¹, Feiyun Cong¹², Zheming Tong², Atsushi Yamashita³
¹Zhejiang University, China, ²Zigong Innovation Center of Zhejiang University, China, ³The University of Tokyo, Japan

TC3-4
16:30~16:45
Research on measurement for bending stress of gear with Fiber Bragg Grating (FBG) and optimization of FBG probe installation
Xindan Zhao, Hang Niu, Xiaodong Zhang
Xi’an Jiaotong University, China

P2-15~P2-28
16:45~16:59
Poster Teaser 2-2
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<td>TC4-1</td>
<td>15:45~16:00</td>
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<td>Design of variable compliance joint mechanism for legged robots</td>
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<td>Yoon Haeng Lee, Luong Tin Phan, Dong Youn Kim, Hyouk Ryol Choi</td>
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<td>Sungkyunkwan University, Korea</td>
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<td>TC4-2</td>
<td>16:00~16:15</td>
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<td>Design of backdrivable soft robotic finger mechanism</td>
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<td>Won Suk You, Young Hun Lee, Gitae Kang, Hyouk Ryol Choi</td>
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<td>Sungkyunkwan University, Suwon, Korea</td>
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<td>TC4-3</td>
<td>16:15~16:30</td>
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<td>Dynamic simulation of the robot manipulator for mobile based rescue robot</td>
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<td>Dong Il Park, Chanhun Park, Hwisu Kim, Joohan Park, Doohyung Kim</td>
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<td>Korea Institute of Machinery &amp; Materials, Korea</td>
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<td>TC4-4</td>
<td>16:30~16:45</td>
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<td>Evaluations of Involuntary Cross-modal Expressions on the Skin of a Communication Robot</td>
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<td>Xiaoshun Meng, Naoto Yoshida, Tomoko Yonezawa</td>
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<td>Kansai University, Japan</td>
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<tr>
<td>P2-29-P2-37, V2-1~V2-4</td>
<td>16:45~16:58</td>
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<td>Poster Teaser 2-3</td>
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<td>17:30~18:30</td>
<td>[V2] Video Session</td>
<td>Room 303</td>
<td>Chair: Ki-baek Lee (Kwangwoon Univ., Korea)</td>
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<tr>
<td>V2-1</td>
<td>17:30~17:45</td>
<td></td>
<td>On-Line Footstep Planning and Following for Humanoid Robots</td>
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<td>Ki-Baek Lee¹, Young-Dae Hong²</td>
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<td></td>
<td>¹Kwangwoon University, Korea, ²Kwangwoon University, Korea</td>
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<tr>
<td>V2-2</td>
<td>17:45~18:00</td>
<td></td>
<td>Line Tracking Control of a Mobile Robot Using EMG Signals from Human Hand Gestures</td>
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<td>Yeong Jae Kim, Hyun Seon Lee, Seul Jung</td>
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<td>Chungnam National University, Korea</td>
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<td>V2-3</td>
<td>18:00~18:15</td>
<td></td>
<td>Line Tracking Control Demonstration of a Master-slave Balancing Mobile Robot</td>
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<td>Hyun Woo Kim, Young Jun Park, Jun Won Yoon, Seul Jung</td>
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<td>Chungnam National University, Korea</td>
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<tr>
<td>V2-4</td>
<td>18:15~18:30</td>
<td></td>
<td>Autonomous Pick and Place Operations in Industrial Production</td>
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<td>Andreas Doemel, Simon Kriegel, Manuel Brucker, Michael Suppa</td>
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<td>German Aerospace Center (DLR), Germany</td>
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### Poster Session

**Foyer of Room 303, 304**

*17:30~18:30*

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<tr>
<th>P2-1</th>
<th>A Preliminary Result on the Passivity Boundary of the Inertia Scale Control for a Human Interactive Robot</th>
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<tr>
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<td>Kwangmin Kim, Juhyeok Kim, Myungsin Kim, Dongjun Lee</td>
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<td>Seoul National University, Korea</td>
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<th>Multiple Humans recognition of Robot aided by Perception Sensor Network</th>
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<td>Kijin An, Geunjae Lee, Sang-Seok Yun, JongSuk Choi</td>
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<td>Korea Institute of Science and Technology, Korea</td>
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<th>P2-3</th>
<th>Rich Feature Hierarchies from Omnidirectional RGB-DI Information for Pedestrian Detection</th>
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<td>Seokju Lee, Sung Sik Huh, Donggeun Yoo, In So Kweon, David Hyunchul Shim</td>
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<th>P2-4</th>
<th>Development of self-sensing Ionic Polymer-Metal Composite soft robotic actuator integrated with Gallium-Indium alloy</th>
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<td></td>
<td>Sarah Trabia¹, Viljar Palmre², Kwang Kim¹</td>
</tr>
<tr>
<td></td>
<td>¹University of Nevada, United States, ²University of Texas, United States</td>
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<th>P2-5</th>
<th>Human Age Estimation Using Multi-Class SVM</th>
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<td></td>
<td>Kyekyung Kim</td>
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<th>P2-6</th>
<th>A simultaneous robot service scheme for Multi-users</th>
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<tr>
<td></td>
<td>Geunjae Lee, Kijin An, Sang-Seok Yun, JongSuk Choi</td>
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<td>Korea Institute of Science and Technology, Korea</td>
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<th>P2-7</th>
<th>Fused Robot Pose Estimation using Embedded and External Cameras</th>
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<td></td>
<td>Kibaek Park, Hyowon Ha, Francois Rameau, In So Kweon</td>
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<th>Control of Cable-Driven Parallel Robot for Gait Rehabilitation</th>
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<td>Soheil Gharatappeh, Ghasem Abbasnejad, Jungwon Yoon, Hosu Lee</td>
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<td>YuKyung Choi, In So Kweon</td>
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<th>P2-10</th>
<th>Geometrical Calibration of Multispectral Calibration</th>
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<td>Namil Kim, Yunkyung Choi, Soonmin Hwang, Kibaek Park, Jae Shin Yoon, In So Kweon</td>
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<th>P2-11</th>
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<td>Wancheol Myeong, Kwangyik Jung, Sungwook Jung, Yonghoon Jung</td>
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<td>Hyung-Soon Park¹, Sang Hoon Chae¹, Jung Won Yoon², Jonghyun Kim³, Amanda Sudduth⁴, Christopher Stanley⁵</td>
</tr>
<tr>
<td></td>
<td>¹KAIST, Korea, ²Gyeongsang National University, Korea, ³Daegu Gyeongbuk Institute of Science &amp; Technology, Korea, ⁴National Institutes of Health, USA</td>
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<th>P2-13</th>
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<td>Jeong-Yeun Yang, Dong-Soo Kwon</td>
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P2-14  Markerless Human Body Pose Estimation from Consumer Depth Cameras for Simulator
Dong-jin Lee, Chan-kyu Park, Su-young Chi, Ho-sub Yoon, Jae-hong Kim
Electronics and Telecommunications Research Institute, Korea

P2-15  Robot Localization Method Using Multi-PTS Cameras and Wi-Fi Receiver
Yu-Cheol Lee
Electronics and Telecommunications Research Institute, Korea

P2-16  Analysis of Children’s Posture for the Bodily Kinesthetic Test
Dongjin Lee, Woo-han Yun, Chan-kyu Park, Ho-sub Yoon, Jae-hong Kim
Electronics and Telecommunications Research Institute, Korea

P2-17  A Software Framework Design for Social Human-Robot Interaction
Minsu Jang¹, Jaehong Kim¹, Byeong-Kyu Ahn²
¹Electronics and Telecommunications Research Institute, Korea, ²KITECH, Korea

P2-18  A Method of Map Updating for Global Path Planning of a Robot
Seunghwan Park, Jaeil Cho
Electronics and Telecommunications Research Institute, Korea

P2-19  Quadruped Bounding with a Passive Compliant Spine
Luong Tin Phan, Yoon Haeng Lee, Dong Youn Kim, Hyouk Ryeol Choi
Sungkyunkwan University, Korea

P2-20  Development of a Portable Forearm Mirror Image Rehabilitation Device
Seulki Kyeong, Gwang Min Gu, Gwang Min Gu
KAIST, Korea

P2-21  Development of a Remote Maintenance Manipulation Tool in the PRIDE Ar Cell
Jonghui Han, Jong Kwang Lee, Byung Suk Park, Il-Je Cho, Kiho Kim
Korea Atomic Energy Research Institute, Korea

P2-22  Synthetic SAR/IR Database Generation for sensor fusion-based A.T.R.
Jin-Ju Won, Sungho Kim
Yeungnam University, Korea

P2-23  2-D Cooperative Localization with Omni-Directional Mobile Robots
Changu Kim, Hyunsoo Yang, Dongho Kang, Dongjun Lee
Seoul National University, Korea

P2-24  Proposal of a behavior model for information support with Ubiquitous Display
Tomonobu Neguchi, Misaki Kasetani, Hirotake Yamazoe, Joo-Ho Lee
Ritsumeikan University, Japan

P2-25  Initial Investigation of Gravity and Friction Compensation of 2-DOF Robot Manipulator for Programming by Demonstration
Min-Gyu Kim, In-Gyu Park
Korea Institute of Robot and Convergence, Korea

P2-26  Low-Cost Synchronization for Multispectral Cameras
Soonmin Hwang, Yukyung Choi, Namil Kim, Kibaek Park, Jae Shin Yoon and In So Kweon
KAIST, Korea

P2-27  A Socially Interactive Robot using Social Skills in Physical Training
Cheonshu Park¹, Daeha Lee¹, Minsu Jang¹, Jaehong Kim¹, Ji-Hoon Kang²
¹Electronics and Telecommunications Research Institute, Korea, ²Chungnam National University, Korea
P2-28 Towards Analysis and Control of Vibration Driven Robotic Mechanism
Woong YeoJ Joe
Tennessee State University, United States

P2-29 Artificial Landmark for Vision-based SLAM of Water Pipe Rehabilitation Robot
Dong Yeop Kim, Joonwan Kim, Insoo Kim, Seewoon Jun
Korea Electronics Technology Institute, Korea

P2-30 Design of Control and Simulation Using Surgical Instrument of Manipulability
Jung-Hoon Hwang, Chang-Woo Park, Geon Won
Korea Electronics Technology Institute, Korea

P2-31 Individual Detection-Tracking-Recognition using Depth Activity Images
Ahmad Jalal1, Shaharyar Kamal2, Daijin Kim1
1Pohang University of Science and Technology, Korea, 2Kyung Hee University, Korea

P2-32 Determining ARMA Model Parameters for Biomedical Signal Applications based on Estimation of the Equivalent AR Model
Junho Park, Geon Lee, Youngjin Choi
Hanyang University, Korea

P2-33 Joint Learning for Smooth Pursuit Eye Movement and Motion Parallax Through Active Efficient Coding
Tanapol Prucksakorn, Sungmoon Jeong, Nak Young Chong
Japan Advanced Institute of Science and Technology, Japan

P2-34 Position Estimation Using Multiple Low-Cost GPS Receivers For Outdoor Mobile Robots
Woosik Lee, Wookjin Chung
Korea University, Korea

P2-35 Preliminary Research on Robust Leg-Tracking Indoor Mobile Robots by Combining the Kinect and the Laser Range Finder Information
Hyojoo Cho, Wookjin Chung
Korea University, Korea

P2-36 Optimization of Fish-like Locomotion using Hierarchical Reinforcement Learning
Jeonghyeon Wang, Jinwhan Kim
KAIST, Korea

P2-37 Design of commercial master controller emulator for operating the underwater manipulator
Gihyeon Lee, Jinhyun Kim
Seoul National University of Science & Technology, Korea
### Technical Program

**Friday, October 30**

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<th>Title</th>
<th>Authors</th>
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<td>09:00~10:30</td>
<td>FA1</td>
<td>303</td>
<td>(OS 4) Intelligent Mobile or Field Robot Technology</td>
<td>Chair: Min Cheol Lee (Pusan National University, Korea)</td>
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<tr>
<td>FA1-1</td>
<td>09:00~09:15</td>
<td></td>
<td>Adaptive Neural Network Based PI Sliding Mode Control of Nonholonomic Mobile Robot</td>
<td>Yu-Dong Zhao, Hyun-Wook Ha, Dong-Eon Kim, Jang-Myung Lee (Pusan National University, Korea)</td>
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<td>FA1-2</td>
<td>09:15~09:30</td>
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<td>The Proposal of Automatic Task Parameter Setting System for Polishing Robot</td>
<td>Naoya Kurihara¹, Shota Yamazaki¹, Takashi Yoshimi¹, Takeyoshi Eguchi², Hiroki Murakami² (¹Shibaura Institute of Technology, Japan, ²IHI Corporation, Japan)</td>
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<td>FA1-3</td>
<td>09:30~09:45</td>
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<td>Visibility and Survivability Map based Path Planning and Its Simulation</td>
<td>Beom Seok Cho, Se Hong Park, Min Cheol Lee (Pusan National University, Korea)</td>
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<td>FA1-4</td>
<td>09:45~10:00</td>
<td></td>
<td>Combinatorial Approach for Lane Detection using Image and LIDAR Reflectance</td>
<td>Seunghak Shin, Inwook Shim, In So Kweon (KAIST, Korea)</td>
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<td>FA1-5</td>
<td>10:00~10:15</td>
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<td>Study of Object Segmentation using 3D Laser Range Finder (LRF)</td>
<td>Young-Geun Moon¹, Seok-Jo Go², Min-Cheol Lee¹ (¹Pusan National University, Korea, ²Pusan National University, Korea)</td>
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<td>FA1-6</td>
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<td>Balancing and Driving Control of a Ball Robot using Fuzzy Control</td>
<td>You Yunong, Hwi-Myung Ha, Yun-Ki Kim, Jang-Myung Lee (Pusan National University, Korea)</td>
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<td>09:00~10:30</td>
<td>FA2</td>
<td>304</td>
<td>(OS 5) Deep Learning for Robotics and Computer Vision</td>
<td>Chair: Junmo Kim (KAIST, Korea)</td>
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<td>FA2-1</td>
<td>09:00~09:20</td>
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<td>Rotating Your Face Using Multi-task Deep Neural Network</td>
<td>Junho Yim¹, Heechul Jung¹, Byungin Yoo¹,², Changkyu Choi², Dusik Park², Junmo Kim¹ (¹KAIST, Korea, ²Samsung Advanced Institute of Technology, Korea)</td>
</tr>
<tr>
<td>FA2-2</td>
<td>09:20~09:40</td>
<td></td>
<td>Multi-scale Pyramid Pooling for Deep Convolutional Representation</td>
<td>Donggeun Yoo, Sunggyun Park, Joon-Young Lee, In So Kweon (KAIST, Korea)</td>
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Learning Deconvolution Network for Semantic Segmentation
Hyeonwoo Noh, Seunghoon Hong, Seunghoon Hong, Bohyung Han
Pohang University of Science and Technology, Korea

Development of a UAV-type jellyfish monitoring system using deep learning
Hangeun Kim1, Donghoon Kim1, Sungwook Jung1, Jungmo Koo1, Jae-Uk Shin2, Hyun Myung1
1KAIST, Korea, 2Rastech Inc., Korea

14:15~15:45 [FB1] Robot Navigation
Chair: Jae-Yeong Lee (Electronics and Telecommunications Research Institute, Korea)
Takashi Kubota (JAXA, Japan)

FB1-1 14:15~14:45 [Invited] Robotics Technology for Deep Space Exploration
Takashi Kubota
JAXA, Japan

FB1-2 14:45~15:00 Adaptive Estimation of Error Sigma Using Cumulative Density Ratio Test in RANSAC
Jae-Yeong Lee
Electronics and Telecommunications Research Institute, Korea

FB1-3 15:00~15:15 Pedestrian-following service robot applications using chance-constrained target tracking
Jinyoung Choi, Sunwoo Lee, Yoonseon Oh, Songhwai Oh
Seoul National University, Korea

FB1-4 15:15~15:30 Navigation Method of PLC Based Mobile Robot
SEHA SAFFAR, FAIRUL AZNI JAFAR, SYAHRIL ANUAR IDRIS
UNIVERSITI TEKNIKAL MALAYSIA MELAKA, Malaysia

FB1-5 15:30~15:45 Dynamic Object Tracking System
Daesung Jeon, Chung-kyeom Kim, Jaehwan Kim
Advanced Institutes of Convergence Technology, Korea
14:15~15:45  [FB2] (OS 6) Micro-/Nano-technology for microrobots and biomedical applications  

Room 305

Chair : Hongsoo Choi (DGIST, Korea)

FB2-1  14:15~14:30  
Design concept of a micro robot delivery system  
Hyo-Jeong Cha, Byung-Ju Yi  
Hanyang University, Korea

FB2-2  14:30~14:45  
Feedback Control of Three-Bead Achiral Robotic Microswimmers  
U Kei Cheang, Hyeon Kim, Dejan Milutinović, Jongeun Choi, Louis Rogowski, and Min Jun Kim  
1Drexel University, USA, 2University of California, USA, 3Michigan State University, USA

FB2-3  14:45~15:00  
Fabrication and Targeted Particle Delivery using Microrobots  
Seungmin Lee, Sangwon Kim, Bradley J. Nelson, Hongsoo Choi  
1DGIST, Korea, 2DGIST, Korea, 3Institute of Robotics and Intelligent System, Switzerland

FB2-4  15:00~15:15  
Scaffold-type microrobots for targeted cell delivery  
Sangwon Kim, Shinwon Ha, Seungmin Lee, Famin Qiu, Hongsoo Choi, Bradley J. Nelson  
1Daegu Gyeongbuk Institute of Science and Technology, Korea, 2Daegu Gyeongbuk Institute of Science and Technology, Korea, 3Institute of Robotics and Intelligent System, Switzerland, 4DGIST-ETH Microrobot Research Center, Korea

FB2-5  15:15~15:30  
An Electromagnetic Steering System for Magnetic Nanoparticle Drug Delivery  
Ton Duc Do, Yeongil Noh, Myeong Ok Kim, Jungwon Yoon  
Gyeongsang National University, Korea

16:00~17:30  [FC1] (OS 7) Coexistence Space: Scene Understanding and Interaction  

Room 303

Chair : Jun-Sik Kim (Korea Institute of Science and Technology, Korea)

FC1-1  16:00~16:15  
Multi-body ICP: Motion Segmentation of Rigid Objects on Dense Point Clouds  
Youngji Kim, Hwasup Lim, Sang Chul Ahn  
Korea Institute of Science and Technology, Korea

FC1-2  16:15~16:30  
Detection and Utilization of Vertical Intersection in Feature-less Environment with RGB-Depth Sensor  
Hyunga Choi, Suyong Yeon, Nakju Lett Doh  
Korea University, Korea

FC1-3  16:30~16:45  
Distant 3D Object Grasping with Gaze-supported Selection  
Kunhee Ryu, Wonsang Hwang, Joong-Jae Lee, Jun-Sik Kim, Jung-Min Park  
1Korea Institute of Science and Technology, Korea, 2Center of Human-centered Interaction for Coexistence, Korea

FC1-4  16:45~17:00  
A Hand-based Collaboration Framework in Egocentric Coexistence Reality  
Jeongmin Yu, Seungtaek Noh, Youngkyoon Jang, Gabyong Park, Woontack Woo  
1KAIST CTRI, Korea, 2KAIST UVR Lab., Korea
**FC1-5**
17:00~17:15
**Control and applications of smart projector based tele-presence robot**
Dae-Keun Yoon, Shin-Young Kim, Jai-Hi Cho, Ji-Yong Lee, Jung-Heum Kwon, Kwang-Kyu Lee, Bum-Jae You
Center of Human-centered Interaction for Coexistence, Korea

**FC1-6**
17:15~17:30
**Editing and Synthesizing Two-Character Motions using a Coupled Inverted Pendulum Model**
Il Hong Suh
Hanyang University, Korea

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**16:00~17:30 [FC2] Humanoid Robots & Teleoperation  Room 304**

Chair : Jaeheung Park (SNU, Korea)
Takashi Yoshimi (Shibaura Institute of Technology, Japan)

**FC2-1**
16:00~16:15
**Effect of Kinesthetic Coupling in Cooperative Teleoperation**
Tae-Hwan Kim, Naveed Ahmed Usmani, Jee-Hwan Ryu
Korea University of Technology and Education, Korea

**FC2-2**
16:15~16:30
**Software Architecture for Humanoid Robots with Versatile Task Performing Capabilities**
Hyeong-Seok Jeon, Yong-Jun Jeong, Deok-Won Lee, Chang-Hyun Oh, Lo-Un Lee, Hyun-Min Kwon, Ki-Won Oh, Yong-Jae Kim
Korea University of Technology and Education, Korea

**FC2-3**
16:30~16:45
**Selective Dimensional Admittance Control for Versatile Manipulation**
Deok-Won Lee, Hyun-Min Kwon, Hyeong-Seok Jeon, Yong-Jun Jeong, Chang-Hyun Oh, Lo-Un Lee, Ki-Won Oh, Yong-Jae Kim
Korea University of Technology and Education, Korea

**FC2-4**
16:45~17:00
**Wall Cutting Strategy for Circular Hole Using Humanoid Robot**
Beomyeong Park, Hyunbum Cho, Wonje Choi, Jaeheung Park
Seoul National University, Korea

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**16:00~17:30 [FC3] (OS 8) Robot Vision and Applications  Room 305**

Chair : Youngbae Hwang (KETI, Korea)

**FC3-1**
16:00~16:15
**Automated Detection Target using K-means based on Per-Norm for Invariant Illumination in Hyperspectral Image**
Heekang Kim, Sungho Kim
Yeungnam University, Korea

**FC3-2**
16:15~16:30
**Confidence-based Weighted Median Filter for Effective Disparity Map Refinement**
Se-Hoon Park, Min-Gyu Park, Kuk-Jin Yoon
Gwangju Institute of Science and Technology, Korea
**FC3-3**  16:30~16:45  
**Automatic Keystone Correction using a Single Camera**  
Youngbae Hwang, Byeonho Choi, Jungho Kim  
Korea Electronics Technology Institute, Korea

**FC3-4**  16:45~17:00  
**Fast and Robust Rotation Invariant Object Detection with Joint Color Channel and Hierarchical Binary Pattern**  
Insu Kim¹, Jaewon Sung², Dongsung Lee³, Dajin Kim¹  
¹Pohang University of Science and Technology, Korea, ²Samsung S1 Cooperation, Korea

**FC3-5**  17:00~17:15  
**Robust visual tracking through deep learning-based confidence evaluation**  
Euntae Hong, Juhan Bae, Jongwoo Lim  
Hanyang University, Korea

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**16:00~17:30 [FC4] HRI**  
**Room 306**  
Chair: Je Ha Ryu (JIST, Korea)

**FC4-1**  16:00-16:30  
[Intervted] Incremental Robot Skill Learning by Human Motion Retargetting and Physical Human Guidance  
Dongheui Lee  
Technische Universität München (TUM), Germany

**FC4-2**  16:30-16:45  
**The Analysis of Decoding Parameter Selection of Hand Movements Based on Brain Function Network**  
Jinhua Zhang, Baozeng Wang, Jun Hong, Ting Li  
School of Mechanical Engineering, China

**FC4-3**  16:45-17:00  
**An Empirical Study of Rendering Sinusoidal Textures on A Ultrasonic Variable-Friction Haptic Surface**  
Joohyun Kim¹,², Kwon Joong Son², Keehoon Kim³  
¹University of Science and Technology, Korea, ²Hongik University, Korea, ³Korea Institute of Science and Technology, Korea

**FC4-4**  17:00-17:15  
**Preliminary Results of Force/Torque Sensorless Impedance Control for Walkbot**  
Quoc Van Tran¹, Sehun Kim¹, Kyunghwan Lee², Jeha Ryu¹  
¹Gwangju Institute of Science and Technology, Korea, ²P&S Mechanics Co., Ltd., Korea

**FC4-5**  17:15-17:30  
**Wearable lower limb biomechanics measurement system for gait analysis during walking and ascending stair**  
Junghoon Park, Youngjin Na, Jung Kim  
KAIST, Korea