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Namiko Kimura-Nomoto(Kagoshima University), Takako Okawachi,Etsuro Nozoe(Kagoshima  
University), Norifumi Nakamura(Kagoshima University)*
- WC6.2** **407**  
**Image Registration Method of Spine Region in CT Images considering Saggital plane**  
*Yuki Yamashita (Kyushu Institute of Technology)\*; Tohru Kamiya (Kyushu Institute of Technology)*
- WC6.3** **411**  
**Image Registration Method from LDCT Image Using FFD Algorithm**  
*Chika Tanaka (Kyushu Institute of Technology)\*; Tohru Kamiya (Kyushu Institute of Technology)*
- WC6.4** **415**  
**Identification of normal and abnormal from ultrasound images of power devices using VGG16**  
*toui ogawa (kyushu institute of technology)\*; Tohru Kamiya (Kyushu Institute of Technology)*
- WC6.5** **419**  
**Object Recognition from Spherical Camera Images Based on YOLOv3**  
*Tomohiro Kai (Kyushu Institute of Technology)\*; Tohru Kamiya (Kyushu Institute of Technology)*
- WC6.6** **423**  
**Automatic Classification of Respiratory Sounds Considering Time Series Information Based on VGG16 with LSTM**  
*Naoki Asatani (Kyushu Institute of Technology)\*; Tohru Kamiya (Kyushu Institute of Technology)*

## TA1 Information and Intelligent Systems

Room 1, 10:30~12:00

Chair: Dr. Jin Gyu Lee (University of Cambridge), UK

### TA1.1

427

#### Training Deep Neural Networks with Synthetic Data for Off-Road Vehicle Detection

*Eunchong Kim (Agency for Defense Development)\*; Kanghyun Park (Agency for Defense Development); Hunmin Yang (Agency for Defense Development); Se-Yoon Oh (Agency for Defense Development)*

### TA1.2

432

#### Hand Detector based on Efficient and Lightweight Convolutional Neural Network

*Duy-Linh Nguyen (University of Ulsan)\*; Muhamad Dwisnanto Putro (University of Ulsan); Kang-Hyun Jo (University of Ulsan)*

### TA1.3

437

#### Analysis of Electric Current by Using MySQL Database on Web Server for Machine Performance Evaluation: A Case Study of Air Conditioning System

*Witsarut Sriratana (King Mongkut's Institute of Technology Ladkrabang (KMITL))\*; Vittaya Khagwian (King Mongkut's Institute of Technology Ladkrabang (KMITL)); Sutham Sattthamsakul (King Mongkut's Institute of Technology Ladkrabang (KMITL))*

### TA1.4

443

#### Comparison of motor fault diagnosis performance using RNN and K-means for data with disturbance

*Dongjin Choi (Hoseo University)\**

## TA2 Mechatronics & Automation I

Room 2, 10:30~12:00

Chair: Prof. Sehoon Oh (DGIST), Korea

### TA2.1

447

#### Robotic Stage for Human Balance Disorder Assessment

*Kangwagye Samuel (DGIST)\*; Sehoon Oh (DGIST)*

### TA2.2

453

#### 2D Lidar Enhanced Direct Sparse Odometry for Scale Recovery

*Jongsik Moon (Nearthlab)\*; Byung-Yoon Lee (NearthLab)*

### TA2.3

457

#### Contact Type Thread Tester for Tap Inspection Automation

*Jeonghyeon Kim (Hongik University); Sangwon Choi (Hongik University); Jaekuk Choi (Hongik University); Dongsun Lim (Hongik University); Jonghoek Kim (Hongik University)\**



**TA2.4** **463**  
**Kinematic Modeling of Spherical Rolling Robots with a Three-Omnidirectional-Wheel Drive Mechanism**  
*Pham Dinh Ba (Vietnam maritime University)\*; Quoc Dong Hoang (Kyung Hee); Soon-Geul Lee (Kyung Hee University); Thanh Hai Nguyen (Sejong University); Duong Xuan Quang (Sejong University); Boi Chau Tham (Vietnam maritime university)*

**TA2.5** **467**  
**Vibration reduction effect of a counterbalance feed drive with right and left ball screws and its investigation in small-diameter drilling operations**  
*Atsushi Kobayashi (Doshisha University)\**

**TA2.6** **473**  
**Testing and Evaluation of Foldable Biopsy Tools for Active Capsule Endoscope**  
*Hernando Leon-Rodriguez (Nueva Granada Military University)\**

### **TA3 Power Control and Energy Systems**

Room 3, 10:30~12:00

Chair: Dr. Dongwook Lee (KIMM), Korea

**TA3.1** **480**  
**Simple LVDT Demodulator**  
*Apinai Rerkratn (Faculty of Engineering, King Mongkut's Institute of Technology Ladkrabang)\*; Amata Luangpol (Faculty of Engineering, King Mongkut's Institute of Technology Ladkrabang); Wandee Petchmaneelumka (King Mongkut's Institute of Technology Ladkrabang); Vanchai Riewruja (Faculty of Engineering, King Mongkut's Institute of Technology Ladkrabang)*

**TA3.2** **484**  
**An Anti-windup Integral Regulator for a DC-DC Boost Power Converter**  
*Javier Moreno-Valenzuela (Instituto Politecnico Nacional-CITEDI)\**

**TA3.3** **490**  
**Model-based analysis of the hysteresis curve of an electric power steering system**  
*Dongwook Lee (KIMM)\*; Kyung-Soo Kim (KAIST); Minwoo Han (Hyundai R&D center)*

**TA3.4** **496**  
**Electrical Analysis about internal short circuit using additional resistance in high energy lithium-ion battery**  
*Seungyun Han(Chungnam National University), Changki Choi(Chungnam National University), Sanguk Kwon(Chungnam National University), Seongjun Lee(Chosun University), Jonghoon Kim(Chungnam National University)*

**TA3.5** **499**  
**Hardware Design Approach for Realization of a Smart Battery Charging/Discharging Strategy in Solar E-bikes**  
*Dania Batool(Chungnam National University), Mazhar Abbas(Chungnam National University), Zineb Cabrane(Chungnam National University), Jonghoon Kim(Chungnam National University)*

## TA4 Sliding Mode Control and Stability Analysis

Room 4, 10:30~12:00

Chair: Prof. Yoonsoo Kim (Gyeongsang National University), Korea

### TA4.1

N/A

#### **Disturbance Observer-Based Continuous Super-Twisting Sliding Mode Control for Systems with Additive Mismatched Disturbances**

*Ngo Phong Nguyen (UNIST)\*; Hyondong Oh (UNIST); Yoonsoo Kim (Gyeongsang National University); Jun Moon (UOS)*

### TA4.2

508

#### **Robust Motion Control using Novel First Order Sliding Modes**

*Akash A Panhale (College of Engineering Pune)\*; Shailaja Ravindra Kurode (University)*

### TA4.3

N/A

#### **High Order Sliding Mode Observer based Nonlinear Gain Sliding Mode Controller for Permanent Magnet Synchronous Motors under Disturbance**

*jeonghwan Gil (Chung-Ang)\*; Sesun You (Chung-Ang University); Wonhee Kim (Chung-Ang University)*

### TA4.4

519

#### **Adaptive Neural Network Sliding Mode Control for an Unmanned Surface Vessels**

*Tuan Duc Pham (Kyung Hee University)\*; Jong Gyu Park (Kyung Hee University); Soon-Geul Lee (Kyung Hee University); Quoc Dong Hoang (Kyung Hee)*

## TA5 (Focused Track 1) Network and Multi-agent Systems I

Room 5, 10:30~12:00

Chair: Prof. Takeshi Hatanaka (Tokyo Institute of Technology), Japan

### TA5.1

524

#### **Distance-Based Formation Tracking with Unknown Bounded Reference Velocities**

*Dung Vu (Hanoi University of Science and Technology); Minh Hoang Trinh (Hanoi University of Science and Technology)\*; Hyo-Sung Ahn (Gwangju Institute of Science and Technology)*

### TA5.2

#### **An Overview of Biological Data Based Studies of Bird Flocking**

*Shiyu Zhao (Westlake University)\**

### TA5.3

#### **Distributed average tracking in multi-agent systems**

*Fei Chen (Northeastern University)\**

### TA5.4

N/A

#### **On Architectural Analogy between ADMM and Bilateral Teleoperation**

*Takeshi Hatanaka (Tokyo Institute of Technology)\**

TA5.5

533

**Improved bounds on the stability margin of dynamical networks**

*Vahid Hamdipoor (Gyeongsang National University)\*; Yoonsoo Kim (Gyeongsang National University)*

TA5.6

**Distributed control of ring-coupled unicycles: From cyclic pursuit to target enclosing**

*Ronghao Zheng (Zhejiang University)\**

**TA6 (OS) Optimization and Learning based Control**

Room 6, 10:30~12:00

Chair: Prof. Jun Moon (Hanyang University), Korea

TA6.1

N/A

**Blended dynamics approach for analysis and construction of distributed optimization algorithms**

*Seungjoon Lee (Seoul National University)\*; Hyungbo Shim (Seoul National University)*

TA6.2

N/A

**Adaptive Neural Network Control via Backstepping for Permanent Magnet Synchronous Motors**

*Sesun You (Chung-Ang University)\*; Jeonghwan Gil (Chung-Ang University); Wonhee Kim (Chung-Ang University)*

TA6.3

N/A

**Soft Actor-Critic Algorithm based Deep Reinforcement Learning for Navigation and Tracking Control of UAVs**

*Myoung Hoon Lee (Ulsan National Institute of Science and Technology)\*; Yoonsoo Kim (Gyeongsang National University); Jin-Ho Chung (Ulsan National Institute of Science and Technology); Jun Moon (UOS)*

TA6.4

N/A

**Design of Neural Network One Step Predictive Control for DC-DC Buck Converter**

*Jaeyun Yim (Chung-Ang University)\*; Jeonghwan Gil (Chung-Ang University); Chunghun Kim (Pai-Chai University); Wonhee Kim (Chung-Ang University)*

TA6.5

N/A

**Gaussian Process Approximate Dynamic Programming for Energy Management of Parallel Hybrid Electric Vehicles**

*Kwangki Kim (Inha Univ.)\*; Jin Woo Bae (Inha University); Dohee Kim (Hyundai Motor Company); Jeongsoo Eo (Hyundai Motor Company)*

**TB1 Sensors and Signal Processing I**

Room 1, 13:20~14:50

Chair: Dr. Taekyoo Kim (Seoul National University), Korea

**TB1.1** **565**  
**ROBUST TRAFFIC LIGHT DETECTION AND CLASSIFICATION UNDER DAY AND NIGHT CONDITIONS**  
*Vinh Dinh Nguyen (Eastern International University)\*; Phuc Nguyen Manh (Eastern International University); Vu Nguyen Cong (Eastern International University); Son Nguyen Ngoc (Eastern International University); Linh Dao Thi My Linh (Eastern International University); Ha Nguyen Xuan (Sungkyunkwan University)*

**TB1.2** **571**  
**Diagnosis of motor aging through cnn model using signal correlation**  
*Ji-Hoon Han (Hoseo university)\**

**TB1.3** **576**  
**Robust Extrinsic Calibration for Arbitrarily Configured Dual 3D Lidars using a Single Planar Board**  
*Junha Kim (Seoul National University)\*; Changhyeon Kim (Seoul National University); Hyoun Jin Kim (Seoul National University)*

**TB1.4** **581**  
**Optical Image Modulation Based Parallax Generator for Monocular Visual Odometry**  
*Minyoung Lee (Korea Institute of Machinery and Materials)\*; Kyung-Soo Kim (KAIST)*

## **TB2 Mechatronics & Automation II**

Room 2, 13:20~14:50

Chair: Prof. Seul Jung (Chungnam National University), Korea

**TB2.1** **586**  
**Design and Development of a Novel Bio-inspired Worm-type Soft Robot for In-pipe Locomotion**  
*Jalitha Dewapura (Department of Mechanical Engineering, University of Moratuwa); Pasindu Hemachandra (Department of Mechanical Engineering, University of Moratuwa); Tharindu Dananjaya (Department of Mechanical Engineering, University of Moratuwa); Isira A Vithanage (Department of Mechanical Engineering, University of Moratuwa); Ashan T Wanasinghe (Department of Mechanical Engineering, University of Moratuwa)\*; Asitha L Kulasekera (Department of Mechanical Engineering, University of Moratuwa); Damith Chathuranga (Department of Mechanical Engineering, University of Moratuwa); Palitha Dassanayake (Department of Mechanical Engineering, University of Moratuwa)*

**TB2.2** **592**  
**A De-risked Bio-inspired Condylar Prosthetic Knee Joint for a Robotic Leg Test Rig**  
*Aghil Jafari (University of the West of England)\*; Subham Agrawal ( University of the West of England); Chathura Simasinghe ( University of the West of England); Appolinaire Etoundi (University of the West of England); Jun Jie Chong (Newcastle University in Singapore)*

**TB2.3** **N/A**  
**Optimal Design of Spiral Spring for Elastic Actuator: Case Study and Experiment**  
*kyeongsik Shin (DGIST)\*; Sehoon Oh (DGIST)*

## TB2.4

603

### **A Unified Approach of Denavit-Hartenberg Representation to Kinematics Equations of Two-wheel Mobile Robots for Undergraduate Robotics Education**

*Seul Jung (Chungnam National University)\*; Yeonggeol Bae (AIControl); Jeonghyung Lee (STX); Hyungjik Lee (Mando); Hyunwook Kim (LIG nex1)*

## **TB3 Noise Control and Industrial Applications of Control**

Room 3, 13:20~14:50

Chair: Prof. Won Hee Kim (Chung-Ang University), Korea

### TB3.1

608

#### **Grasping System for Industrial Application Using Point Cloud-Based Clustering**

*Joon-Hyup Bae (Korea University); HyunJun Jo (Korea University); Da-Wit Kim (Korea University); Jae-Bok Song (Korea Univ)\**

### TB3.2

612

#### **Provably Safe Real-Time Receding Horizon Trajectory Planning for Linear Time-Invariant Systems**

*Inkyu Jang (Seoul National University)\*; Dongjae Lee (Seoul National University); Hyoun Jin Kim (Seoul National University)*

### TB3.3

617

#### **Novel active noise control based on a robust filtered-x normalized least mean square sign algorithm against large measurement and impulsive noises**

*Dong Woo Kim (POSTECH)\*; PooGyeon Park (POSTECH); Chan Park (POSTECH); JunHui Lee (POSTECH); Hyeon-Woo Na (POSTECH)*

### TB3.4

622

#### **Active noise control algorithm robust to noisy inputs and measurement impulsive noises**

*Taesu Park (POSTECH)\*; PooGyeon Park (POSTECH); Minsu Kim (POSTECH); Minseon Gwak (POSTECH); Taesung Cho (POSTECH)*

### TB3.5

N/A

#### **Extended-state Observer based Torque Control Using Only Torsion-bar feedback for Electric Power Steering System**

*Gwanyeon Kim (Chung-Ang Univ.)\*; Sesun You (Chung-Ang University); jeonghwan Gil (Chung-Ang); Wonhee Kim (Chung-Ang University)*

## **TB4 Estimation and Systems Identification**

Room 4, 13:20~14:50

Chair: Prof. Jin Woo Song (Sejong University), Korea

### TB4.1

631

#### **Evolutionary box particle filter for nonlinear estimation**

*Suktae Kang (University of Science and Technology)\**

**TB4.2** 637  
**Nonlinear Kalman Filter by Hermite-Gauss Quadrature**  
*Petr Husek (Czech Technical University in Prague)\**

**TB4.3** 643  
**State Estimation for Polysolenoid Linear Motor based on an Adaptive Unscented Kalman Filter with Unknown Load and Measurement Noises**  
*Hoang Anh Tran (Sejong University)\*; Hoang Viet Do (Sejong University); Jin Woo Song (Sejong University)*

**TB4.4** 648  
**State of charge and State of health estimation method based on measurement fusion and dual extended Kalman filter for combining the inhomogeneity of cell characteristics**  
*Jinhyeong Park(Chungnam National University), Woonki Na(California State University), Jonghoon Kim(Chungnam National University)*

**TB4.5** 652  
**Bias Compensated Least Mean Mixed-norm Adaptive Filtering Algorithm Robust to Impulsive Noises**  
*Minho Lee (Pohang university of science and technology)\*; In Seok Park (Pohang university of science and technology); Chan-eun Park (Pohang university of science and technology); Hosub Lee (Pohang university of science and technology); PooGyeon Park (POSTECH)*

**TB4.6** 658  
**Online Motion-Artifact Removal in fNIRS Signals: Combined Square-Root Cubature Kalman Filter and Weighted Moving Average Model Approach**  
*Ruisen Huang (Pusan National University)\*; Dalin Yang (Pusan national university); Qiang Kun Qing (Pusan National University); Keum-Shik Hong (Pusan National University)*

## **TB5 (Focused Track 1) Network and Multi-agent Systems II**

Room 5, 13:20~14:50

Chair: Prof. Shun-ichi Azuma (Nagoya University), Japan

**TB5.1** 664  
**Mathematical Properties of Maximum Hands-off Control**  
*Masaaki Nagahara (The Univ. of Kitakyushu)\**

**TB5.2**  
**Distributed Computation of Median**  
*Hyungbo Shim (Seoul National University)\**

**TB5.3**  
**Structural Stability Analysis of Boolean Networks**  
*Shun-ichi Azuma (Nagoya University)\**

**TB5.4** N/A  
**Formation Control of Multi-Agent Systems with Relative Measurements through Group and Graph Theoretic Approach**  
*Kazunori Sakurama (Kyoto University)\**

**TB5.5** 670  
**Synchronization of nonlinear multi-agent systems via exact feedback linearization**  
*Branislav Rehak (Department of Control Theory, The Czech Academy of Sciences, Institute of Information Theory and Automation)\*; Volodymyr Lynnyk (Department of Control Theory, The Czech Academy of Sciences, Institute of Information Theory and Automation)*

**TB5.6**  
**Output Consensus of Linear Multi-Agent Systems via Event-Triggered Control**  
*Lu Liu (City University of Hong Kong)*

## **TB6 (OS) Intelligent Systems and Applications**

Room 6, 13:20~14:50

Chair: Prof. Young Soo Suh (Ulsan University), Korea

**TB6.1** 678  
**On sampled-data control synthesis of Markovian jump systems with actuator faults**  
*Sung Hyun Kim (University of Ulsan); Khanh Hieu Nguyen (University of Ulsan)\**

**TB6.2** N/A  
**Human Gait Estimation using a Dual Foot-mounted IMU and a 2D LiDAR**  
*Huu Toan Duong (University of Ulsan); Young Soo Suh (Univ. of Ulsan)\**

**TB6.3** N/A  
**Inspection System for Detecting Atypical Defects of Shoe Upper Stitch**  
*JUNGHO KANG (Pukyong National University)\*; KIMIN JEONG (PUKYONG UNIVERSITY); HYUNHEE KIM (Pukyong National University); KYUNGCHANG LEE (Pukyong National University)*

**TB6.4** N/A  
**Design of Fuzzy Sliding Mode Control System For Human Heart Rate Control**  
*Dong Jun Kim (Pusan National University)\*; Min Cheol Lee (Pusan National University); Saad Abbasi Jamshed (Pusan National University)*

## **TC5 (Focused Track 1) Network and Multi-agent Systems III**

Room 5, 16:30~18:00

Chair: Prof. Dongjun Lee (Seoul National University), Korea

**TC5.1** **692**  
**Robust Motion Control of Robotic Systems with Environmental Interaction via Data-Driven Inversion of CPG**  
*Sangyul Park (Samsung Electronics); Hasun Lee (Seoul National University); Dongjun Lee (Seoul National University)\**

**TC5.2** **699**  
**Multi-UAV Routing with Priority using Mixed Integer Linear Programming**  
*Youkyung Hong (ETRI)\*; Sunggoo Jung (ETRI); Suseong Kim (ETRI); Jihun Cha (ETRI)*

**TC5.3** **703**  
**Controllers for flight in a string-type geometry and string stability in a group of UAVs with kinematic and input generator dynamic models**  
*Shai Arogeti (Ben Gurion University of the Negev), Amit Ailon (Ben Gurion University of the Negev)\**

**TC5.4** **709**  
**Grid Computing for MSE during Volatile Economy**  
*P.S. JosephNg (UCSI University)\*; Y.F. Loh (UCSI University); H.C. Eaw (UCSI University)*

## **TC6 (Focused Track 3) Automotive Control I**

Room 6, 16:30~18:00

Chair: Prof. Kibeom Lee (Halla University), Korea

**TC6.1** **715**  
**Recurrent Neural Network to Estimate Intake Manifold O2 Concentration in a Diesel Engine**  
*Loris Ventura (Politecnico di Torino)\*; Stefano Malan (Politecnico di Torino)*

**TC6.2** **721**  
**NLQR Control of High Pressure EGR in Diesel Engine**  
*Loris Ventura (Politecnico di Torino)\*; Stefano Malan (Politecnico di Torino)*

**TC6.3** **727**  
**Development of Steering Control Algorithms with Self-tuning Fuzzy PID for All-terrain Cranes**  
*Jaho Seo (Ontario Tech University)\*; Moohyun Cha (Korea Institute of Machinery & Materials); Kwangseok Oh (Hankyong National University); Young-Jun Park (Seoul National University); Tae J. Kwon (University of Alberta)*

**TC6.4** **731**  
**Model Predictive Path Planning Based on Artificial Potential Field and Its Application to Autonomous Lane Change**  
*Pengfei Lin (Hanyang University); Woo Young Choi (Hanyang University); Seung-Hi Lee (Hanyang University); Chung Choo Chung (Hanyang University)\**



**TC6.5**

**737**

**Predictive Collision Avoidance Control with Optimized Ride Comfort in Vehicle Lateral Motion Control**

*Jin Ho Yang (Hanyang University); Dae Jung Kim (Hanyang University); Chung Choo Chung (Hanyang University)\**

**TC6.6**

**743**

**Clutch Torque Estimation of Ball-ramp Dual Clutch Transmission using Higher Order Disturbance Observer**

*Dong-Hyun Kim (KAIST)\*; Seibum Choi (KAIST)*

**TC6.7**

**750**

**Nonlinear Model Predictive Control for Self-Driving cars Trajectory Tracking in GNSS-denied environments**

*Ali Barzegar (Kunsan National University)\*; Oualid Doukhi (Kunsan National University); Deok-Jin Lee (Kunsan National University); Yeon-ho Jo (Kunsan National University)*

## TP1 Poster Session 1

Event Hall 2, 16:30~18:00

Chair: Prof. Jung Hoon Kim (POSTECH), Korea

### TP1.1

N/A

#### Condition-Based Maintenance of a Bogie Suspension System by Way of an Extended Kalman Filter

*Myeong-Joon Kim (Konkuk University); Chul-Goo Kang (Konkuk Univ.)\*; Hyun-Jik Cho (Hyundai-Rotem Co.)*

### TP1.2

761

#### Determining Potential Obstacles in Unobservable Areas Based on Current and Past Perception

*Julia Baumgartner (Friedrich-Alexander Universitat)\*; Henrik Bey (Friedrich-Alexander Universitat); Dennis Faßbender (Audi AG); Jörn Thielecke (Friedrich-Alexander Universitat)*

### TP1.3

769

#### What Do Pedestrians See?: Visualizing Pedestrian-View Intersection Classification

*Marcella Astrid (University of Science & Technology)\*; Muhammad Zaigham Zaheer (University of Science & Technology); Jin-Ha Lee (University of Science and Technology); Jae-Yeong Lee (Electronics and Telecommunications Research Institute); Seung-Ik Lee (Electronics and Telecommunication Research Institute (ETRI))*

### TP1.4

774

#### Practical Simplified Indoor Multiwall Path-Loss Model

*Taewon Kang (Yonsei University); Jiwon Seo (Yonsei University)\**

### TP1.5

N/A

#### Analysis of Magnetic Flux Leakage Signal for Non-Destructive Inspection Robot Driving Spiral in Water Main Pipe

*JONG HO BAE (KIRO)\*; GOO BONG CHUNG (KIRO); CHEOL HO BAE (K-WATER); JEONG HYUN KIM (K-WATER); CHANG GEUN HEO (PSU); Gwansoo Park (PSU)*

### TP1.6

784

#### Motion Planning by Reinforcement Learning for an Unmanned Aerial Vehicle in Virtual Open Space with Static Obstacles

*Sanghyun Kim (Yonsei University); Jongmin Park (Yonsei University); Jae-Kwan Yun (Electronics and Telecommunications Research Institute); Jiwon Seo (Yonsei University)\**

### TP1.7

788

#### Dynamic 3-D Visualization of the Korea Pathfinder Lunar Orbiter Attitude Control Simulator

*Dawoon Jung (Korea Aerospace Research Institute)\*; Jae Wook Kwon (Korea Aerospace Research Institute); Kwangyul Baek (Korea Aerospace Research Institute); Han Woong Ahn (Korea Aerospace Research Institute); Jong-Wook Choi (Korea Aerospace Research Institute)*

### TP1.8

793

#### Anomaly Detection Algorithm Based on Global Object Map for Video Surveillance System

*Ho-chul Shin (Electronics and Telecommunication Research Institute (ETRI))\*; Jiho Chang (ETRI); Kiin Na (ETRI)*

<b>TP1.9</b>	<b>796</b>
<b>Development of Record and Management Software for GPS/Loran Measurements</b>	
<i>Woohyun Kim (Yonsei University); Pyo-Woong Son (Korea Research Institute of Ships and Ocean Engineering); Joon Hyo Rhee (Korea Research Institute of Standards and Science); Jiwon Seo (Yonsei University)*</i>	
<b>TP1.10</b>	<b>800</b>
<b>Effects of Initial Attitude Estimation Errors on Loosely Coupled Smartphone GPS/IMU Integration System</b>	
<i>Kwansik Park (Yonsei University); Woohyun Kim (Yonsei University); Jiwon Seo (Yonsei University)*</i>	
<b>TP1.11</b>	<b>N/A</b>
<b>Lead Screw Driven Revolute Joint for Remote Center of Motion Mechanism</b>	
<i>Seongbo Shim (KIMM); Hyo Jung Cha (KIMM); Joonho Seo (KIMM)*</i>	
<b>TP1.12</b>	<b>N/A</b>
<b>Performance Recovery Adaptive Current Controller for Permanent Magnet Synchronous Motor</b>	
<i>Jae Kyung Park (Hanbat National University); Bonn Koo (Hanbat National University); Hyeon Joon Jang (Hanbat National University); Yeon Ji (Hanbat National University); Sang Woo Park (Hanbat National University); Seok-Kyoon Kim (Hanbat National University)</i>	
<b>TP1.13</b>	<b>814</b>
<b>Dynamic Model For Solar Hydrogen Via Alkaline Water Electrolyzer: A Real-Time Techno-economic Perspective With And Without Energy Storage System</b>	
<i>Haider Niaz (Pukyong National University)*; Jay Liu (Pukyong National University)</i>	
<b>TP1.14</b>	<b>820</b>
<b>UAV Engine Control Monitoring System based on CAN Network</b>	
<i>HYUN LEE (KOREA POLYTECHNIC)*</i>	
<b>TP1.15</b>	<b>824</b>
<b>Effect of Outlier Removal from Temporal ASF Corrections on Multichain Loran Positioning Accuracy</b>	
<i>Jongmin Park (Yonsei University); Pyo-Woong Son (Korea Research Institute of Ships and Ocean Engineering); Woohyun Kim (Yonsei University); Joon Hyo Rhee (Korea Research Institute of Standards and Science); Jiwon Seo (Yonsei University)*</i>	
<b>TP1.16</b>	<b>827</b>
<b>DaHOG-based Mobile Robot Indoor Global Localization</b>	
<i>Howon Cheong (Yonsei University / KIST); Euntai Kim (Yonsei University); Sung-Kee Park (KIST)*</i>	

## **TP2 Poster Session 2**

Event Hall 3, 16:30~18:00

Chair: Prof. Kyoungchul Kong (KAIST), Korea

<b>TP2.1</b>	<b>833</b>
<b>Parameter identification of a flexible cantilever beam with a moving hub</b>	
<i>Nguyen Van Thuat (Ho Chi Minh City University of Technology)*; Vu Giang ( Ho Chi Minh City University of Technology); Quoc Chi Nguyen (Ho Chi Minh City Univ. of Tech.)</i>	
<b>TP2.2</b>	<b>839</b>
<b>Efficient Order-based Scheduling Algorithms for Automated Retrieval System (ARS) in Smart Warehouses</b>	
<i>JIALEI LIU (Faculty of Information and Communication Technology of Universiti Tunku Abdul Rahman)*</i>	
<b>TP2.3</b>	<b>845</b>
<b>Research on jamming strategy of surface-type infrared decoy against by infrared-guided simulation</b>	
<i>Wei Sun (Xijing University)*</i>	
<b>TP2.4</b>	<b>850</b>
<b>Concave Wall Surface Tracking for Aerial Manipulator Using Contact Force Estimation Algorithm</b>	
<i>Seon-il Lee (Kyungpook National University); Hyungsuk Kim (Kyungpook National University); Uikyum Kim (Korea Institute of Machinery &amp; Materials); Hyeonbeom Lee (Kyungpook National University)*</i>	
<b>TP2.5</b>	<b>856</b>
<b>Intelligent task robot system based on process recipe extraction from product 3D modeling file</b>	
<i>Hyonyoung Han (ETRI)*; Heechul Bae (ETRI); Hyunchul Kang (ETRI); Jiyon Son (ETRI); Hyun Kim (ETRI)</i>	
<b>TP2.6</b>	<b>860</b>
<b>A New Hand Exoskeleton Framework for Rehabilitation of Fingers</b>	
<i>Qiang Kun Qing (Pusan National University); Dalin Yang (Pusan national university); Ruisen Huang (Pusan National University); Keum-Shik Hong (Pusan National University)*</i>	
<b>TP2.7</b>	<b>865</b>
<b>Photometric Stereo Using CNN-based Feature-Merging Network</b>	
<i>Euijeong Song (Korea University)*; Minho Chang (Korea University)</i>	
<b>TP2.8</b>	<b>869</b>
<b>Impact Force Minimization Algorithm for Collaborative Robots Using Impact Force Prediction Model</b>	
<i>Tae Jung Kim (Korea University)*; Ji Hoon Kim (Korea University); Kuk-Hyun Ahn (Korea University); Jae-Bok Song (Korea Univ)</i>	
<b>TP2.9</b>	<b>873</b>
<b>Sliding Mode Backstepping Control for Variable Mass Hexa-Rotor UAV</b>	
<i>Nam-Sik Kim (SungKyunKwan University)*; Taeyong Kuc (Sungkyunkwan University)</i>	
<b>TP2.10</b>	<b>N/A</b>
<b>Learning to Use Topological Memory for Visual Navigation</b>	
<i>obin kwon (Seoul National University)*; Songhwai Oh (Seoul National University)</i>	

<b>TP2.11</b>	<b>883</b>
<b>Path-Following Navigation Network Using Sparse Visual Memory</b>	
<i>Hwiyeon Yoo (Seoul National University)*; Nuri Kim (Seoul National University); Jeongho Park (Seoul National University); Songhwa Oh (Seoul National University)</i>	
<b>TP2.12</b>	<b>N/A</b>
<b>Joint-based Control of Humanoid Arms Using Motion Capture System</b>	
<i>Hyeonseok Jeong (Korea University)*; SHINSUK PARK (Korea University); Junhwi Kim (Korea University)</i>	
<b>TP2.13</b>	<b>892</b>
<b>Detection of Limit Situation in Segmentation Network via CNN</b>	
<i>Junho Song (Korea University)*; Sangkyoo Park (Korea University); Myotaeg Lim (Korea University)</i>	
<b>TP2.14</b>	<b>895</b>
<b>Influence of Preprocessing and Augmentation on 3D Point Cloud Classification Based on a Deep Neural Network: PointNet</b>	
<i>Hogeon Seo (Korea Atomic Energy Research Institute)*; Sungmoon Joo (Korea Atomic Energy Research Institute )</i>	
<b>TP2.15</b>	<b>900</b>
<b>Legged balance on moving table by reinforcement learning</b>	
<i>Woojin Seol (KAIST)*</i>	
<b>TP2.16</b>	<b>906</b>
<b>Autonomous distributed control system strategy of rail vehicle for nuclear waste disposal</b>	
<i>Zdenek Slanina (VSB-TU Ostrava)*; Jakub Nemcik (VSB-TU Ostrava); Filip Krupa (VSB-TU Ostrava); Stepan Ozana (VSB-TU Ostrava); Jiri Koziorek (VSB-TU Ostrava); Daniel Polak (Robotsystem)</i>	
 <b>TP3 Poster Session 3</b>	
Event Hall 4, 16:30~18:00	
Chair: Prof. Hong Keun Kim (KOREATECH), Korea	
<b>TP3.1</b>	<b>912</b>
<b>Application of two-point boundary problem with optimization of a candidate function</b>	
<i>Tomas Docekal (VSB-TUO)*; Stepan Ozana (VSB-TU Ostrava)</i>	
<b>TP3.2</b>	<b>916</b>
<b>Control system for V2H applications</b>	
<i>Zdenek Slanina (VSB-TU Ostrava)*; Martin Kosinka (VSB-TU Ostrava); Vojtech Blazek (VSB-TU Ostrava); Michal Petruzela (VSB-TU Ostrava)</i>	

<b>TP3.3</b>	<b>N/A</b>
<b>Prototype system for non-invasive brain stimulation by integrating multi-DoF robotic arm and end-effector</b>	
<i>Joonho Seo (KIMM)*; Hyo Jung Cha (KIMM); Haejune Park (KIMM); Junmin Baek (KIMM); Seongbo Shim (KIMM)</i>	
<b>TP3.4</b>	<b>924</b>
<b>Heterogeneous sensor fusion based omnidirectional object detection</b>	
<i>Hyunjee Ryu (KAIST)*; Inhwan Wee (KAIST); Taeyeon Kim (KAIST); David Hyunchul Shim (KAIST)</i>	
<b>TP3.5</b>	<b>928</b>
<b>Operating Point Optimization of Fuel Cell-Battery Power System for Unmanned Underwater Vehicle</b>	
<i>Tae-Ryong Park (Agency for Defense Development)*; Kiyoul Kim (Agency for Defense Development); Jang-Hyeon Cho (Agency for Defense Development)</i>	
<b>TP3.6</b>	<b>N/A</b>
<b>Development of Optimized Control Interface for Quadruped Robot</b>	
<i>HongShik Kim (Korea University)*; SHINSUK PARK (Korea University); Euihyun Han (Korea University)</i>	
<b>TP3.7</b>	<b>939</b>
<b>Neural Network-Based Ranging with LTE Channel Impulse Response for Localization in Indoor Environments</b>	
<i>Halim Lee (Yonsei University); Ali Abdallah (University of California, Irvine); Jongmin Park (Yonsei University); Jiwon Seo (Yonsei University)*; Zaher Kassas (University of California, Irvine)</i>	
<b>TP3.8</b>	<b>945</b>
<b>Tendon-Driven Continuum Robot Systems with only A Single Motor and A Radius-Changing Pulley</b>	
<i>Myung-oh Kim (Korea Institute of Industrial Technology)*; Dong-Wook Lee (Korea Institute of Industrial Technology)</i>	
<b>TP3.9</b>	<b>947</b>
<b>Data filtering for corrupted MIMIC III dataset with deep learning</b>	
<i>Yongsik Jin (Electronics and Telecommunications Research Institute)*; Crino Shin (Korea Institute of Industrial Technology); Wookyong Kwon (ETRI); Kyuhyung Kim (Electronics and Telecommunications Research Institute); Jong Pil Yun (Korea Institute of Indus</i>	
<b>TP3.10</b>	<b>950</b>
<b>Camera and Radar-based Perception System for Truck Platooning</b>	
<i>TaeWook Kim (Kookmin University)*; WonSeok Jang (Kookmin University); Jaesung Jang (Kookmin University); JongChan Kim ( Kookmin University)</i>	
<b>TP3.11</b>	<b>956</b>
<b>Integrated Path Planning and Tracking Control of Autonomous Vehicle for Collision Avoidance based on Model Predictive Control and Potential Field</b>	
<i>Chanho Ko (KAIST)*; Seungho Han (KAIST); Minseong Choi (KAIST); Kyung-Soo Kim (KAIST)</i>	

<b>TP3.12</b>	<b>962</b>
<b>Autonomous docking of an Unmanned Surface Vehicle based on Reachability Analysis</b>	
<i>jinwook Park (KAIST)*</i>	
<b>TP3.13</b>	<b>967</b>
<b>Analysis on the performance of VIO according to Trajectory Planning of UAV</b>	
<i>EungChang Mason Lee (KAIST)*; Hyun Myung (KAIST)</i>	
<b>TP3.14</b>	<b>972</b>
<b>V2H control system software analysis and design</b>	
<i>Zdenek Slanina (VSB-TU Ostrava)*; Martin Kosinka (VSB-TU Ostrava); Michal Petruzela (VSB-TU Ostrava); Vojtech Blazek (VSB-TU Ostrava)</i>	
<b>TP3.15</b>	<b>978</b>
<b>Human Recognition and Tracking in Narrow Indoor Environment using 3D Lidar Sensor</b>	
<i>Jae-Seong Yoon (SungKyunKwan University); SangHyeon Bae (Sungkyunkwan University); Taeyong Kuc (Sungkyunkwan University)*</i>	
<b>TP3.16</b>	<b>982</b>
<b>Mobile service robot multi-floor navigation using visual detection and recognition of elevator features</b>	
<i>eunho Kim (SungKyunkwan University ); Sang-Hyeon Bae ( SungKyunkwan University); Taeyong Kuc (Sungkyunkwan University)*</i>	
<b>TP4 Poster Session 4</b>	
Event Hall 5, 16:30~18:00	
Chair: Prof. Jae Heung Park (Seoul National University), Korea	
<b>TP4.1</b>	<b>986</b>
<b>System Design for Automation in Multi-Agent-Based Manufacturing Systems</b>	
<i>Samyeul Noh (Electronics and Telecommunications Research Institute)*; Junhee Park (Electronics and Telecommunications Research Institute)</i>	
<b>TP4.2</b>	<b>991</b>
<b>Feature Extraction and Matching Algorithms to Improve Localization Accuracy for Mobile Robots</b>	
<i>Sin Won Kang (Sungkyunkwan University); Sang-Hyeon Bae ( SungKyunkwan University); Taeyong Kuc (Sungkyunkwan University)*</i>	
<b>TP4.3</b>	<b>995</b>
<b>Development of real-time automatic sorting system for color PET recycling process</b>	
<i>Youngjun Jeon (KAIST)*; Sangwoo Um (KAIST); Jaemin Yoo (KAIST); Minseok Seo (KAIST); Eugene Jeong (KAIST); Woojin Seol (KAIST); Daewon Kang (KAIST); Hancheul Song (RM corp.); Kyung-Soo Kim (KAIST); SooHyun Kim (KAIST)</i>	

<b>TP4.4</b>	<b>999</b>
<b>Analysis of noise removal speed and accuracy in various color spaces of image</b>	
<i>Kyung-Soo Kim (KAIST); Ji-il Park (KAIST); Hyunyong Jeon (KAIST)*; Moohyun Cha (Korea Institute of Machinery &amp; Materials); Minyoung Lee (Korea Institute of Machinery and Materials)</i>	
<b>TP4.5</b>	<b>N/A</b>
<b>Clustering Sequences of Mechanoreceptive Tactile Signals in Robot Grasping Task for Detecting Phase Transitions</b>	
<i>Won Dong Kim (KAIST)*; Jung Kim (Korea Advanced Institute of Science and Technology)</i>	
<b>TP4.6</b>	<b>1006</b>
<b>Text and Sign Recognition for Indoor Localization</b>	
<i>ARPAN GHOSH (Sung Kyun Kwan University)*; Jung-Won Pyo (SungKyunKwan University); Taeyong Kuc (Sungkyunkwan University)</i>	
<b>TP4.7</b>	<b>1010</b>
<b>Basic steps for building and using a functional near infra-red spectroscopy (fNIRS) System</b>	
<i>Eugene Jeong (KAIST)*; Minseok Seo (KAIST); Kyung-Soo Kim (KAIST)</i>	
<b>TP4.8</b>	<b>N/A</b>
<b>Design of Fabric Based Soft Surface Electromyography Sensor and Application to Respiratory Muscles Assessment</b>	
<i>Hwayeong Jeong (KAIST)*; Jirou Feng (Korea Advanced Institute of Science and Technology); Jung Kim (Korea Advanced Institute of Science and Technology)</i>	
<b>TP4.9</b>	<b>N/A</b>
<b>Development of Reinforcement Learning Assembly Algorithm Based on Estimated Reaction Force Using Sliding Perturbation Observer</b>	
<i>Hyun Hee Kim (Pusan National Univ.); Hamza Khan (Pusan National Univ.); Young Jun An (Pusan national university); Min Cheol Lee (Pusan National University)*</i>	
<b>TP4.10</b>	<b>1022</b>
<b>Development of Haptic Bracelets Based Arm Swing Feedback System for Stroke Survivors</b>	
<i>Hosu Lee (Gwangju Institute of Science and Technology); Amre Eizad (Gyeongsang National University); Geonhyup Lee (Gwangju Institute of Science and Technology); Yeongmi Kim (MCI); Jungwon Yoon (Gwangju Institute of Science and Technology)*</i>	
<b>TP4.11</b>	<b>1026</b>
<b>Zero-Shot Transfer Learning of a Throwing Task via Domain Randomization</b>	
<i>Sungyong Park (Seoul National University)*; Jigang Kim (Seoul National University); Hyoun Jin Kim (Seoul National University)</i>	
<b>TP4.12</b>	<b>1031</b>
<b>Development of Growing House Control System using Wireless Sensor Network</b>	
<i>Elaiza Nicole R Salamat (Hankyong National University); Jaehyun Yoo (Hankyong National university)*</i>	



- TP4.13** **1034**  
**Velocity Control of Servo Systems Under Control Input Saturation and Disturbance Using Robust Discrete-Time Sliding Mode Control Method**  
*Ji-Seok Han (Seoul National University)\*; Tae-Ho Oh (Seoul National University); Young-Seok Kim (Seoul National University); Hyuntaek Lim (Seoul National University); Yang Dae Young (Seoul National University); Sang-Hoon Lee (RS Automation); Dong-Il Cho (Seoul National University)*
- TP4.14** **1040**  
**Outdoor Monocular Visual Odometry Enhancement Using Depth Map and Semantic Segmentation**  
*Jee-Seong Kim (Seoul National University)\*; Chulhong Kim (Seoul National University); Dong-Il Cho (Seoul National University); Yongmin Shin (LG Electronics Inc.); Ilsoo Cho (LG Electronics Inc.)*
- TP4.15** **1046**  
**Trajectory Tracking Controller Design for Caterpillar Vehicles Using a Model Reference Adaptive Controller**  
*Lanh Van Nguyen (Pukyong National University)\*; DaeHwan Kim (Pukyong National University); Sang Kwun Jeong (Korea Polytechnics, JinJu Campus); Choong Hwan Lee (Dongwon Institute of Science and Technology); Hak Kyeong Kim (Pukyong National University); Sang Bong Kim (Pukyong National University)*
- TP4.16** **N/A**  
**A ring-type thumb finger sensor for food intake metrics**  
*Wonki Hong (Kyung Hee University)\*; Jungmin LEE (Kyunghee university); Won Gu Lee (Kyung Hee University)*

## FA1 Robot Vision & Image Processing

Room 1, 10:30~12:00

Chair: Dr. Yonghun Kim (KAIST), Korea

### FA1.1

1056

#### Improving Localization Performance of Robot Using Obstacle Recognition and Probability Model through Image Processing

*DongHa Yoo (Hanyang University)\*; In Joon Min (Hanyang University); Min Sung Ahn (UCLA); Jeakweon Han (Hanyang University)*

### FA1.2

1062

#### GOPE: Geometry-Aware Optimal Viewpoint Path Estimation Using a Monocular Camera

*Nuri Kim (Seoul National University); Yunho Choi (Seoul National University); Minjae Kang (Seoul National University); Songhwa Oh (Seoul National University)\**

### FA1.3

1068

#### Occlusion Data Augmentation for Object Detectors based on Random Erasing

*Jiseong Heo (Agency for Defense Development)\*; Yooseung Wang (ADD); Jihun Park (ADD)*

### FA1.4

1073

#### Exploring the possibility for early detection of Alzheimer's disease with spatial-domain neural images

*Dalin Yang (Pusan national university); Ruisen Huang (Pusan National University); Qiang Kun Qing (Pusan National University); Keum-Shik Hong (Pusan National University)\**

### FA1.5

1079

#### Retaining Image Feature Matching Performance Under Low Light Conditions

*Antyanta Bangunharcana (KAIST)\*; Pranjay Shyam (Korea Advanced Institute of Science and technology); Kyung-Soo Kim (KAIST)*

## FA2 Robot Mechanism and Systems

Room 2, 10:30~12:00

Chair: Prof. Jihyuk Park (Yeungnam University), Korea

### FA2.1

1086

#### Parameter Identification of an Unknown Object in Human-Robot Collaborative Manipulation

*Jaeyoung Jang (Hanyang University); JongHyeon Park (Hanyang University)\**

### FA2.2

1092

#### Electrical impedance myography (EIM) For multi-class prosthetic robot hand control

*younggeol cho (Korea Advanced of Science and Technology (KAIST))\**

### FA2.3

1095

#### Control of tendon-driven(Twisted-string Actuator) robotic joint with adaptive variable-radius pulley

*Jihyuk Park (Yeungnam University)\*; Ji-il Park (KAIST); Hyung-Tae Seo (KAIST); Yanheng Liu (Yeungnam University); Kyung-Soo Kim (KAIST); SooHyun Kim (KAIST)*

#### FA2.4

1099

##### **Investigation of novel teaching method for skillful operation of working plate with an industrial dual arm robot**

*TAKAHIRO MASE (Doshisha University)\*; RYO KITAHATA (Doshisha University); TOSHIKI HIROGAKI (School of Engineering and Science, Doshisha University); EICHI AOYAMA (School of Engineering and Science, Doshisha University)*

#### FA2.5

1105

##### **Experimental Analyses of an Efficient Aggregated Robot Processing with Cache-Control for Multi-Robot System**

*Abdul Jalil (Kyushu Institute of Technology)\*; Jun Kobayashi (Kyushu Institute of Technology)*

### **FA3 Network and Robot Applications**

Room 3, 10:30~12:00

Chair: Dr. Junsoo Kim (Seoul National University), Korea

#### FA3.1

1110

##### **An Experimental Study of Wi-Fi Access Service using Drone in Container Yard**

*Krongpon Meesriyong ( King Mongkut's Institute of Technology Ladkrabang); Olarn Wongwirat (King Mongkut's Institute of Technology Ladkrabang)\*; Kamesh Namuduri (University of North Texas)*

#### FA3.2

1116

##### **Object Removal and Inpainting from Image using Combined GANs**

*Jeongwon Pyo (SungKyunKwan University)\*; YURI G ROCHA (Sungkyunkwan University); ARPAN GHOSH (Sung Kyun Kwan University); Gungyo In (SungKyunKwan University); Taeyong Kuc (Sungkyunkwan University)*

#### FA3.3

1120

##### **Bio-inspired directional microphone for robotic hearing system**

*Ashiqur Rahaman (Korea University of Technology and Education); Byungki Kim (School of Mechatronics Engineering, Korea University of Technology and Education)\**

#### FA3.4

1124

##### **Blockchain Agreement for Self-identification of Online Test Cheating: Improvement of Algorithm Performance**

*Seong-Kyu Kim (Sungkyunkwan University); Jun-Ho Huh (Korea Maritime and Ocean University)\**

### **FA4 Image and Signal Processing**

Room 4, 10:30~12:00

Chair: Prof. Hyungpil Moon (SungKyunKwan University), Korea

- FA4.1** 1134  
**Application of Webcam for Inspection of Rice Grain Quality by Using Image Processing Technique**  
*Witsarut Sriratana (King Mongkut's Institute of Technology Ladkrabang (KMITL))\*; Namo Narknam (King Mongkut's Institute of Technology Ladkrabang (KMITL)); Ruangsit Apichitanon ( King Mongkut's Institute of Technology Ladkrabang (KMITL)); Narin Tammarugwattana (King Mongkut's Institute of Technology Ladkrabang (KMITL))*
- FA4.2** N/A  
**Delta Robot and Image Processing**  
*Phat Xuan Truong (Hochiminh University of Technology and Education)\**
- FA4.3** 1146  
**Preliminary Connector Recognition System Based on Image Processing for Wire Harness Assembly Tasks**  
*Francisco Yumbra (ESPOL)\*; Meseret Abeyabas (Sungkyunkwan University); Tuan Luong (Sungkyunkwan University); June-Sup Yi (Sungkyunkwan University); Hyungpil Moon (Sungkyunkwan University)*
- FA4.4** 1151  
**Recursive Inverse Kinematics Analysis for Teaching Human Motion to a Humanoid Social Robot using a Depth Camera**  
*Jun Ha Sohn (Chungnam National University)\*; Seunghwa Oh (Chungnam National University); Chang-Ho Lee (Research Institute for High-Technology Transportation, Chungnam National University); Sung-Soo Dr. Kim (Chungnam National University)*
- FA4.5** 1155  
**Normal Distributions Transform is Enough: Real-time 3D Scan Matching for Pose correction of Mobile Robot Under Large Odometry Uncertainties**  
*Hyungtae Lim (KAIST); Sungwon Hwang (KAIST)\*; Sungjae Shin (KAIST); Hyun Myung (KAIST)*
- FA4.6** 1162  
**Viewpoint Estimation for Visual Target Navigation by Leveraging Keypoint Detection**  
*Yunho Choi (Seoul National University); Nuri Kim (Seoul National University); Jeongho Park (Seoul National University); Songhwai Oh (Seoul National University)\**

## **FA5 (Focused Track 3) Automotive Control II**

Room 5, 10:30~12:00

Chair: Prof. Dongsuk Kum (KAIST), Korea

- FA5.1**  
**Distributional Soft Actor Critic (DSAC) and Its Application on Autonomous Driving**  
*Prof. Shengbo Li (Tsinghua University)*
- FA5.2** 1166  
**Decision of Driver Intention of a Surrounding Vehicle Using Hidden Markov Model with Optimizing Parameter Estimation**  
*Jin Ho Yang (Hanyang University); Dae Jung Kim (Hanyang University); Tae Won Kang (Hanyang University); Jeong Sik Kim (Hanyang University); Chung Choo Chung (Hanyang University)\**

**FA5.3** 1172

**Autonomous Evasive Steering with Differential Braking Backup**

*Moad Kissai (ENSTA Paris)\*; Anh-Lam Do (Renault); Xavier Mouton (Renault); Bruno MONSUEZ (ENSTA ParisTech)*

**FA5.4** 1177

**Longitudinal and Lateral Integrated Safe Trajectory Planning of Autonomous Vehicle via Friction Limit**

*Kibeom Lee (Halla University); Dongsuk Kum (Korea Advanced Institute of Science and Technology)\**

**FA5.5** 1181

**Finite State Machine based Vehicle System for Autonomous Driving in Urban Environments**

*SangHyeon Bae (Sungkyunkwan University)\*; Sung-Hyeon Joo (SungKyunKwan University); Jung-Won Pyo (SungKyunKwan University); Jae-Seong Yoon (SungKyunKwan University); Taeyong Kuc (SungKyunKwan University); GwangHee Lee (Korea Institute of Industrial Technology)*

**FA6 (OS) Semantic Descriptor, Semantic Modelling and Mapping for Humanlike Perception and Navigation of Mobile Robots toward Large Scale Long-Term**

Room 6, 10:30~12:00

Chair: Dr. Sang Hoon Ji (KITECH), Korea

**FA6.1** N/A

**TOSM-Based Scene Encoding Using a Semantic Descriptor**

*Hyun-Uk Lee (SungKyunKwan University); YURI G ROCHA (Sungkyunkwan University); Sung-Hyeon Joo (SungKyunKwan University); SangHyeon Bae (Sungkyunkwan University); Sumaira Manzoor (Sungkyunkwan University); Taeyong Kuc (Sungkyunkwan University)\**

**FA6.2** N/A

**Exploring the Possibility of Semantic Map Data Representation as an Extension of the IEEE 2D and 3D Map Data Representation Standards**

*Wonpil Yu (ETRI)\*; Francesco Amigoni (Politecnico di Milano); Tomasz Kucner (Orebro University); Yucheol Lee (ETRI)*

**FA6.3** 1195

**Study on multi-modal sensor system based semantic navigation map building**

*Gi-Deok Bae (Korean Institute of Robot and Convergence)\*; Taeyoung Uhm (Korean Institute of Robot and Technology Convergence); Young-ho Choi (Korean Institute of Robot and Convergence); Jung-Hwan Hwang (Korea Institute of Robotics & Technology Convergence)*

**FA6.4** 1198

**Object Detection-based Semantic Map Building for A Semantic Visual SLAM System**

*Phuc Huu Truong (KITECH); Sujeong You (KITECH); Sang Hoon Ji (KITECH)\**

**FA6.5** N/A

**PDDL to LTL Description Translation for Collective Intelligent Planning using Transformer**

*Jiyoun Moon (Seoul National University)\*; Jang Hyeok Moon (Han Yang University); Sung Hoon Bae (REDONE TECHNOLOGIES CO., LTD)*

FA6.6

1206

**An Appearance and Viewpoint Invariant Visual Place Recognition for Seasonal Changes**  
*SABA ARSHAD (Chungbuk National University); Gon-Woo Kim (Chungbuk National University)\**

### **FB5 (Focused Track 3) Automotive Control III**

Room 5, 13:20~14:50

Chair: Prof. Kyoung-Dae Kim (DGIST), Korea

FB5.1

#### **Risk Predictive Driver Assistance System towards Zero-Traffic Accidents**

*Prof. Pongsathorn Raksincharoensak (Tokyo University of Agriculture and Technology)*

FB5.2

1212

#### **Mixed Reinforcement Learning for Efficient Policy Optimization in Stochastic Environments**

*Yao Mu (Tsinghua University); Baiyu Peng (Tsinghua University); Ziqing Gu (Tsinghua University); Shengbo Li (Tsinghua University)\*; Chang Liu (Cornell University); Bingbing Nie (Tsinghua University); Jianfeng Zheng (Didi Chuxing); Bo Zhang (Didi Chuxing)*

FB5.3

1220

#### **IMM EKF based Sensor Fusion for Vehicle Positioning Under Various Road Surface Conditions**

*Hyeon Uk Heo (Hanyang University); Dae Jung Kim (Hanyang University); Chung Choo Chung (Hanyang University)\**

FB5.4

1225

#### **3D SaccadeNet: A Single-Shot 3D Object Detector for LiDAR Point Clouds**

*Lihua Wen (University of Ulsan)\**

FB5.5

1231

#### **Deep Reinforcement Learning-based ROS-Controlled RC Car for Autonomous Path Exploration in the Unknown Environment**

*Sabir Hossain (Kunsan National University); Oualid Doukhi (Kunsan National University); Yeon-ho Jo (Kunsan National University); Deok-Jin Lee (Kunsan National University)\**