

IEEE 1st International Conference on Autonomous Systems (ICAS'21)

Advanced Program v.2.0
Virtual Conference at: ... (TBA) ...
Aug. 10-13, 2021

Wed., Aug. 11, 2021	
09:00 - 09:30	Welcome Chair: Dr. Arash Mohammadi, All Co-Chairs
09:30 - 10:20	Keynote 1 Drone Vision and Deep Learning for Infrastructure Inspection Prof. Ioannis Pitas, FIEEE, FEURASIP Aristotle University of Thessaloniki (AUTH), Greece Chair: Prof. Kostas Plataniotis
10:20 - 10:30	Coffee Break
10:30 - 12:10	Parallel Sessions
MT1. Framework of Autonomous Systems Chair: Yingxu Wang	ST1. Autonomous Medical Robotic Systems Chairs: Mahdi Tavakoli, Farokh Atashzar, and Dario Farina
Perspectives on the Emerging Field of Autonomous Systems and its Theoretical Framework (23) <i>Yingxu Wang, Konstantinos Plataniotis, Arash Mohammadi, Lucio Marcenaro, Amir Asif, Ming Hou, Henry Leung, and Marina Gavrilova</i>	A Vision-Based Method for Estimating Contact Forces in Intracardiac Catheters (44) <i>Hamidreza Khodashenas, Pedram Fekri, Mehrdad Zadeh & Javad Dargahi</i>
Optimal Multidimensional Cyclic Convolution Algorithms for Deep Learning and Computer Vision Applications (72) <i>Ioannis Pitas</i>	A Classical Machine Learning Approach for EMG-based Lower Limb Intention Detection for Human-Robot Interaction Systems (75) <i>Hasti Khiabani and Mojtaba Ahmadi</i>
Interpretable Anomaly Detection using a Generalized Markov Jump Particle Filter (60) <i>Giulia Slavic, Pablo Marin, David Martin, Lucio Marcenaro and Carlo Regazzoni</i>	An Open-source Platform for Cooperative, Semi-autonomous Robotic Surgery (110) <i>Laura Connolly, Anton Deguet, Kyle Sunderland, Andras Lasso, Tamas Ungi, John F Rudan, Russell H. Taylor, Parvin Mousavi, etc.</i>
Deliberation for Intra-vehicle Robotic Activities in Space (47) <i>Abiola Akanni, J. Benton and Robert Morris</i>	Improving a User's Haptic Perceptual Sensitivity by Optimizing Effective Manipulability of a Redundant User Interface (112) <i>Teng Li, Ali Torabi, Hongjun Xing and Mahdi Tavakoli</i>
Experimental Validation of Domain Knowledge Assisted Robotic Exploration and Source Localization (63) <i>Thomas Wiedemann, Dmitriy Shutin and Achim J. Lilienthal</i>	Toward Semi-autonomous Stiffness Adaptation of Pneumatic Soft Robots: Modeling and Validation (114) <i>Majid Roshanfar, Javad Dargahi and Amir Hooshair</i>
12:10 - 13:00	Lunch
13:00 - 13:50	Keynote 2 Verification, Trustworthiness and Accountability of Human-Driven Autonomous Systems Prof. Imre Rudas, FIEEE, and Prof. Tamás Haidegger, PhD Óbuda University, Budapest, Hungary Chair: Prof. Yingxu Wang
13:50 - 14:40	Keynote 3 Sustainable Autonomy: Challenges and Perspectives Prof. Robert Kozma, FIEEE, FINNS Dept. of Mathematics, University of Memphis, TN, USA Chair: Dr. Arash Mohammadi
14:40 - 14:50	Coffee Break

14:50 - 16:30	Parallel Sessions	
MT2. Emerging Technologies for Autonomous Systems (I) Chair: Lucio Marcenaro	SS1. Autonomous Vehicle Vision Chairs: Rui Fan and Ioannis Pitas	
Information-Bottleneck-Based Behavior Representation Learning for Multi-Agent Reinforcement Learning (16) <i>Yue Jin, Shuangqing Wei, Jian Yuan and Xudong Zhang</i>	Semantic Image Segmentation Guided by Scene Geometry (32) <i>Sotirios Papadopoulos, Ioannis Mademlis and Ioannis Pitas</i>	
Estimation of Fields using Binary Measurements from a Mobile Agent (13) <i>Alex Leong and Mohammad Zamani</i>	Road Surface Deep Embedded Classifier for an Efficient Physio-based Car Driver Assistance (26) <i>Francesco Rundo, Roberto Leotta, Vincenzo Piuri, Angelo Genovese, Fabio Scotti and Sebastiano Battiato</i>	
Multichannel Nonnegative Matrix Factorization with Motor Data-regularized Activations for Robust Ego-noise Suppression (24) <i>Alexander Schmidt and Walter Kellermann</i>	Automated Parking Test using ISAR Images from Automotive Radar (103) <i>Neeraj Pandey and Shobha Ram</i>	
Goal-Oriented Communication for Real-Time Tracking in Autonomous Systems (64) <i>Nikolaos Pappas and Marios Kountouris</i>	Autonomous Vision-based Landing of UAV's on Unstructured Terrains (95) <i>Evangelos Chatzikalymnios and Konstantinos Moustakas</i>	
Intelligent Intersection Coordination and Trajectory Optimization for Autonomous Vehicles (91) <i>Yixiao Zhang, Gang Chen and Tingting Zhang</i>	Gesture Learning for Self-Driving Cars (118) <i>Ethan Shaotran, Jonathan Cruz and Vijay J. Reddi</i>	
16:30 - 16:40	Coffee Break	
16:40 - 18:20	Parallel Sessions	
ST2. Security & Resilience of Auto. Cyber-Physical Sys. Chair: Deepa Kundur and Mohammad Janaideh	SS2. Advanced Navigation for Networked AS' Chair: Siwei Zhang and Henk Wymeersch	
Leader-Follower Multi-Agent Systems: A Model Predictive Control Scheme Against Covert Attacks (12) <i>Francesco Tedesco, Domenico Famularo and Giuseppe Franzè</i>	Collision Prediction using UWB and Inertial Sensing: Experimental Evaluation (25) <i>Aarti Singh and Neal Patwari</i>	
State-of-the-Art and Directions for the Conceptual Design of Safety-Critical Unmanned and Autonomous Aerial Vehicles (29) <i>Saad B. Nazarudeen and Jonathan Liscouet</i>	Design and Simulation of an Autonomous Racecar: Perception, SLAM, Planning and Control (20) <i>Sihao Wu, Zhengwei Yang, Xiaopo Xie, Yilong Wang, etc.</i>	
On Securing Cloud-hosted Cyber-physical Systems using Trusted Execution Environments (41) <i>Amir Mohammad Naseri, Walter Lucia, Mohammad Mannan & Amr Youssef</i>	Graph-based Motion Planning for Automated Vehicles using Multi-model Branching and Admissible Heuristics (35) <i>Oliver Speidel, Jona Ruof and Klaus Dietmayer</i>	
Stress Testing Framework for Autonomous System Verification and Validation (V&V) (36) <i>Gregory Falco and Leilani Gilpin</i>	Perception Through 2D-MIMO FMCW Automotive Radar under Adverse Weather (105) <i>Xiangyu Gao, Sumit Roy, Guanbin Xing and Sian Jin</i>	
Fault Tree Analysis and Risk Mitigation Strategies for Autonomous Systems via Statistical Model Checking (71) <i>Ashkan Samadi, Marwan Ammar and Othmane A. Mohamed</i>	Different Co-Chirps-Based Non-Uniform PRF Automotive FMCW Radar (115) <i>Lifan Xu, Shunqiao Sun and Kumar V. Mishra</i>	
Thursday, Aug. 12, 2021		
09:00 - 09:50	Keynote 4 Morphogenetic Self-organization of Swarm Robots Prof. Yaochu Jin, FIEEE Dept. of Computer Science, University of Surrey, Guildford, UK Chair: Dr. Lucio Marcenaro	
09:50 - 10:40	Keynote 5 Improving Manipulation Capabilities of Autonomous Robots Dr. Anthony Vetro, FIEEE Vice President and Director at Mitsubishi Electric Research Labs, USA Chair: Dr. Farokh Atashzar	
10:40 - 10:50	Coffee Break	
10:50 - 12:30	Parallel Sessions	
MT3. Autonomous System and AI Chair: Farokh S. Atashzar	ST3. Autonomous Control Systems Chairs: Giuseppe Franze and Walter Lucia	
Towards Three-Dimensional Active Incoherent Millimeter-Wave Imaging <i>Stavros Vakis and Jeffrey Nanzer</i> (113)	Lane Changing using Multi-Agent DQN (6) <i>Karthikeyan Nagarajan and Zhong Yi</i>	
An Autonomous Semantic Learning Methodology for Fake News Recognition (99)	Data-Driven Pump Scheduling for Cost Minimization in Water Networks (59)	

<i>Yingxu Wang and James Y. Xu</i>		<i>Jyotirmoy Bhardwaj, Joshin Krishnan and Baltasar Beferull Lozano</i>	
Progress on a Perimeter Surveillance Problem (21) <i>Jeremy Avigad and Floris van Doorn</i>		Cooperative Communication, Localization, Sensing and Control for Autonomous Robotic Networks (39) <i>Siwei Zhang, Emanuel Staudinger, Robert Pöhlmann and Armin Dammann</i>	
Real-Time Learning for THz Radar Mapping and UAV Control (58) <i>Anna Guerra, Francesco Guidi, Davide Dardari and Petar M. Djuric</i>		First Steps Toward the Development of Virtual Platform for Validation of Autonomous Wheel Loader at Pulp-and-Paper Mill: Modelling, Control and Real-Time Simulation (76) <i>Michael Kerr, Danielle Nasrallah and Tsz-Ho Kwok</i>	
Collaborative Communications between a Human and a Resilient Safety Support System (73) <i>Saeideh Samani, Richard Jessop and Angela Harrivel</i>		River Flow Path Control with Reinforcement Learning (100) <i>Dongqi Liu, Yutaka Naito, Chen Zhang, Shogo Muramatsu, Hiroyasu Yasuda, Kiyoshi Hayasaka and Yu Otake</i>	
12:30 - 13:30	Lunch		
13:30 - 14:20	<p style="text-align: center;">Keynote 6 Information Fusion and Decision Support for Autonomous Systems Prof. Henry Leung, FIEEE, FSPiE Dept. of Electrical and Software Eng., Univ. of Calgary, Canada Chair: Dr. Arash Mohammadi</p>		
14:20 - 14:30	Coffee Break		
14:30 - 16:10	Parallel Sessions		
MT4. Application Paradigms of Autonomous Systems Chairs: Amir Asif		SS3. Trustworthy Autonomous Human-Machine Systems Chairs: Yaoping Hu and Baris Fidan	
Improving Automated Search for Underwater Threats using Multistatic Sensor Fields by Incorporating Unconfirmed Track Information (27) <i>Daniel Angley, Steve Mehrkanoon, Bill Moran, Christopher Gilliam and Sergey Simakov</i>		Trustworthy Adaptation with Few-shot Learning for Hand Gesture Recognition (48) <i>Elahe Rahimian, Soheil Zabih, Amir Asif, Farokh Atashzar and Arash Mohammadi</i>	
Interference Suppression Using Adaptive Nulling Algorithm Without Calibration Sources (119) <i>Peng Chen, Wei Wang and Jingjie Gao</i>		Thermal Face Image Generator (78) <i>Xingdong Cao, Kenneth Lai, Svetlana Yanushkevich and Michael Smith</i>	
Learning Robust Features for 3D Object Pose Estimation (30) <i>Christos Papaioannidis and Ioannis Pitas</i>		Building and Measuring Trust in Human-machine Systems (43) <i>Lida Ghaemi Dizaji and Yaoping Hu</i>	
General Frameworks for Anomaly Detection Explainability: Comparative Study (53) <i>Ambareesh Ravi, Xiaozhuo Yu, Iara Santelices, Fakhri Karray & Baris Fidan</i>		Quality Assurance Challenges for Machine Learning Software Applications During Software Development Life Cycle Phases (84) <i>Md Abdullah Al Alamin and Gias Uddin</i>	
Heterogeneous Vehicular Platooning with Stable Decentralized Linear Feedback Control (77) <i>Amir Zakerimanesh, Tony Qiu and Mahdi Tavakoli</i>		An Open Source Motion Planning Framework for Autonomous Minimally Invasive Surgical Robots (116) <i>Aleks Attanasio, Nils Marahrens, Bruno Scaglioni and Pietro Valdastrì</i>	
16:10 - 16:20	Coffee Break		
16:20 - 18:00	Parallel Sessions		
ST4. Autonomous Transportation Systems Chairs: Chun Wang and Anjali Awasthi		SS4. Explainable Machine Learning for AS' Chairs: Yong M. Ro, Parnian Afshar and Kostas Plataniotis	
Order Dispatching in Ride-Sharing Platform under Travel Time Uncertainty: A Data-Driven Robust Optimization Approach (40) <i>Xiaoming Li, Jie Gao, Chun Wang, Xiao Huang and Yimin Nie</i>		Towards Explainable Semantic Segmentation for Autonomous Driving Systems by Multi-Scale Variational Attention (61) <i>Mohanad Abukmeil, Angelo Genovese, Vincenzo Piuri, Francesco Rundo and Fabio Scotti</i>	
Data-Driven Kalman-Based Velocity Estimation for Autonomous Racing <i>Adrià López Escoriza, Guy Revach, Nir Shlezinger & Ruud van Sloun</i> (108)		Attentive AutoEncoders for Improving Visual Anomaly Detection <i>Ambareesh Ravi and Fakhri Karray</i> (52)	
Cooperative UWB-Based Localization for Outdoors Positioning and Navigation of UAVs aided by Ground Robots (96) <i>Xianjia Yu, Qingqing Li, Jorge Peña Queraltà, Jukka Heikkonen etc.</i>		Anomaly-aware Federated Learning with Heterogeneous Data (19) <i>Zheng Chen, Chung-Hsuan Hu and Erik G. Larsson</i>	
An Off-Road Terrain Dataset Including Images Labeled with Measures of Terrain Roughness (45) <i>Gabriela Gresenz, Jules White and Douglas C. Schmidt</i>		Online Unsupervised Learning for Domain Shift in COVID-19 CT Scan Datasets (111) <i>Nicolas Ewen and Naimul Khan</i>	
A Visual Control Scheme for AUV Underwater Pipeline Tracking (34) <i>Waseem Akram and Alessandro Casavola</i>		Blind Detection of Radar Pulse Trains via Self-Convolution (89) <i>Alex Byrley and Adly Fam</i>	

Friday, Aug. 13, 2021

09:00 - 09:50	<p>Keynote 7</p> <p>Bayesian Emergent Self Awareness</p> <p>Prof. Carlo S. Regazzoni</p> <p>Cognitive Telecommunications systems at DITEN, University of Genova, Italy</p> <p>Chair: Dr. Lucio Marcenaro</p>
09:50 - 10:40	<p>Keynote 8</p> <p>On Ethics of Autonomous and Intelligent Systems (AIS)</p> <p>Prof. Hagit Messer, FIEEE</p> <p>The Kranzberg Chair in Signal Processing, School of Electrical Engineering, Tel Aviv University, Israel</p> <p>Chair: Prof. Amir Asif</p>
10:40 - 10:50	Coffee Break
10:50 - 12:30	Parallel Sessions
<p>MT5. AS Solutions for Engineering Problems</p> <p>Chair: Farokh Atashzar</p>	<p>ST5. Signal Processing for Self-Aware & Social AS'</p> <p>Chairs: Hoi-To Wai and Usman Khan</p>
<p>Simultaneous Calibration of Positions, Orientations, and Time Offsets, among Multiple Microphone Arrays (49)</p> <p><i>Chishio Sugiyama, Katsutoshi Itoyama, Kenji Nishida and Kazuhiro Nakadai</i></p>	<p>Simultaneous Distributed Estimation and Attack Detection/Isolation in Social Networks: Structural Observability, Kronecker-Product Network, and Chi-Square Detector (67)</p> <p><i>Mohammadreza Doostmohammadian, Themistoklis Charalambous, Miadreza Shafie-Khah, Nader Meskin and Usman Khan</i></p>
<p>Improved and Efficient Inter-vehicle Distance Estimation using Road Gradients of Ego and Target Vehicles (90)</p> <p><i>Muhyun Back, Jinkyu Lee, Kyuho Bae, Sung Soo Hwang and Il Yong Chun</i></p>	<p>Modified Crop Health Monitoring and Pesticide Spraying System using NDVI and Semantic Segmentation: An Acrocopter based Approach (66)</p> <p><i>Atharv Tendolkar, P.M.M. Manohara., Amit Choraria, etc.</i></p>
<p>A Graph Convolutional Neural Network for Reliable Gait-Based Human Recognition (14)</p> <p><i>Md Shopon, Svetlana Yanushkevich, Yingxu Wang and Marina Gavrilova</i></p>	<p>Local, Global and Scale-dependent Node Roles (37)</p> <p><i>Michael Scholkemper and Michael T. Schaub</i></p>
<p>Multi-Scale Feature Fusion: Learning Better Semantic Segmentation for Road Pothole Detection (57)</p> <p><i>Jiahe Fan, Junaid Bocus, Brett Hosking, Rigen Wu, Yanan Liu, Sergey Vityazev and Rui Fan</i></p>	<p>Analysis of Contractions in System Graphs: Application to State Estimation (5)</p> <p><i>Mohammadreza Doostmohammadian, Themistoklis Charalambous, Miadreza Shafie-Khah, Hamid R. Rabiee and Usman A. Khan</i></p>
<p>Deep Learning Architectures used in EEG-based Estimation of Cognitive Workload: A Review (42)</p> <p><i>Nusrat Zerir Zenia and Yaoping Hu</i></p>	
12:30 - 14:00	Lunch
14:00 - 14:50	<p>Keynote 9</p> <p>Enabling Trust in Autonomous Human-Machine Teaming</p> <p>Dr. Ming Hou, SMIEEE, FI2CICC</p> <p>Defence Research and Development Canada (DRDC), Toronto, Canada</p> <p>Chair: Prof. Yingxu Wang</p>
14:50 - 15:00	Coffee Break
15:00 - 16:40	Parallel Sessions
<p>MT6 Emerging Technologies for Autonomous Systems (II)</p> <p>Chair: Arash Mohammadi</p>	<p>SS5. Autonomous Diagnosis/Prognosis of COVID-19</p> <p>Chairs: Farnoosh Naderkhani and Moazedin J. Rafie</p>
<p>Fast Machine Learning-based Signal Classification in Energy Constrained CRN: FPGA Design and Implementation (10)</p> <p><i>Arash Rasti-Meymandi, Jamshid Abouei, Zohreh H. Meybodi, Arash Mohammadi and Amir Asif</i></p>	<p>An Ensemble Learning Framework for Multi-class COVID-19 Lesion Segmentation from Chest CT Images (98)</p> <p><i>Nastaran Enshaei, Parnian Afshar, Shahin Heidarian, Arash Mohammadi, Faranak Babaki, Konstantinos N. Plataniotis etc.</i></p>
<p>A DRL based Distributed Formation Control Scheme with Stream-Based Collision Avoidance (28)</p> <p><i>Xinyou Qiu, Xiaoxiang Li, Jian Wang, Yu Wang and Yuan Shen</i></p>	<p>WSO-CAPS: An Automated Framework for Diagnosis of COVID-19 disease from Low and Ultra-Low Dose CT scans using Capsule Networks and Window Setting (56)</p> <p><i>Shahin Heidarian, Parnian Afshar, Nastaran Enshaei, etc.</i></p>
<p>Matching Models for Crowd-shipping Considering Shipper's Acceptance Uncertainty (50)</p> <p><i>Shixuan Hou and Chun Wang</i></p>	<p>Multi-Slice Net: A novel light weight framework for COVID-19 Diagnosis (106)</p> <p><i>Harshala Gammulle, Tharindu Fernando, Sridha Sridharan, Simon Denman and Clinton Fookes</i></p>
<p>Observational Learning: Imitation Through an Adaptive Probabilistic</p>	<p>Using Reinforcement Learning to Forecast the Spread of COVID-19</p>

Approach (68) <i>Sheida Nozari, Lucio Marcenaro, David Martin and Carlo Regazzoni</i>	in France (109) <i>Soheyl Khalilpourazari and Hossein Hashemi Doulabi</i>
Detecting Anomalous Swarming Agents with Graph Signal Processing <i>Kevin Schultz, Anshu Saksena, Elizabeth Reilly, Rahul Hingorani and Marisel Villafane-Delgado (69)</i>	
16:40 - 16:50	Coffee Break
16:50 - 17:30	Plenary Panel Future Development of Autonomous Systems Panelists (TBA) Chair: Prof. Yingxu Wang
17:30 - 18:00	Awards All Co-Chairs

Tuesday, Aug. 10, 2021	
08:30 – 9:50	Student AS Competition on Vehicle Trajectories Tracking by Drones Chairs: Dr. David Martín and Dr. Lucio Marcenaro
Selected report: Team 1	
Selected report: Team 2	
Selected report: Team 3	
9:50 - 10:00	Coffee Break
10:00 - 17:10	Summer School of the AutoDefence Network Chairs: Prof. S. Yanushkevich and Dr. A. Mohammadi
10:00 - 10:05	Welcome M. Hou, S. Yanushkevich, A. Mohammadi
10:05 - 12:05	Tutorials (I) Chair: S. Yanushkevich
Cognitive Radar Design Using Deep Learning <i>Hamid Najafabadi and Henry Leung</i>	
Autonomous Systems and Autonomous Neural Networks for Machine Learning <i>Yingxu Wang</i>	
Cognitive Dynamic Systems - Acquiring Information from Surprise <i>Yeganeh Zamiri and Konstantinos N. Plataniotis</i>	
12:05 - 12:30	Lunch
12:30 - 14:00	Poster Sessions Chair: A. Mohammadi
Training-free Semantic Learning for Autonomous Fake News Recognition <i>James Y. Xu</i>	
Social Behavioral System for Person Identification from Online Traits <i>Brandon Sieu</i>	
RGBD Object Detection <i>Minyuan Huang</i>	
Trustworthy and Time-Varying Connection Scheduling in a Coupled UAV-aided Cellular Network <i>Zohreh Hajikhondi</i>	
Relatable Objects Detection <i>Thomas Truong</i>	
Autonomous, Blockchain-based, and Trustworthy Indoor Contact Tracing <i>Mohammad Salimibeni</i>	
Stress Detection and Assessment <i>Kenneth Lai</i>	
SVEA: A Small-scale Benchmark for Validating the Usability of Post-hoc Explainable AI Solutions in Image and Signal Recognition <i>Sam Sattarzadeh</i>	
A Bayesian Surprise Approach in Designing Cognitive Radar for Autonomous Vehicles <i>Yeganeh Zamiri</i>	

Towards an Internal Process Model for Trustworthy Human-machine Haptic Interactions <i>Stanley Tarnq</i>	
Multi-Agent Gradient-based Off-policy Actor-Critic Algorithm for Reinforcement Learning <i>Jineng Ren</i>	
Explainable AI Frameworks for Visual Anomaly Detection <i>Xiaozhuo Yu</i>	
14:00 - 16:50	Tutorials (II) Chair: S. Yanushkevich
State-of-the-art of Sensory Cue Integration <i>Stanley Tarnq and Yaoping Hu</i>	
Spatio-Temporal Forecasting for Multivariate Time-Series <i>Mark Coates</i>	
Analysis and Prediction in Autonomous Biometrics Authentication Systems <i>Marina Gavrilova</i>	
Deep Learning Approaches for Visual Anomaly Detection <i>Ambareesh Ravi and Fakhri Karray</i>	
Visual Post-hoc Explainable AI (XAI) for Convolution Neural Networks <i>Sam Sattarzadeh and Konstantinos N. Plataniotis</i>	
16:50 - 17:10	Summary All Co-PIs