

Virtual and intelligent traffic signs in rescue simulation system: imitation of human society in agent society

Authors: [Mostafa Asghari](#) Azad University of Miyandoab, Iran
[Behrooz Masoumi](#) Azad University of Qazvin, Iran
[Mohammad Reza Meybodi](#) Amirkabir University of Technology, Department of Computer Engineering and IT, Tehran, Iran

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Robocup Rescue Simulation System is a suitable test-bed for test and evaluation of multi-agent system's related ideas and techniques. Hence, the world robocup competitions are held each year and the used ideas and techniques are evaluated in the form of different teams. In rescue simulation system, at the start of simulation, police agents should search and explore the earthquake area and open the blocked roads. In this paper, which is the first application of distributed learning automata in rescue simulation system, the agents imitate the ways which real people use for solving traffic problems in their societies. Like the real peoples' solutions for traffic problem, the agents use virtual police and street signs in their virtual environment junctions. The results indicate the fact that the proposed method gives more exploration power to rescue agents.

↑ AUTHORS[Mostafa Asghari](#)

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[Post](#)[↑ Table of Contents](#)**Proceedings of the 8th IEEE international conference on Computational intelligence in robotics and automation****Table of Contents****SECTION: Multi co-operative robotics**[Grasp Motion Planning for box opening task by multi-fingered hands and arms](#)[Tetsuyou Watanabe, Michael Beetz](#)

Pages: 1-7

The aim of our project is to develop a robot to manipulate an object in human environment. In this paper, as a first step, we focus on opening paper box such as tea box, and present a method to plan grasp motion by 2 arms with multi-fingered hands. we ...[expand](#)

[Planning of diverse complex cooperative robot actions using multi-stage genetic algorithm](#)[Masakazu Suzuki](#)

Pages: 8-14

This article is concerned with autonomous planning of diverse cooperative robot actions. In this work complex cooperative actions are realized based upon the Intelligent Composite Motion Control, which is a learning methodology for intelligent robots ...[expand](#)

[Exploration and mapping for unstructured robot teams](#)[Adrian Martin, M. Reza Emami](#)

Pages: 15-20

As the applications of mobile robot teams become more complex, the impracticability of designing custom solutions is becoming increasingly obvious. A new approach to control system design is required to facilitate the development of modular and scalable ...[expand](#)

SECTION: Neural networks[Stable trajectory generator: echo state network trained by particle swarm optimization](#)[Qingsong Song, Zuren Feng](#)

Pages: 21-26

Recurrent neural networks (RNNs) have good modeling capability for nonlinear dynamic systems, but due to the difficulties for training this superiority is discounted. Echo state network (ESN) is a new paradigm for using RNNs with a simpler training method, ...[expand](#)

[Modular reservoir computing networks for imitation learning of multiple robot behaviors](#)[Tim Waegeman, Eric Antonelo, Francis Wyffels, Benjamin Schrauwen](#)

Pages: 27-32

Autonomous mobile robots must accomplish tasks in unknown and noisy environments. In this context, learning robot behaviors in an imitation based approach would be desirable in the perspective of service robotics as well as of learning robots. In this ...[expand](#)

[Interactive evolutionary computation for robot design support system](#)[Wataru Sato, Naoyuki Kubota](#)

Pages: 33-38

Recently, human-friendly support systems for product design have been developed as demands of individual user to products become diversified. In the previous works, Interactive Evolutionary Computation has been applied to support product designs. An ...[expand](#)

[CMAC neural networks structures](#)[Kamran Mohajeri, Ghasem Pishehvar, Mohammad Seifi](#)

Pages: 39-45

Cerebellar Model Articulation Controller (CMAC) NN is a computational model of cerebellum introduced as an alternative to backpropagated multilayer networks to control robot arms. From then it has seen many improvements and has been applied in many other ...[expand](#)

SECTION: Social intelligence[Robot deception: recognizing when a robot should deceive](#)[Alan R. Wagner, Ronald C. Arkin](#)

Pages: 46-54

This article explores the possibility of developing robot control software capable of discerning when and if a robot should deceive. Exploration of this problem is critical for developing robots with deception capabilities and may lend valuable insight ...[expand](#)

[A small world algorithm for high-dimensional function optimization](#)[Xiaohu Li, Jinhua Zhang, Sunan Wang, Maolin Li, Kunpeng Li](#)

Pages: 55-59

In this paper, we describe a new small world optimization algorithm for obtaining satisfactory solution for high-dimensional function. Based on the small world phenomenon which is revealed in Milgram's sociological experiment, some operators with decimal-coding ...[expand](#)

[Towards social-therapeutic robots: how to strategically implement a robot for social group therapy?](#)[Kiju Lee, Georgios Kaloutsakis, Jeremy Couch](#)

Pages: 60-65

One of the most innovative applications of robotics is creating artificial social relationships between humans and robots in order to promote healthier and more active lifestyles as a means of long-term, sustainable healthcare solutions. This paper describes ...[expand](#)

[Stochastic approach on a simplified OCC model for uncertainty and believability](#)

[Won Hwa Kim](#), [Jeong Woo Park](#), [Won Hyong Lee](#), [Woo Hyun Kim](#), [Myung Jin Chung](#)

Pages: 66-71

As robots step into the human's daily lives, interaction and communication between human and robot is becoming essential. For this social interaction with humans, we propose an emotion generation model considering simplicity, believability and uncertainty. ...[expand](#)

SECTION: Computer vision 1

[Examining robotic systems with shape-adjustable manipulators under dynamic environments: from simulation to verification](#)

[Chih-Hong Cheng](#), [Alois Knoll](#), [Christian Buckl](#), [Javier Esparza](#), [Yang Chen](#)

Pages: 72-77

In this paper, we present our preliminary report in applying formal verification to the design process of robotic systems under dynamic environments; the goal is to complement existing testing or simulation techniques by experimenting an adaptable framework, ...[expand](#)

[SILT: scale-invariant line transform](#)

[Bahador Khaleghi](#), [Malek Baklouti](#), [Fakhreddin O. Kararay](#)

Pages: 78-83

Line matching is useful in many computer vision tasks such as object recognition, image registration, and 3D reconstruction. The literature on line matching has advanced in recent years, nevertheless, compared to other features (such as point and region ...[expand](#)

[Vision-based servo control of a quadrotor air vehicle](#)

[Zehra Ceren](#), [Erdinc Altun](#)

Pages: 84-89

Unmanned aerial vehicles (UAVs) are seeing more widespread use in military, scientific, and civilian sectors in recent years. This study presents algorithms for the visual servo control of an UAV. The helicopter has been stabilized with visual information ...[expand](#)

SECTION: Machine learning

[Information-based exploration strategy for mobile robot in dynamic environment](#)

[Satoshi Hirashita](#), [Takehisa Yairi](#)

Pages: 90-95

To meet the necessity of handling environmental uncertainties of mobile robots, we proposed an efficient exploration strategy to gather information, called Entropy Sweeper. To do so, we utilized the entropy distribution and the utility function to determine ...[expand](#)

[A boltzmann theory based dynamic agglomerative hierarchical clustering](#)

[Gang Li](#), [Jian Zhuang](#), [Hongning Hou](#), [Dehong Yu](#)

Pages: 96-101

In this study, a novel dynamic agglomerative hierarchical clustering algorithm which combines Boltzmann theory of thermodynamics and a graph-theoretic representation of data objects is put forward for data with non-sphere shape clusters. The new algorithm ...[expand](#)

[Q-learning using fuzzified states and weighted actions and its application to omni-directional mobile robot control](#)

[Dong-Hyun Lee](#), [In-Won Park](#), [Jong-Hwan Kim](#)

Pages: 102-107

The conventional Q-learning algorithm is described by a finite number of discretized states and discretized actions. When the system is represented in continuous domain, this may cause an abrupt transition of action as the state rapidly changes. To avoid ...[expand](#)

[A cognitive approach for a robotic welding system that can learn how to weld from acoustic data](#)

[Ingo Stork](#), [genannt Wersborg](#), [Thibault Bautze](#), [Frederik Born](#), [Klaus Diepold](#)

Pages: 108-113

Laser beam welding is the method of choice for the high-quality joining of materials. However, for industrial production these systems have to be set up and calibrated manually with much effort. Our objective is to apply intelligent data processing that ...[expand](#)

[Use of the knowledge which is independence on reward in reinforcement learning](#)

[Yoshiki Miyazaki](#), [Kentarou Kurashige](#)

Pages: 114-119

Now, there are some techniques called machine learning, and reinforcement learning is one of the machine learning which often used for actual machine. In this study, we pay attention to the knowledge that does not depend on a reward in reinforcement ...[expand](#)

SECTION: Swarm intelligence

[DEM: a discrete electromagnetism-like mechanism for solving discrete problems](#)

[Omid AghaLatifi](#), [Mohammad Reza Bonyadi](#)

Pages: 120-125

In this paper a novel model based on Electromagnetism-Like Mechanism (EM) is proposed which is highly compatible with discrete space problems. The proposed method utilizes the EM operators to move particles towards an optimal or near optimal solutions. ...[expand](#)

[Autonomous behavior system combining motivation with consciousness using dopamine](#)

[Eiji Hayashi](#), [Takahiro Yamasaki](#), [Koichiro Kuroki](#)

Pages: 126-131

To enhance the affinity between humans and robots, we have attempted to give a robot "consciousness" and "emotion" such as that identified in

humans and animals. A hierarchical structure model has been developed to connect the robot's consciousness with ...[expand](#)

[Comparative study of genetic algorithm and ant colony optimization algorithm performances for robot path planning in global static environments of different complexities](#)

[Nohaidda Binti Sariff, Norlida Buniyamin](#)

Pages: 132-137

This paper presents the application of Genetic Algorithm (GA) and Ant Colony Optimization (ACO) Algorithm for robot path planning (RPP) in global static environment. Both algorithms were applied within global maps that consist of different number of ...[expand](#)

[Bio-insect and artificial robots interaction: a dragging mechanism and experimental results](#)

[Ji-Hwan Son, Hyo-Sung Ahn](#)

Pages: 138-141

In this paper, we introduce the experimental test platform for bio-insect and artificial robot interaction based on distributed systems (BRIDS). The main architecture of the BRIDS was reported in [1] and simulation results were introduced in [2, 3]. ...[expand](#)

SECTION: Adaptive and learning system 1

[A combined skin model and feature approach for tracking of human faces](#)

[Jamil Abou Saleh, Malek Baklouti, Fakhreddine Kararay](#)

Pages: 142-147

In this paper, we propose a face detection framework that combines both feature, and skin pixel approaches, while making the framework self adaptive which is important for non controlled environmental conditions. The framework uses skin color information ...[expand](#)

[Adaptive sliding mode trajectory tracking control of mobile robot with parameter uncertainties](#)

[Li Kunpeng, Wang Xuwen, Yuan Mingxin, Li Xiaohu, Wang Sunan](#)

Pages: 148-152

The trajectory tracking control problem of nonholonomic mobile robots with parameter uncertainties has been analyzed. The kinematics and dynamical models of mobile robots are taken into account, the control rule based on the kinematics model is taken ...[expand](#)

[Active suspension control scheme for vehicles without measurements of tire deflection](#)

[Katsuhiro Okumura, Masahiro Oya, Masashi Nagae, Hidetaka Ota, Hideki Wada](#)

Pages: 153-158

In this paper, a new active suspension control scheme is proposed in which the tire deflections are not required. The controller has good property that we can specify a location where the ride comfort becomes best. To achieve this end, a combined ideal ...[expand](#)

[Animal-robot interaction for pet caring](#)

[Jong-Hwan Kim, Seung-Hwan Choi, Duckhwan Kim, Joonwoo Kim, Minjoo Cho](#)

Pages: 159-164

Pet has been serving as an emotional companion to people. However, nowadays it is common that people are too busy to take care of their pet due to everyday work. This research is to see the possibility that robot can replace the role of taking care of ...[expand](#)

[Topological environment reconstruction in informationally structured space for pocket robot partners](#)

[Naoyuki Kubota, Akihiro Yorita](#)

Pages: 165-170

This paper deals with environment reconstruction in informationally structured space used for pocket robot partners. The environmental information is measured through the sensor network, and is stored in the remote host computer. The pocket robot partner ...[expand](#)

SECTION: Evolutionary computation 1

[A meta-heuristic paradigm for solving the forward kinematics of 6-6 general parallel manipulator](#)

[Rohitash Chandra, Marcus Frean, Luc Rolland](#)

Pages: 171-176

The forward kinematics of the general Gough platform, namely the 6-6 parallel manipulator is solved using hybrid meta-heuristic techniques in which the simulated annealing algorithm replaces the mutation operator in a genetic algorithm. The results are ...[expand](#)

[Solving the forward kinematics of the 3RPR planar parallel manipulator using a hybrid meta-heuristic paradigm](#)

[Rohitash Chandra, Mengjie Zhang, Luc Rolland](#)

Pages: 177-182

The forward kinematic of the 3-RPR parallel manipulator is solved using a hybrid meta-heuristic technique where the simulated annealing algorithm replaces the mutation operator in a genetic algorithm. The results from the hybrid meta-heuristic approach ...[expand](#)

[Feature generation in fault diagnosis based on immune programming](#)

[Li Maolin, Liang Lin, Wang Sunan, Li Xiaohu](#)

Pages: 183-187

In the symptom feature discovery, genetic programming has the shortage of premature convergence. So a new feature generation method based on immune programming is put forward. The new features are constructed by polynomial expressions of the original ...[expand](#)

[A hybrid cultural algorithm with local search for traveling salesman problem](#)

[Yongjun Kim, Sung-Bae Cho](#)

Pages: 188-192

A new Hybrid Cultural Algorithm with Local Search (HCALS) is introduced to solve Traveling Salesman Problem (TSP). The algorithm integrates the local search method into the cultural algorithm which uses social intelligence to guide and lead individuals ...[expand](#)

[A master-slave algorithm for control of micro-macro manipulators along unknown path](#)

[Mohammad J. Sadigh, Ali Salehi](#)

Pages: 193-198

Micro-Macro manipulators are considered as a solution for applications which needs precise manipulation within a large work space. Such systems consists of two parts i.e. a flexible large manipulator - Macro - and a rigid short manipulator - Micro. There ...[expand](#)

SECTION: Intelligent systems 1

[Force control in multi-degree-of-freedom flexible systems - sensorless technique](#)

[Islam S. M. Khalil, A. T. Naskali, Asif Sabanovic](#)

Pages: 199-204

This paper presents a novel sensorless force control algorithm for Multi-degree-of-freedom flexible systems which enables controlling the interaction forces with the environment without using force sensors. The coupled nature of flexible system dynamics ...[expand](#)

[Virtual and intelligent traffic signs in rescue simulation system: imitation of human society in agent society](#)

[Mostafa Asghari, Behrooz Masoumi, Mohammad Reza Meybodi](#)

Pages: 205-209

Robocup Rescue Simulation System is a suitable test-bed for test and evaluation of multi-agent system's related ideas and techniques. Hence, the world robocup competitions are held each year and the used ideas and techniques are evaluated in the form ...[expand](#)

[Decompose the operational space of FG vision system into parallel virtual planes to support autonomous navigation in dynamic environment](#)

[Maki K. Habib](#)

Pages: 210-215

This article introduces the development of a fast 3D active vision system, and a new concept based on space decomposition into virtual planes to support 3D real time obstacle detection during the navigation mission of autonomous mobile robots. This system ...[expand](#)

[Applying a neuro-fuzzy classifier for gesture-based control using a single wrist-mounted accelerometer](#)

[Nona Helmi, Mohammad Helmi](#)

Pages: 216-221

Gestures, due to their natural modality, can be normally used in human-computer interaction (HCI) domains such as robotics, design environments and handheld devices. In this paper, a single wrist-mounted triaxial accelerometer is used to collect the ...[expand](#)

[Gain-scheduled Takagi-Sugeno fuzzy PI control methodology for LPV systems](#)

[Joabe Silva, Ginalber Serra](#)

Pages: 222-227

This work proposes a theoretical approach of gainscheduled fuzzy PI control design based on gain and phase margins specifications for LPV (Linear and Parameters Varying) systems, in the continuous time domain. A mathematical formulation from the Takagi-Sugeno ...[expand](#)

[An action pool architecture for multi-tasking service robots with interdependent resources](#)

[Tapio Taipalus, Aarne Halme](#)

Pages: 228-233

We present a novel control architecture for execution of multiple tasks simultaneously. Traditionally, the task control architecture of a service robot has been focused on executing one task at a time. This has mainly been due to the history of mobility ...[expand](#)

SECTION: Computer vision 2

[Super-resolution using regularized orthogonal matching pursuit based on compressed sensing theory in the wavelet domain](#)

[Tingting Li](#)

Pages: 234-239

We proposed a compressed sensing Super Resolution algorithm based on wavelet. The proposed algorithm performs well with a smaller quantity of training image patches and outputs images with satisfactory subjective quality. It is tested on classical images ...[expand](#)

[JSEG-based image segmentation in computer vision for agricultural mobile robot navigation](#)

[Luciano C. Lulio, Mario L. Tronco, Arthur J. V. Porto](#)

Pages: 240-245

This project aims to apply image processing techniques in computer vision featuring an omnidirectional vision system to agricultural mobile robots (AMR) used for trajectory navigation problems, as well as localization matters. To carry through this task, ...[expand](#)

[Particle filter based self-localization using visual landmarks and image database](#)

[Wardah Inam](#)

Pages: 246-251

This paper presents an approach to vision-based self-localization using the combination of particle filter and preprocessed image database. The robot uses particle filter with odometry data and landmark pose for position tracking. Furthermore, it uses ...[expand](#)

[Trajectories tracing for a pitching robot based on human recognition](#)

[Osamu Yuuki, Kunihiro Yamada, Naoyuki Kubota](#)

Pages: 252-257

In this study, we discussed human recognition method for the trajectory tracking. Visual perception is very important to realize the feature extraction from the time series of images, but it is very difficult to perform the object tracking. We classified ...[expand](#)

SECTION: Evolutionary robotics

[Evolving multirobot excavation controllers and choice of platforms using an artificial neural tissue paradigm](#)

[Jekanthan Thangavelautham, Nader Abu El Samid, Paul Grouchy, Ernest Earon, Terence Fu, Nagina Nagrani, Gabriele M. T. D'Eleuterio](#)

Pages: 258-265

Autonomous robotic excavation has often been limited to a single robotic platform using a specified excavation vehicle. This paper presents a novel method for developing scalable controllers for use in multirobot scenarios and that do not require human ...[expand](#)

[Evolutionary optimized footstep planning for humanoid robot](#)

[Young-Dae Hong](#), [Ye-Hoon Kim](#), [Jong-Hwan Kim](#)

Pages: 266-271

This paper proposes a novel evolutionary optimized footstep planner for humanoid robot. Firstly, a footstep planner using univector field navigation method is proposed to provide a command state (CS) which is to be the input of modifiable walking pattern ...[expand](#)

[Trajectory planning optimization with dynamic modeling of four wheeled omni-directional mobile robots](#)

[Ehsan Hashemi](#), [Maani Ghaffari Jadidi](#), [Omid Bakhshandeh Babarsad](#)

Pages: 272-277

Path planning together with the tuning and determination of controller parameters are major concerns in omnidirectional mobile robots. Defining appropriate controller parameters in acceleration and deceleration to reach far and near target points without ...[expand](#)

[A new approach to simultaneous localization and map building with learning: neoslam \(neuro-evolutionary optimizing\)](#)

[Jeong-Gwan Kang](#), [Su-Yong An](#), [Sunhyo Kim](#), [Se-Young Oh](#)

Pages: 278-284

This paper addresses a novel approach to the solution of the Simultaneous Localization and Mapping (SLAM) problem based on a Neuro Evolutionary Optimization (NeoSLAM) method. The proposed algorithm first casts SLAM as a global optimization problem using ...[expand](#)

[Evolution of co-operative communication signals in artificial societies](#)

[Zack Z. Zhu](#)

Pages: 285-289

Experimental issues arise when scientists attempt to directly study emergent behaviour brought on by the evolutionary process. Recently, algorithms that simulate artificial evolution in robotic societies have been used to circumvent such issues. This ...[expand](#)

SECTION: Intelligent systems 2

[An artificial neural network approach for creating an ethical artificial agent](#)

[Ali Reza Honarvar](#), [Nasser Ghasem-Aghaee](#)

Pages: 290-295

Autonomous robotic systems and intelligent artificial agents' capability have advanced dramatically. Since the intelligent artificial agents have been developing more autonomous and human-like, the capability of them to make moral decisions becomes an ...[expand](#)

[Path planning algorithm for VTOL type UAVs based on the methods of ray tracing and limit cycle](#)

[Byung Cheol Min](#), [Hee Yeul Kwon](#), [Donghan Kim](#)

Pages: 296-301

In this paper, the new path planning algorithm for vertical take-off and landing (VTOL) type unmanned aerial vehicles (UAVs), which is widely used in various practical applications, is introduced. The essence of the algorithm comes from the existing ...[expand](#)

[A study on hierarchical modular reinforcement learning for multi-agent pursuit problem based on relative coordinate states](#)

[Tatsuya Wada](#), [Takuya Okawa](#), [Toshihiko Watanabe](#)

Pages: 302-308

In order to realize intelligent agent such as autonomous mobile robots, Reinforcement Learning is one of the necessary techniques in behavior control system. However, applying the reinforcement learning to actual sized problem, the "curse of dimensionality" ...[expand](#)

[Embedding intelligent agents to enable physical robotic and sensor organizations](#)

[Eric T. Matson](#)

Pages: 309-315

The integration of multiagent systems (MAS) with organizations creates a platform to solve a number of real world problems. Extending the use of multiagent organizations to work with physical sensors and robotic systems synergizes the control ability ...[expand](#)

[Path planning strategy design under the experience of mobile robot navigation](#)

[Wen-Yo Lee](#), [An-Doo Yang](#), [Ta-Chih Hung](#), [Jhu-Syuan Guo](#)

Pages: 316-321

This paper presents a path planning strategy for a mobile robot. The path planning strategy is according to the experience that the mobile robot has been experienced in target navigation. The mixed reality technique is implemented by both the Virtools ...[expand](#)

SECTION: Computer vision 3

[Head orientation estimation for covert-tracking robot](#)

[Wei Zou](#), [Lixin Fang](#), [Yuan Li](#), [Kui Yuan](#)

Pages: 322-327

Covert-tracking robot refers to the mobile robot that not only can follow a human objective, but at the same time can control itself to keep away from the human's visual field. This paper proposes a head orientation estimation method based on probability ...[expand](#)

[Range image registration using hierarchical segmentation and clustering](#)

[Yonghuai Liu](#), [Longzhuang Li](#), [Xianghua Xie](#), [Baogang Wei](#)

Pages: 328-333

An accurate, robust, and automatic registration of overlapping range images is usually a pre-requisite step for range image analysis and applications. While accurate depiction of object geometry requires the increase of the resolutions of images and ...[expand](#)

[Accurate camera calibration using the collinearity constraint](#)[Yonghuai Liu, Ala Al-Obaidi, Anthony Jakas, Junjie Liu](#)

Pages: 334-339

In this paper, we apply the collinearity constraint for accurate camera calibration and correction. The novel method consists of two steps: the first is to estimate the relative parameters of interest with closed form solutions. The second employs the ...[expand](#)

[Formation coordination for self-mobile localization: framework](#)[Hyo-Sung Ahn](#)

Pages: 340-348

In this paper we introduce a framework for self-mobile localization of a group of mobile agents via a novel formation coordination. The key idea of formation coordination is to make an agent move while fixing other agents as reference nodes. Since the ...[expand](#)

SECTION: **Sensor fusion 1**[Sensor fusion for differential encoder integrated with light intensity sensors and accelerometer](#)[P. Surachai, T. Thiraporn, L. Chaipayorn, T. Kittichai, S. Tayawat](#)

Pages: 349-354

This paper proposed mainly fusions between encoders and light intensity sensors and between encoders and accelerometer for distance increment with Kalman filter to estimate robot's position. A developed fusion algorithm between differential encoder system ...[expand](#)

[A multi-step heart rate prediction method based on physical activity using Adams-Bashforth technique](#)[Feng Xiao, Ming Yuchi, Ming-yue Ding, Jun Jo, Jong-Hwan Kim](#)

Pages: 355-359

Physical activity (PA) is commonly recognized to directly influence changes in heart rate (HR). HR prediction based on PA can be a useful tool in medical research and monitoring in a clinical setting. In our previous works, predictors with high accuracy ...[expand](#)

[Visual-inertial simultaneous localization, mapping and sensor-to-sensor self-calibration](#)[Jonathan Kelly, Gaurav S. Sukhatme](#)

Pages: 360-368

Visual and inertial sensors, in combination, are well-suited for many robot navigation and mapping tasks. However, correct data fusion, and hence overall system performance, depends on accurate calibration of the 6-DOF transform between the sensors (one ...[expand](#)

[Speeding up top-down attention control learning by using full observation knowledge](#)[N. Noori, M. Nili Ahmadabadi, M. S. Mirian, B. N. Araabi](#)

Pages: 369-374

we present a general mathematical description of the top-down attention control problem. Three important components are identified in the model: context extraction, attention focus and decision making. The context gives a coarse blurry representation ...[expand](#)

[Registration of fixed-and-mobile- based terrestrial laser data sets with DSM](#)[Taha Ridene, François Goulette](#)

Pages: 375-380

This study tackles the production of 3D realistic map databases for outdoor environments. An approach based on the fusion of heterogeneous 3D representations was studied. We propose a variant of ICP (Iterative Closest Point) based on an adaptive dynamic ...[expand](#)

SECTION: **Behavioral intelligence**[An ethical adaptor: behavioral modification derived from moral emotions](#)[Ronald C. Arkin, Patrick Ulam](#)

Pages: 381-387

This paper presents the motivation, basis and a prototype implementation of an ethical adaptor capable of using a moral affective function, guilt, as a basis for altering a robot's ongoing behavior. While the research is illustrated in the context of ...[expand](#)

[Bilateral teleoperation systems using genetic algorithms](#)[Byeong-Yeon Kim, Hyo-Sung Ahn](#)

Pages: 388-393

This paper presents a synchronization scheme of bilateral teleoperation systems with time delay using genetic algorithms. In general, bilateral teleoperation systems have two main goals: stability and transparency. The system can be destabilized by time ...[expand](#)

[Harmonic opponent modeling and behavior structure for 3D soccer simulation agent](#)[B. Jozi, A. Fakharian, M. Nademi, M. Yousefi Azar Khanian](#)

Pages: 394-397

As the beginning of the 3D soccer simulation competitions the simulated humanoid robots were used to play soccer in simulated games, this event shifted the aim of the soccer simulation from the design of strategic behaviors into the low level skills ...[expand](#)

[Appearance-based action recognition in the tensor framework](#)[Behrouz Saghaei Khadem, Deepu Rajan](#)

Pages: 398-403

There are multiple contributory factors taking place in an action video, e.g., person, clothing, illumination, etc. When these factors change together, conventional 1-mode analysis like PCA in action space encounters difficulties. The N- mode ...[expand](#)

[A study on an ion polymer metal composite actuator as a self-sensing system](#)[K. K. Ahn, D. N. C. Nam, D. Q. Truong, J. I. Yoon, T. Q. Thanh](#)

Pages: 404-408

An ion polymer metal composite (IPMC) is an Electro-Active Polymer (EAP) that bends in response to a small electrical field as a result of mobility of cations in the polymer network and vice versa. A typical IPMC sheet is constructed with a thin ionic ...[expand](#)

SECTION: Adaptive and learning system 2

[Adaptive steering controller to improve handling stability for driver-combined-vehicles system](#)

[Qiang Wang, Masahiro Oya, Natsuki Takagi, Yuichiro Taira, Hidetaka Ota](#)

Pages: 409-414

If the dynamics of combined vehicles such as tractor-semitrailer varies greatly, it may be very difficult for inexperienced drivers to achieve good handling stability. Moreover, once combined vehicles become unstable, it is very difficult for all drivers ...[expand](#)

[Adaptive control of systems with input saturation: a scheme using output derivatives of order up to relative degree](#)

[Natsuki Takagi, Masahiro Oya, Qiang Wang, Toshihiro Kobayashi](#)

Pages: 415-420

In this paper, the main attention is focused on transient property of control input signal, we propose a novel adaptive controller for time-continuous single-input single-output linear systems with an input saturation in which i -th derivatives ...[expand](#)

[Learning to grasp unknown objects based on 3D edge information](#)

[Leon Bodenbagen, Dirk Kraft, Mila Popović, Emre Başeski, Peter Eggenberger Hotz, Norbert Krüger](#)

Pages: 421-428

In this work we re ne an initial grasping behavior based on 3D edge information by learning. Based on a set of autonomously generated evaluated grasps and relations between the semi-global 3D edges, a prediction function is learned that computes a likelihood ...[expand](#)

[Dynamic state estimation using particle filter and adaptive vector quantizer](#)

[Takeshi Nishida, Wataru Kogushi, Natsuki Takagi, Shuichi Kurogi](#)

Pages: 429-434

Particle filter (PF) is a method for discrete approximation of dynamic and non-Gaussian probability distribution by using numerous particles, and its procedure can execute at high speed and is suitable for on-line applications. However, in conventional ...[expand](#)

[Identification and verification of a MR damper using a nonlinear black box model](#)

[D. Q. Truong, K. K. Ahn, J. I. Yoon, T. Q. Thanh](#)

Pages: 435-440

Nowadays, magneto-rheological (MR) fluid dampers (MRD) are widely used for the semi-active suspension control in vibration community. However, the inherent nonlinear nature of the MRD causes challenges for damping control of the suspension system using ...[expand](#)

[Acquisition of shared symbols in multi-agent cooperative tasks](#)

[Siavash Kayal, Abdol Hossein Aminaiee, Caro Lucas](#)

Pages: 441-444

In this paper a novel mechanism for acquiring shared symbols in multi-agent cooperative task is introduced. Inspired by human communication, a technique is suggested in which learning the behaviors and learning how to communicate are decomposed. Decomposing ...[expand](#)

SECTION: Evolutionary computation 2

[Bacterial foraging oriented by particle swarm optimization strategy for PID tuning](#)

[Wael M. Korani, Hassen Taher Dorrah, Hassan M. Emara](#)

Pages: 445-450

Proportional integral derivative (PID) controller tuning is an area of interest for researchers in many disciplines of science and engineering. This paper presents a new algorithm for PID controller tuning based on a combination of the foraging behavior ...[expand](#)

[A hybrid PSO-DV based intelligent method for fault diagnosis of gear-box](#)

[Liu Bo, Pan Hongxia](#)

Pages: 451-456

The gear box fault occur can lead to the fatal breakdown of mechanical system. Back propagation neural network (BPNN) have been proved to be of widespread utility for identifying and classifying gear box faults to prevent serious damage in a mechanical ...[expand](#)

[Finding multiple first order saddle points using a valley adaptive clearing genetic algorithm](#)

[Mostafa M. H. Ellabaan, Yew Soon Ong, Meng Hiot Lim, Kuo Jer-Lai](#)

Pages: 457-462

First order saddle points have important applications in different fields of science and engineering. Some of their interesting applications include estimation of chemical reaction rate, image segmentation, path-planning and robotics navigation. Finding ...[expand](#)

[Collision-free curvature-bounded smooth path planning using composite Bezier curve based on Voronoi diagram](#)

[Yi-Ju Ho, Jing-Sin Liu](#)

Pages: 463-468

In this paper, we present an obstacle avoiding smooth path planning method based on Voronoi diagram and composite Bezier curve algorithm which obtains the curvature bounded path with small length. In our algorithm, a Voronoi diagram is constructed according ...[expand](#)

[Online training for single hidden-layer Online training for single hidden-layer](#)

[Hieu Trung Huynh, Yonggwan Won](#)

Pages: 469-473

Extreme learning machine (ELM) is one of the effective training algorithms for single hidden layer feedforward neural networks (SLFNs), but it often requires a large number of hidden units which makes the trained networks respond slowly to input patterns. ...[expand](#)

SECTION: **Fuzzy logic**

[New fuzzy-based anti-swing controller for helicopter slung-load system near hover](#)

[Hanafy M. Omar](#)

Pages: 474-479

In this paper, a new fuzzy based anti-swing controller for helicopter slung load system near hover flight is proposed. The output from this controller is additional displacements that are added to the helicopter trajectory in the longitudinal and lateral ...[expand](#)

[Designing integrated guidance law for aerodynamic missiles by multi-objectives evolutionary algorithm and tabu search](#)

[Hanafy M. Omar](#), [M. A. Abido](#)

Pages: 480-487

In this paper, a Strength Pareto Evolutionary Algorithm (SPEA) based approach is proposed for designing an Integrated Fuzzy Guidance Law which consists of three fuzzy controllers. Each of these controllers is activated in a region of the interception. ...[expand](#)

[An intelligent fuzzy controller based on genetic algorithms](#)

[M. Yousefi Azar Khanian](#), [A. Fakharian](#), [M. Godarzvand Chegini](#), [B. Jozi](#)

Pages: 486-491

In view of many applications, in recent years, there has been increasing interest in robot's control. Two intelligent controllers based on fuzzy logic and neural network are developed to trace the desired trajectory for a robot. A variety of evolutionary ...[expand](#)

[Takagi-Sugeno fuzzy control method for nonlinear systems](#)

[Ginalber L. O. Serra](#), [Carlos Cesar T. Ferreira](#)

Pages: 492-496

This paper proposes a new methodology for analysis and design of robust fuzzy Takagi-Sugeno (TS) control, with PID structure, for nonlinear systems, based on gain and phase margins specifications. The nonlinear system to be controlled, is studied in ...[expand](#)

[A new design of fuzzy logic controller based on generalized orthogonality principle](#)

[Nora Boumella](#), [Karim Djouani](#), [Sohail Iqbal](#)

Pages: 497-502

Improving Fuzzy Logic System (FLS) design is of main interest. Linguistic rules of a FLS can be converted into Fuzzy Basis Functions (FBFs). Moreover, numerical rules and their FBFs can be extracted from numerical training data. This combination of both ...[expand](#)

[Rendering of environmental force feedback in mobile robot teleoperation based on fuzzy logic](#)

[Ildar Farkhatdinov](#), [Jee-Hwan Ryu](#), [Jury Poduraev](#)

Pages: 503-508

In this paper a study on rendering of environmental force feedback in mobile robot teleoperation based on fuzzy logic is presented. To ensure safety of mobile robot teleoperation it is often necessary to provide environmental force feedback which is ...[expand](#)

SECTION: **Computer vision 4**

[A comparative study of different corner detection methods](#)

[JunJie Liu](#), [Anthony Jakas](#), [Ala Al-Obaidi](#), [Yonghuai Liu](#)

Pages: 509-514

Interest points are widely used in computer vision applications such as camera calibration, robot localization and object tracking that require fast and efficient feature matching. A large number of techniques have been proposed in the literature. This ...[expand](#)

[Real-time feature point tracking at 1000 fps](#)

[Idaku Ishii](#), [Ryo Sukenobe](#), [Yuta Moriue](#), [Kenkichi Yamamoto](#)

Pages: 515-520

Real-time feature point tracking at 1000 fps was performed by implementing a feature point tracking algorithm on a high-speed vision platform, which is improved for hardware integration and high-speed processing at real time. The high-speed vision platform ...[expand](#)

[A statistical image retrieval method using color invariant](#)

[Cheng Jin](#)

Pages: 521-525

Content based image retrieval is an essential task in many image processing applications, among which, color based methods have been receiving constant attentions in past years, because color information is a discriminative descriptor for image retrieval, ...[expand](#)

[Composite visual servoing for catching a 3-D flying object using RLS trajectory estimation from a monocular image sequence](#)

[R. Herrejon](#), [S. Kagami](#), [K. Hashimoto](#)

Pages: 526-531

Online coordination of visual information with slow speed manipulator control is studied in the specific task of three dimensional robotic catching using position based visual servoing. The problem involves the design and application of a recursive algorithm ...[expand](#)

[Environment adaptive 3D object recognition and pose estimation by cognitive perception engine](#)

[Hyunjun Kim](#), [Jangwon Lee](#), [Sukhan Lee](#)

Pages: 532-539

In this paper, we propose novel evidence selection and collection method based on Bayesian theorem for object recognition and pose estimation in real environment. To recognize and estimate 3D object pose accurately, photometric and geometric evidences ...[expand](#)

[Fast neighbor cells finding method for multiple octree representation](#)

[Jaewoong Kim](#), [Sikhan Lee](#)

Pages: 540-545

A cell occupancy map has been used widely for efficiently representing obstacles in robotic navigation. Such a map can often be formed based on the multi-resolution octree representation (MOR) of 3D point clouds captured from objects and workspace. This ...[expand](#)

SECTION: **Sensor fusion 2**

[Range image registration using plane extraction by the CAN2](#)

[Shuichi Kurogi](#), [Hideaki Koya](#), [Ryoji Nagashima](#), [Daisuke Wakeyama](#), [Takshi Nishida](#)

Pages: 546-550

This paper describes range image registration to fuse three-dimensional surfaces of range images taken from around an object. By means of using the competitive associative net caUed CAN2 for plane extraction, we constructed two methods: one is for the ...[expand](#)

[FPGA based hardware in the loop test platform of small size UAV](#)

[Ta-ming Shih](#), [Ho-chung Chang](#)

Pages: 551-556

Recently, there has been a need of small size UAV for vast applications in military and civilian applications as local area surveillance reconnaissance in hostile condition, damage assessment in natural disaster and remote sensing of harmful materials. ...[expand](#)

[Improving generalization performance of bagging ensemble via Bayesian approach](#)

[Shuichi Kurogi](#), [Kenta Harashima](#)

Pages: 557-561

This paper describes a method for improving the generalization performance of bagging ensemble by means of using Bayesian approach. We examine the Bayesian prediction using bagging leaning machines for regression problems, and show a method to reduce ...[expand](#)

[Distributed receding horizon filtering in discrete-time dynamic systems](#)

[II Young Song](#), [Vladimir Shin](#)

Pages: 562-567

A distributed receding horizon filtering for discrete-time dynamic systems is proposed. A distributed fusion with the weighted sum structure is applied to the set of local receding horizon Kalman Filters (LRHKFs). All LRHKFs have the same receding horizon ...[expand](#)

[Distributed fusion of local probability data association filters in multi-sensor environment](#)

[Kyungmin Lee](#), [Vladimir Shin](#)

Pages: 568-573

The problem of data association for target tracking in a multi-sensor cluttered environment is discussed. The probabilistic data association filter (PDAF) is useful to obtain proper estimate of state in this environment. We propose two distributed algorithms ...[expand](#)

SECTION: **Personal robotics**

[Hill climbing algorithm of an inverted pendulum](#)

[Howon Lee](#), [Junseok Lee](#), [Jangmyung Lee](#)

Pages: 574-579

This research aims at the control of the inverted pendulum attached on the top plate of a mobile robot. Especially, when the mobile robot is climbing up the hill, the stable control of the inverted pendulum is a challenging problem. Considering the gravity ...[expand](#)

[3D path planning with novel multiple 2D layered approach for complex human-robot interaction](#)

[Thomas A. Smith](#), [Rui C. V. Loureiro](#), [William S. Harwin](#)

Pages: 580-585

Navigating cluttered indoor environments is a difficult problem in indoor service robotics. The Acroboter concept, a novel approach to indoor locomotion, represents unique opportunity to avoid obstacles in indoor environments by navigating the ceiling ...[expand](#)

[An extensible dialogue script for robot based on unification of state transition models](#)

[Yosuke Matsusaka](#), [Hiroyuki Fujii](#), [Isao Hara](#)

Pages: 586-591

In this paper, we propose an extension-by-unification method to improve reusability and Oexibility in the incremental development of state-transition models. The dialogue engine SEAT (Speech Event-Action Translator) has been developed to realize continuous ...[expand](#)

[Gesture based dialogue management using behavior network for flexibility of human robot interaction](#)

[Sungsoo Lim](#), [Jongwon Yoon](#), [Keunhyun Oh](#), [Sung-Bae Cho](#)

Pages: 592-597

The usage of robots becomes more sophisticated, direct communication by means of human language is required to increase the efficiency of their performance. However, the dialogue systems that reply to the user with a set of predefined answers tend to ...[expand](#)

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