

CALL FOR PAPERS

IEEE Transactions on Emerging Topics in Computational Intelligence

Special issue on computational intelligence for perception and decision-making of autonomous systems

I. AIM AND SCOPE

Autonomous systems have the ability to perform advanced tasks intelligently and interact with humans naturally, and therefore they are playing more and more crucial roles in industry, agriculture, transportation and related fields. The abilities of autonomously perceiving environments and making decisions are the main characteristics of autonomous systems. However, conventional algorithms face emerging challenges because of high dimensional, heterogeneous, unstructured, and unpredictable characteristics of the data captured by different sensors (e.g., visual, auditory and olfactory sensors, LIDAR, inertia measurement unit). Since recent advanced computational intelligence algorithms have achieved a great success in different challenging research areas, such as computer vision and natural language processing, computational intelligence (e. g., deep neural networks, evolutionary computation, or fuzzy logic) is expected to provide efficient and powerful tools that will substantially improve the capabilities of environmental perception and decision-making of autonomous systems. Although some initial attempts have been presented, several challenging problems remain fully unsolved, including accuracy, real-time performance, domain adaptability, model transferability and robustness, etc. Therefore, new computational intelligence technologies as well as their novel variants are called for coping with different kinds of high-level environmental perception, decision-making and application scenarios for autonomous systems. Given the above premises, this special issue will focus on new/emerging computational intelligence based theories and methodologies for improving the perception and decision-making of autonomous systems. All submitted papers will be peer-reviewed and selected based on both their quality and relevance.

II. TOPICS

The topics of interest for this special issue include, but are not limited to

- Modelling autonomous systems via computational intelligence;
- Learning systems for semantic segmentation and object detection;
- Learning systems for environmental 3D structure perception;
- Learning systems for ego-motion estimation;
- Learning systems for olfactory, tactile, audio and color perception;
- Multi-source data fusion based on learning systems for accurate perception;

- Transfer learning for the environmental perception of autonomous systems;
- Unsupervised and semi-supervised learning for the environmental perception of autonomous systems;
- Reinforcement learning for the smart navigation of autonomous systems;
- Meta learning for the smart navigation of autonomous systems;
- Reinforcement learning for the decision-making of autonomous systems;
- Computational intelligence for the decision-making of autonomous systems;
- Computational intelligence for autonomous multi-robot systems;
- Evolutionary computation for autonomous systems;
- Fuzzy control and neural control for autonomous systems;
- Applications of computational intelligence in autonomous systems in real-life world.

III. SUBMISSIONS

Manuscripts should be prepared according to the “Information for Authors” section of the journal, and submissions should be done through the journal submission website: <https://mc.manuscriptcentral.com/tetci-ieee>, by selecting the Manuscript Type of “Computational intelligence for perception and decision-making of autonomous systems” and clearly marking “Computational intelligence for perception and decision-making of autonomous systems” in the comments to the Editor-in-Chief. Submitted papers will be reviewed by domain experts. Submission of a manuscript implies that it is the authors’ original unpublished work and is not being submitted for possible publication elsewhere.

IV. IMPORTANT DATES

Submission deadline: **July 30, 2021**
Notice of the first round review results: **September 30, 2021**
Revision due: **November 30, 2021**
Final notice of acceptance/reject: **February 28, 2022**

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