Derong Liu, Chin-Teng Lin,
Garry Greenwood, Simon Lucas,
and Zhengyou Zhang

Publication Spotlight

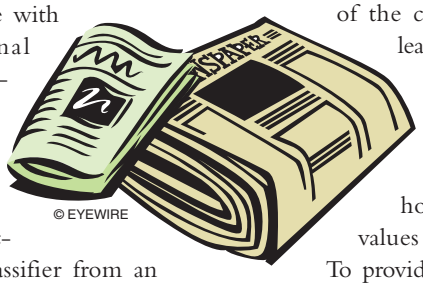
CIS Publication Spotlight

IEEE Transactions on Neural Networks and Learning Systems

Transfer Ordinal Label Learning, by C. W. Seah, I.W. Tsang, and Y.S. Ong, *IEEE Transactions on Neural Networks and Learning Systems,* Vol. 24, No. 11, November 2013, pp. 1863–1876.

Digital Object Identifier: 10.1109/TNNLS.2013.2268541

"Designing a classifier in the absence of labeled data is becoming a common encounter as the acquisition of informative labels is often difficult or expensive, particularly on new uncharted target domains. The feasibility of attaining a reliable classifier for the task of interest is embarked by some in transfer learning, where label information from relevant source domains is considered for complimenting the design process. The core challenge arising from such endeavors, however, is the induction of source sample selection bias, such that the trained classifier has the tendency of steering toward the distribution of the source domain. In addition, this bias is deemed to become more severe on data involving multiple classes. Considering this cue, our interest in this paper is to address such a challenge in the target domain, where ordinal labeled data are unavailable. In contrast to the previous works, a transfer ordinal label learning paradigm is introduced to predict the ordinal labels of target unlabeled data by spanning the feasible solution space with ensemble of ordinal classifiers from the multiple relevant source domains. Specifically, the maximum margin criterion is considered for the construction of the target classifier from an ensemble of source ordinal classifiers. Theoretical analysis and extensive empirical studies on real-world data sets are presented to study the benefits of the proposed method."



Adaptive Optimal Control of Unknown Constrained-Input Systems Using Policy Iteration and Neural Networks, by H. Modares, F.L. Lewis, and M.B. Naghibi-Sistani, *IEEE Transactions on Neural Networks and Learning Systems,* Vol. 24, No. 10, October 2013, pp. 1513–1525.

Digital Object Identifier: 10.1109/TNNLS.2013.2276571

"An online policy iteration (PI) algorithm is developed to learn the continuous-time optimal control solution for unknown constrained-input systems. The proposed PI algorithm is implemented on an actor-critic structure where two neural networks (NNs) are tuned online and simultaneously to generate the optimal bounded control policy. The requirement of complete knowledge of the system dynamics is obviated by employing a novel NN identifier in conjunction with the actor and critic NNs. It is shown how the identifier weights estimation error affects the convergence of the critic NN. A novel learning rule is developed to guarantee that the identifier weights converge to small neighborhoods of their ideal values exponentially fast. To provide an easy-to-check persistence of excitation condition, the experience replay technique is used. That is, recorded past experiences are used simultaneously with current data for the adaptation of the identifier weights. Stability of the whole system consisting of the actor, critic, system state, and system identifier is guaranteed while all three networks undergo adaptation. Convergence to a near-optimal control law is also shown. The effectiveness of the proposed method is illustrated with a simulation example."

IEEE Transactions on Fuzzy Systems

Clustering Spatiotemporal Data: An Augmented Fuzzy C-Means, IEEE Transactions on Fuzzy Systems, Vol. 21, No. 5, October 2013, pp. 855–868.

Digital Object Identifier: 10.1109/TFUZZ.2012.2233479

"In spatiotemporal data commonly encountered in geographical systems, biomedical signals, and the like, each datum is composed of features comprising a spatial component and a temporal part. Clustering of data of this nature poses challenges, especially in terms of a suitable treatment

Digital Object Identifier 10.1109/MCI.2013.2291678
Date of publication: 14 January 2014

of the spatial and temporal components of the data. In this study, the authors revisit and augment the algorithm for proceeding with the objective function-based clustering, such as fuzzy C-means, for making it applicable to spatiotemporal data. An augmented distance function is discussed. Besides, the resulting clustering algorithm is provided. Two optimization criteria, a reconstruction error and a prediction error, are introduced and used as vehicles to optimize the performance of the clustering method. Experimental results obtained for synthetic and real-world data are reported."

New Stability Conditions Based on Piecewise Fuzzy Lyapunov Functions and Tensor Product Transformations, IEEE Transactions on Fuzzy Systems, Vol. 21, No. 4, August 2013, pp. 748–760.

Digital Object Identifier: 10.1109/TFUZZ.2012.2230178

"This paper proposes improvements of recent stability conditions for well-known Takagi–Sugeno (T–S) fuzzy systems (continuous-time). The key idea is to bring together the so-called local transformations of membership functions and new piecewise fuzzy Lyapunov functions. By relying on these special local transformations, the associated linear matrix inequalities that are used to prove the system's stability can be relaxed without increasing the number of conditions. In addition, to enhance the usefulness of the proposed methodology, one can choose between two different sets of conditions characterized by independence or dependence on known bounds of the membership functions time derivatives. A standard example is presented to illustrate that the proposed method is able to provide substantial improvements in some cases."

IEEE Transactions on Evolutionary Computation

Multimodal Optimization Using a Biobjective Differential Evolution Algorithm Enhanced with Mean Distance-Based Selection, by A. Basak, S. Das and KC Tan, *IEEE Transactions on Evolutionary Computation,* Vol. 17, No. 5, October 2013, pp. 666–685.

Digital Object Identifier: 10.1109/TEVC.2012.2231685

"Numerous research works integrate a niching scheme with an existing single-objective evolutionary algorithm to perform multimodal optimization. Recently a few approaches have recast multimodal optimization as a multiobjective optimization problem to be solved by modified multiobjective evolutionary algorithms. In this paper the authors propose a novel biobjective formulation of the multimodal optimization problem and use differential evolution with nondominated sorting followed by hypervolume measure-based sorting to finally detect a set of solutions corresponding to multiple global and local optima of the function under test. Their algorithm is compared with eight state-of-the-art single-objective niching algorithms and two recently developed biobjective niching algorithms using a test suite of 14 basic and 15 composite multimodal problems."

An Adaptive Particle Swarm Optimization with Multiple Adaptive Methods, by M. Hu, T. Wu, and J. Weir, *IEEE Transactions on Evolutionary Computation,* Vol. 17, No. 5, October 2013, pp. 705–720.

Digital Object Identifier: 10.1109/TEVC.2012.2232931

"An intelligent augmented particle swarm optimization with multiple adaptive methods was recently proposed and experiments showed it to be effective for diverse functions. However, the performance of that algorithm heavily depends on the settings of three parameters: the two learning factors and the inertia weight. In this paper, the authors propose a parameter control mechanism to adaptively change those parameters. The performance of this adaptive algorithm was compared against several PSO variants and evolutionary algorithms. The proposed parameter control method is also compared with several existing parameter control methods."

IEEE Transactions on Computational Intelligence and AI in Games

Games, Gameplay, and BCI: The State of the Art, by Marshall, D.; Coyle, D.; Wilson, S.; Callaghan, M., *IEEE Transactions on Computational Intelligence and AI in Games,* Vol. 5, No. 2, June 2013, pp. 82–99.

Digital Object Identifier: 10.1109/TCIAIG.2013.2263555

"Brain-computer interfaces (BCIs) and basic computer games have been interconnected since BCI development began, exploiting gameplay elements as a means of enhancing performance in BCI training protocols and entertaining and challenging participants while training to use a BCI. BCIs have been used to enrich the experience of able-bodied and physically impaired users in various computer applications, in particular, computer games. This paper reviews and evaluates gameplay within BCI. Gameplay is a key aspect of any computer game and encompasses the challenges presented to the player, the actions made available to the player by the game designer to overcome the challenges and the interaction mechanism in the game. The gameplay mechanics employed across a range of BCI games are reviewed and evaluated in terms of the BCI control strategy's suitability, considering the genre and gameplay mechanics employed. A number of recommendations for the field relating to genre-specific BCI-games development and assessing user performance are also provided for BCI game developers."

IEEE Transactions on Autonomous Mental Development

From Action to Interaction: Infant Object Exploration and Mothers' Contingent Responsiveness, by Tamis-LeMonda, C.S., Kuchirko, Y., and Tafuro, L., *IEEE Transactions on Autonomous Mental Development,* Vol. 5, No. 3, September 2013, pp. 202–209.

(continued on page 18)

IEEE norms and with the help of the iThenticate system provided by the IEEE.

As a part of the banquet, an excellent classical Indian dance program introduced the attendees to local traditions and cultures. Several of the CIS technical meetings were held in Hyderabad to complement the conference program and Prof. Witold Pedrycz received the 2013 Fuzzy Systems Pioneer Award during the banquet. To conclude, we gratefully acknowledge that the IEEE Computational Intelligence Society played a very active role in the organization of the conference.

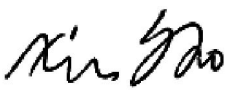
President's Message

(continued from page 3)

volunteer involvement. You, the CIS members, are the one who drives the development of TCs and TFs.

CIS has over 100 local chapters distributed all over the world, which serve their local members. CIS Chapters are run by local volunteers, for the local members. They host Distinguished Lecturers and organize seminars and workshops. They tailor activities towards the needs of the local membership. These are great ways to make new friends with like-minded peers and mentors while strengthening existing professional links. Every member can approach their Chapter Chairs with new ideas of events and activities and I certainly encourage you to do so.

Last but not least, I would like to take this opportunity to thank the past Editors-in-Chief of the *CI Magazine*, Profs. Kay Chen Tan and Gary Yen, for their leadership and enormous effort in managing and developing the *CIM* into the leading society magazine it is today. The Society is very fortunate to have Prof. Hisao Ishibuchi, a highly respected scholar and an experienced CIS volunteer, as its new Editor-in-Chief of the *CI Magazine* from 2014. I am sure like me, you will enjoy the first issue of *CIM* he has put together for us!



Society Briefs

(continued from page 12)

This announcement will include the deadline for bids and the acceptance date. Further, as we are aware that putting together a bid, particularly for our larger conferences is significant work, we will announce a prioritized listing of regions sought for a particular conference. This prioritized listing has two goals: a) to provide some hints to organizers of what the conference committee is looking for and b) ensuring that conferences do rotate across the geographical regions, where possible.

Conclusion

The challenges facing conference organization are multiple, not least financial, where not only delegates face a growing challenge to find funding to participate, but also conference organizers face increasing challenges to meet their budgets. Despite these and many other challenges, conferences are still fantastic events, where you can get away, at least to an extent, from the daily challenges of your local workplace and engross yourself in our fantastic field and meet with both existing and newly formed collaborators. However, such events would not be possible without the fantastic work that our conference organizers do. For those of you who have already volunteered for some role in upcoming conferences let me take this opportunity to thank you for your support for our conferences and I look forward to working directly or indirectly with all of you in the near future.

Publication Spotlight

(continued from page 16)

Digital Object Identifier: 10.1109/TAMD.2013.2269905

"This paper examines maternal contingent responsiveness to infant object exploration in 190 mother-infant pairs from diverse cultural communities. Dyads were video-recorded, and sequential analysis was used to examine whether certain maternal behaviors were more (or less) likely to follow infant object exploration relative to chance, to one another, and to times when infants were off task. Mothers were more likely to explore objects and use referential language in response to infant object exploration than to use regulatory language or be off task, and maternal behaviors were reduced in the context of infants being off task. Infant object exploration elicits reciprocal object exploration and informative verbal input from mothers, illustrating the active role infants play in their social experiences."