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Special Session on
Reinforcement learning for understanding human organ behaviors

Name and affiliation of organizers:

Bingo Wing-Kuen Ling

Tsientang Institute for Advanced Study, **wkling@tias.ac.cn**

Bingo Wing-Kuen Ling is a Fellow of the IET. He serves in the nonlinear circuits and systems technical committee, the digital signal processing technical committee and the power and energy for circuits and systems technical committee of the IEEE Circuits and Systems Community, as well as the cloud and wireless systems for industrial applications technical committee of the IEEE Industrial Electronics Society. He was awarded the best reviewer prizes from the IEEE Instrumentation and Measurement Society in 2008 and 2012. He has also served as the guest editor-in-chief of several special issues of highly rated international journals, such as the IET Signal Processing, the Circuits, Systems and Signal Processing, the HKIE Transactions and the American Journal of Engineering and Applied Sciences. He is currently an associate editor of IET Signal Processing, Circuits, Systems and Signal Processing, Journal of Franklin Institute, Measurement, Measurement: Sensors, Journal of Industrial Management, the Frontiers in Signal Processing. He has published an undergraduate textbook, a research monograph, five book chapters, 300 internationally leading journal papers and 180 highly rated international conference papers as well as owned 50+ China patents. His research interests include time frequency analysis, optimization theory, symbolic dynamics, biomedical signal processing and multimedia signal processing.

Yongyi Lu

Guangdong University of Technology, **yylu@gdut.edu.cn**

Yongyi Lu is an Associate Professor at Guangdong University of Technology (GDUT). He received his Ph.D. in Computer Science and Engineering from the Hong Kong University of Science and Technology (HKUST) in 2018 and was a Postdoctoral Fellow from 2019 to 2022 at Johns Hopkins University in Prof. Alan Yuille's Compositional Cognition, Vision, and Learning (CCVL) Lab. He has published over 50 papers in top AI venues including CVPR, ICCV, ECCV, NeurIPS, TPAMI, MIA, TIP, and MICCAI, with more than 8,000 citations and a single most-cited work exceeding 5,000 citations. His research spans computer vision, medical image analysis, and brain-computer interfaces (BCI), with a strong interdisciplinary focus. He is particularly interested in learning theory such as unsupervised, self-supervised, and transfer learning; AI-generated content, including GANs, diffusion models, vision-language models; and medical neuro-AI applications (early tumor detection, brain signal decoding and brain-to-text/image translation). He serves as a reviewer for leading journals and conferences including IJCV, TPAMI, TIP, TMM, TCSVT, Nature Machine Intelligence, Neurocomputing, CVPR, ICCV, ECCV, NeurIPS, and ICLR. In 2023, he was recognized with the Young Outstanding Award under the Zhujiang Talent Plan of Guangdong Province, China.

Scope of the session

The behaviors of the human organs such as the brain, the heart, the lung and the kidney are highly dependent on the environment. For example, if the environment causes the body to enter the excited state, the adrenaline would increase. As a result, the heart rate and the respiratory rate would increase. On the other hand, the reinforcement learning is an emerging technology in the machine learning and the artificial intelligence. The learning system is adaptively updated based on the feedback from the background so that it can learn the complex systems and yield the excellent performances. Hence, the reinforcement learning is a useful tool for studying the behaviors of the human organs under the time varying environments. This aims of this call for papers is to collect the above iseas.

Prospective authors are invited to submit original and unpublished work on the following research topics related to this Special Session:

- *Novel reinforcement learning algorithms*
- *Rate of convergence of reinforcement learning algorithms*
- *Analysis of local and global optimality of reinforcement learning algorithms*
- *Analysis of heart behaviors via reinforcement learning*
- *Analysis of lung behaviors via reinforcement learning*
- *Analysis of brain behaviors via reinforcement learning*
- *Analysis of kidney behaviors via reinforcement learning*
- *Analysis of electrocardiograms via reinforcement learning*
- *Analysis of electroencephalograms via reinforcement learning*