Sam Kwong received his B.Sc. degree from the State University of New York at Buffalo, M.A.Sc. in electrical engineering from the University of Waterloo in Canada, and Ph.D. from Fernuniversität Hagen, Germany. Before joining the City University of Hong Kong (CityU), he was a Diagnostic Engineer with Control Data Canada. He was responsible for designing diagnostic software to detect the manufacturing faults of the VLSI chips in the Cyber 430 machine. He later joined Bell-Northern Research as a Member of the Scientific Staff working on the Integrated Services Digital Network (ISDN) project.

Kwong is currently Chair Professor at the CityU Department of Computer Science, where he previously served as Department Head and Professor from 2012 to 2018. Prof Kwong joined CityU as a Department of Electronic Engineering lecturer in 1989. Prof. Kwong is the associate editor of leading IEEE transaction journals, including IEEE Transactions on Evolutionary Computation, IEEE Transactions on Industrial Informatics, and IEEE Transactions on Cybernetics.
Kwong is actively engaged in knowledge exchange between academia and industry. In 1996, he was responsible for designing the first handheld GSM mobile phone consultancy project at the City University of Hong Kong, one of the largest. He has filed over 20 US patents, of which 17 have been granted.

Kwong has a prolific research record. He has co-authored three research books, eight book chapters, and over 300 technical papers. According to Google Scholar, his works have been cited more than 27,000 times with an h-index of 73. He has been the distinguished lecturer of IEEE SMCS since 2018 and delivers two DL lectures yearly to promote IEEE SMC Society and cutting-edge cybernetics technology. He also frequently delivers keynote speeches in IEEE supported conferences. In 2014, he was elevated to IEEE Fellow for his contributions to optimization techniques in cybernetics and video coding.

Kwong’s involvement in the multiple facets of IEEE has been extensive and committed throughout the years. For IEEE Systems, Man and Cybernetics Society (SMCS), he serves as Hong Kong SMCS Chapter Chairman, Board Member, Conference Coordinator, Membership Coordinator and Member of the Long Range Planning and Finance Committee, Vice President of Conferences and Meetings, Vice President of Cybernetics. He led the IEEE SMC Hong Kong Chapter to win the Best Chapter Award in 2011 and was awarded the Outstanding Contribution Award for his contributions to SMC 2015. He was the President-Elect of the IEEE SMC Society in 2021. Currently, he serves as the President of the IEEE SMC Society. He is an IEEE fellow and listed as a Highly cited researcher according to Clarivate 2022 highly cited researcher report.

Talk Title:

Title: Deep Learning Based Video Coding and its applications

Abstract:

In June 6th 2016, Cisco released the White paper[1], VNI Forecast and Methodology 2015-2020, reported that 82 percent of Internet traffic will come from video applications such as video surveillance, content delivery network, so on by 2020. It also reported that Internet video surveillance traffic nearly doubled, Virtual reality traffic quadrupled, TV grew 50 percent and similar increases for other applications in 2015. The annual global traffic will first time exceed the zettabyte(ZB;1000 exabytes[EB]) threshold in 2016, and will reach 2.3 ZB by 2020. It implies that 1.886ZB belongs to video data. Thus, in order to relieve the burden on video storage, streaming and other video services, researchers from the video community have developed a series of video coding standards. Among them, the most up-to-date is the High Efficiency Video Coding(HEVC) or H.265 standard, which has successfully halved the coding bits of its predecessor, H.264/AVC, without significant increase in perceived distortion. With the rapid growth of network transmission capacity, enjoying high definition video applications anytime and anywhere with mobile display terminals will be a desirable feature in the near future. Due to the lack of hardware computing power and limited bandwidth, lower complexity and higher compression efficiency video coding scheme are still desired. For higher video compression performance, the key optimization problems, mainly decision making and resource allocation problem, shall be solved. In this talk, I will present the most recent research results on machine learning, deep neural network and reinforcement based video coding. This is very different from the traditional approaches in video coding. We hope applying these intelligent techniques to vide coding could allow us to go further and have more choices in trading off between cost and resources.