



**THE CHINESE UNIVERSITY OF HONG KONG**  
Department of Information Engineering  
*Seminar*

**Runtime Extra Compression for Time-Critical Content Delivery**

by

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**Time : 2:30pm – 3:30pm**

**Venue : Rm 833, Ho Sin-hang Engineering Building, CUHK**

Abstract

Recent advances in user devices and computer vision techniques have significantly increased daily multimedia consumption. Adaptive bitrate streaming methods like Dynamic Adaptive Streaming over HTTP (DASH) have been widely used to deliver multimedia content in time-varying network conditions by pre-encoding videos at multiple bitrates. However, these approaches depend on client feedback, which is often inaccurate due to the nature of time-varying bandwidth, leading to under-utilization of the network from conservative bitrate selection or overshooting of delay from excessive bandwidth degradation. This paper introduces Runtime eXtra Compression (RXC), a framework designed to dynamically compress multimedia content during delivery. RXC employs a Dynamic Multi-level AutoEncoder (DMAE), which provides multiple levels of compression and allows real-time adaptation based on network conditions. By distributing computation across the network and compressing content at bottleneck routers, RXC enhances bandwidth utilization, ensuring timely delivery of time-critical content and improving content quality. The paper presents the structure and training of the DMAE model, develops the Dynamic Compression Control (DCC) algorithm for real-time bitrate adjustment, and demonstrates through simulations that RXC improves delay performance substantially.

Biography

Changhee Joo received the Ph.D. degree from Seoul National University in 2005. He was with Purdue University and The Ohio State University, and then with Korea University of Technology and Education (KoreaTech) and Ulsan National Institute of Science and Technology (UNIST). Since 2019, he has been with Korea University. His research interests are in the broad areas of networking and machine learning. He was a recipient of the IEEE INFOCOM 2008 Best Paper Award, the KICS Haedong Young Scholar Award (2014), the ICTC 2015 Best Paper Award, and the GAMENETS 2018 Best Paper Award. He is an Associate Editor of the IEEE Transactions Vehicular Technology, a Division Editor of the Journal of Communications and Networks. He was an Associate Editor of the IEEE/ACM Transactions on Networking, and organized WiOpt'24 and ACM MobiHoc'22 as a general co-chair. He also served many primary conferences as a technical program committee member, including IEEE INFOCOM, ACM MobiHoc, IEEE WiOpt, and IEEE GLOBECOM.

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