Deep Learning for Video Frame Interpolation and Object Co-segmentation

林彥宇教授

國立交通大學資訊工程學系

摘要

In this talk, I will present our recent research results on video frame interpolation and object co-segmentation.

For video frame interpolation, it predicts intermediate frames to produce videos with higher frame rates and smooth view transitions given two consecutive frames as inputs. We observe that synthesized frames are more reliable if they can be used to reconstruct the input frames with high quality. Based on this observation, we introduce a new loss term, the cycle consistency loss. The cycle consistency loss can better utilize the training data to not only enhance the interpolation results, but also maintain the performance better with less training data. It can be integrated into any frame interpolation network and trained in an end-to-end manner. Both qualitative and quantitative experiments demonstrate that our model outperforms the state-of-the-art methods.

For object co-segmentation, it aims to segment the common objects in images. We present a CNN-based method that is unsupervised and end-to-end trainable to better solve this task. Our method is unsupervised in the sense that it does not require any training data in the form of object masks but merely a set of images jointly covering objects of a specific class. Our method comprises two collaborative CNN modules, a feature extractor and a co-attention map generator. The former module extracts the features of the estimated objects and backgrounds. The latter module is learned to generate co-attention maps by which the estimated figure-ground segmentation can better fit the former module. Experiments show that our method achieves superior results, even outperforming the state-of-the-art, supervised methods.

Bio:

Yen-Yu Lin received the B.B.A. degree in Information Management, and the M.S. and Ph.D. degrees in Computer Science and Information Engineering from National Taiwan University in 2001, 2003, and 2010, respectively. He is a Professor with the Department of Computer Science, National Chiao Tung University since August 2019. Prior to that, he worked for the Research Center for Information Technology Innovation, Academia Sinica from January 2011 to July 2019. His research interests include computer vision, machine learning, and artificial intelligence.