AI Researches on Computer Graphics Vision LAB

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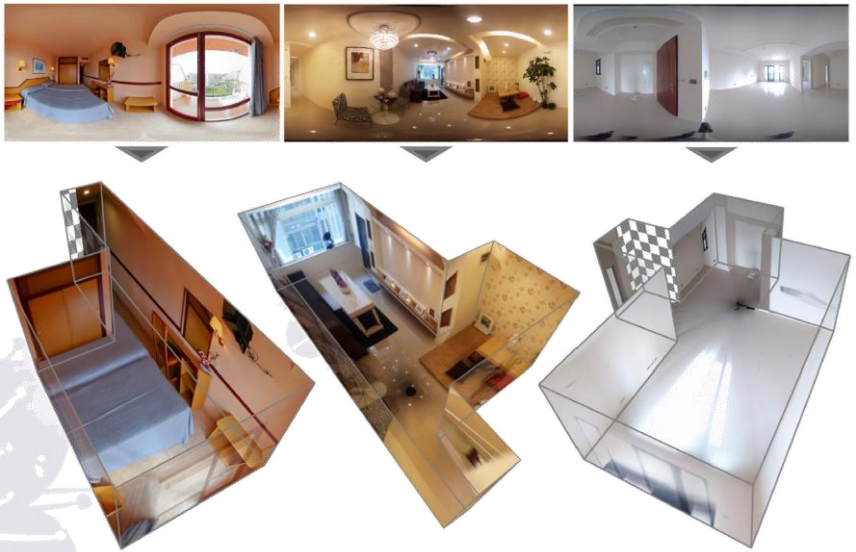
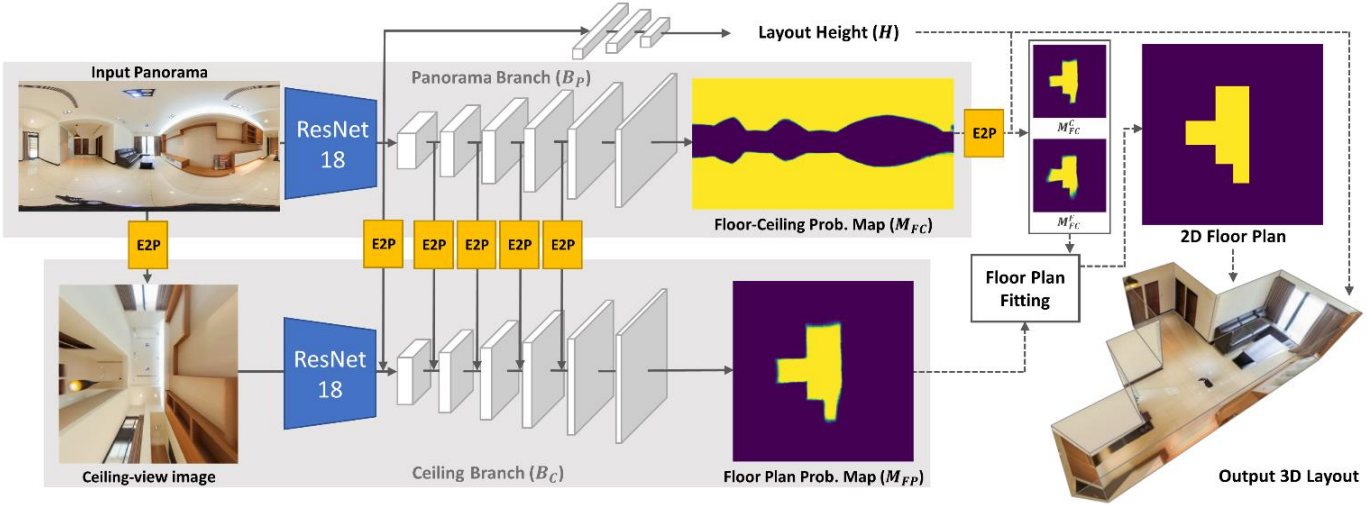
Topic #1:
3D Room Layout Estimation

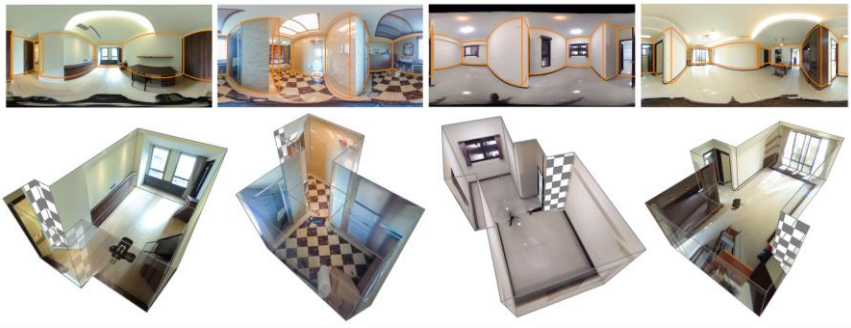
- A deep learning framework to predict Manhattan-world 3D room layouts from a single RGB panorama



DuLa-Net: A Dual-Projection Network for Estimating Room Layouts from a Single RGB Panorama [**CVPR 2019**]

Shang-Ta Yang, Fu-En Wang, Chi-Han Peng, Peter Wonka, Min Sun, **Hung-Kuo Chu***

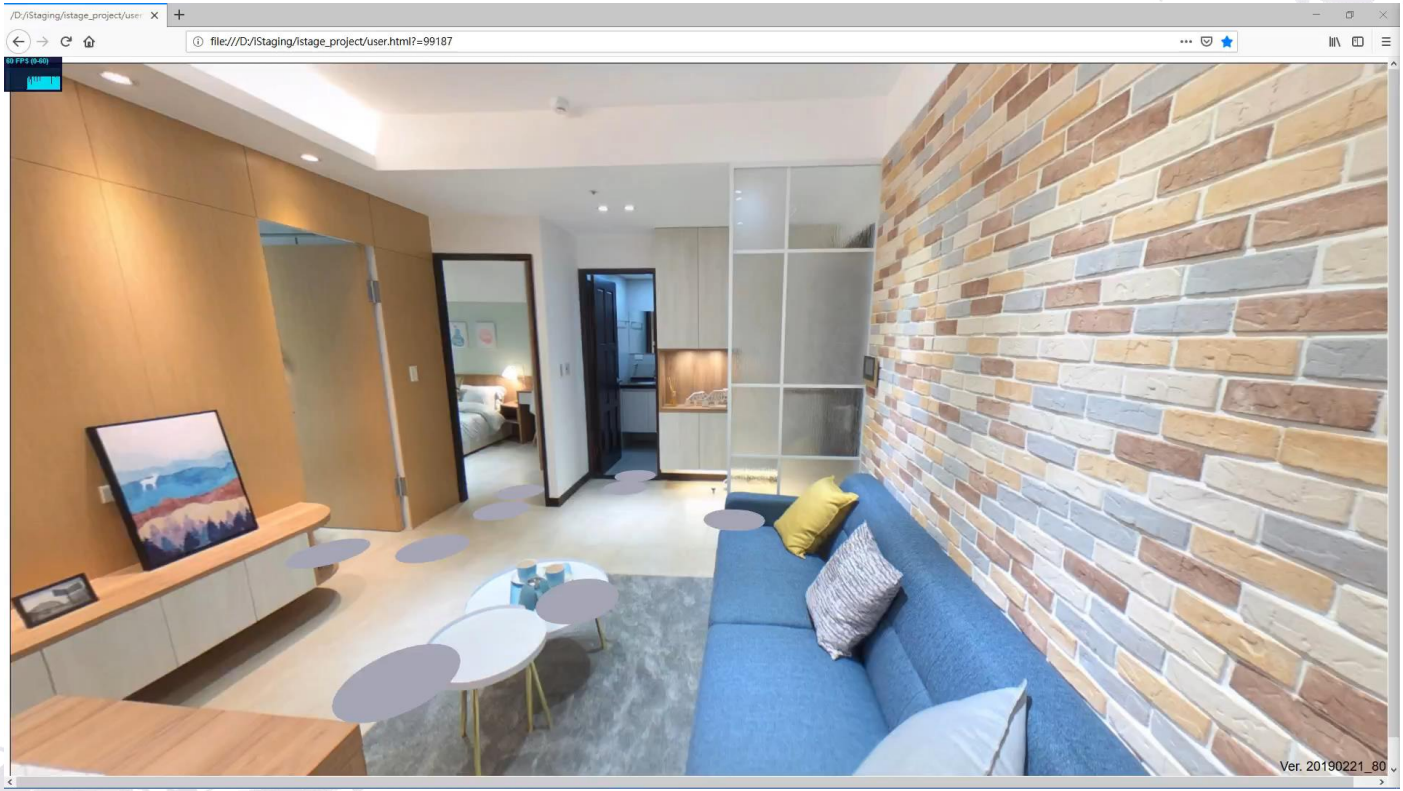




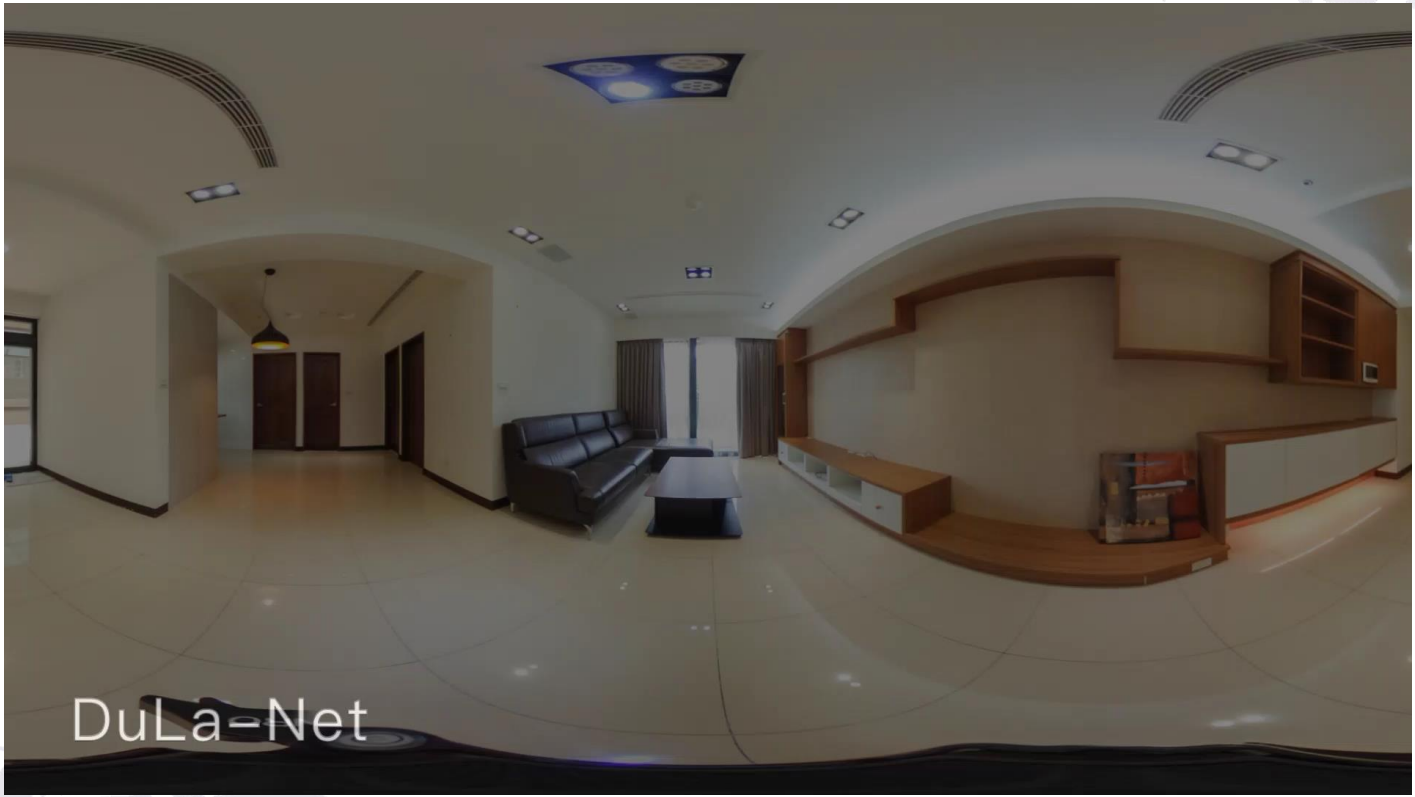
Method	Average	
	2D IoU (%)	3D IoU (%)
LayoutNet [33]	65.84	62.77
	75.2	72.02
	75.75	72.18
	78.52	74.8
ours (full)	**80.53**	**77.2**

亮點：世界第一成效
15% improvement!!

Application：360 Navigation

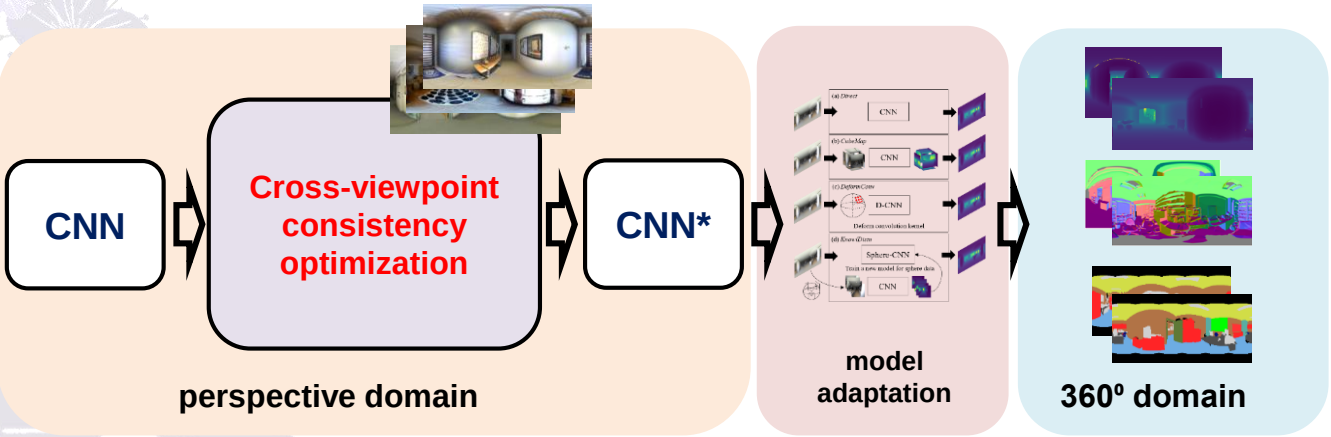


Application ：VR Estate Tour



Topic #2:
Domain Adaptation on 360 Images

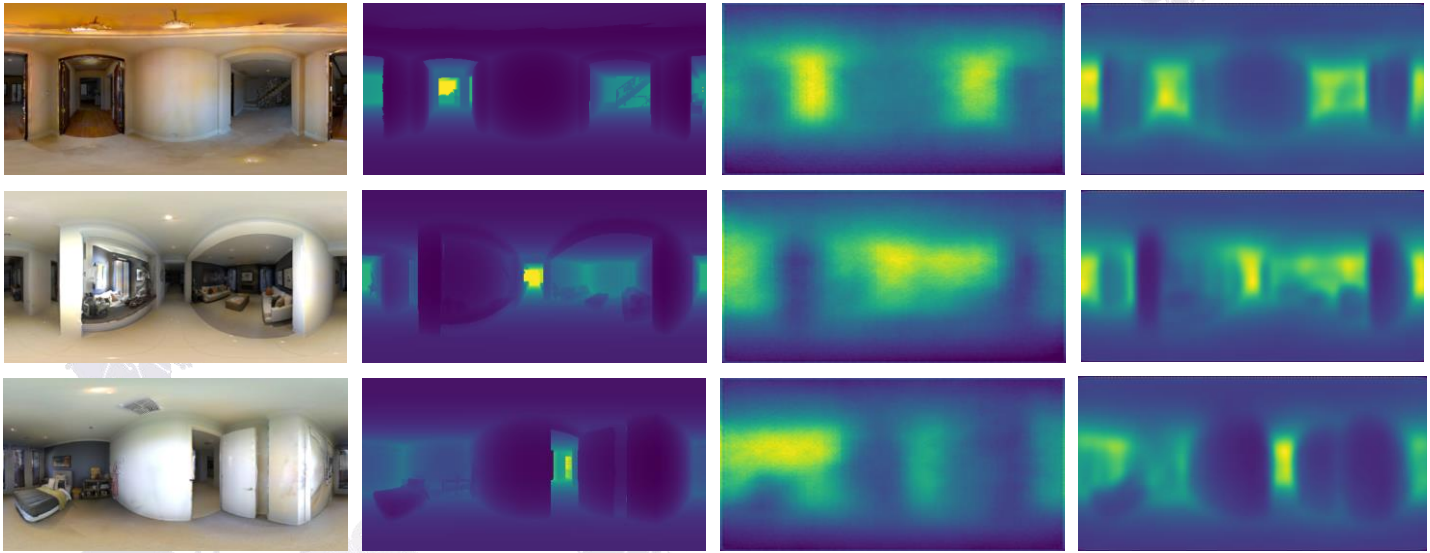
- Propose a **cross-viewpoint consistency optimization** framework for improving the model adaptation from perspective to 360º domain.



Cross-Viewpoint Consistency

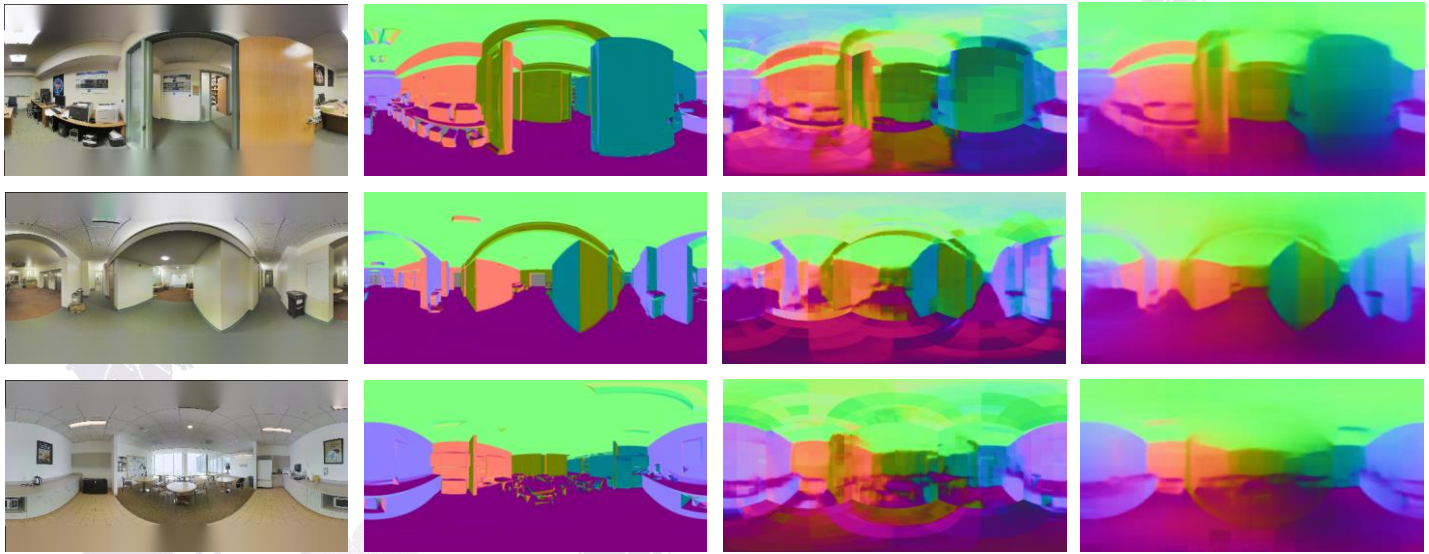
- The model (perspective-domain) prediction on sampled views in a 360º image should be consistent in the overlapping region.

Depth Prediction



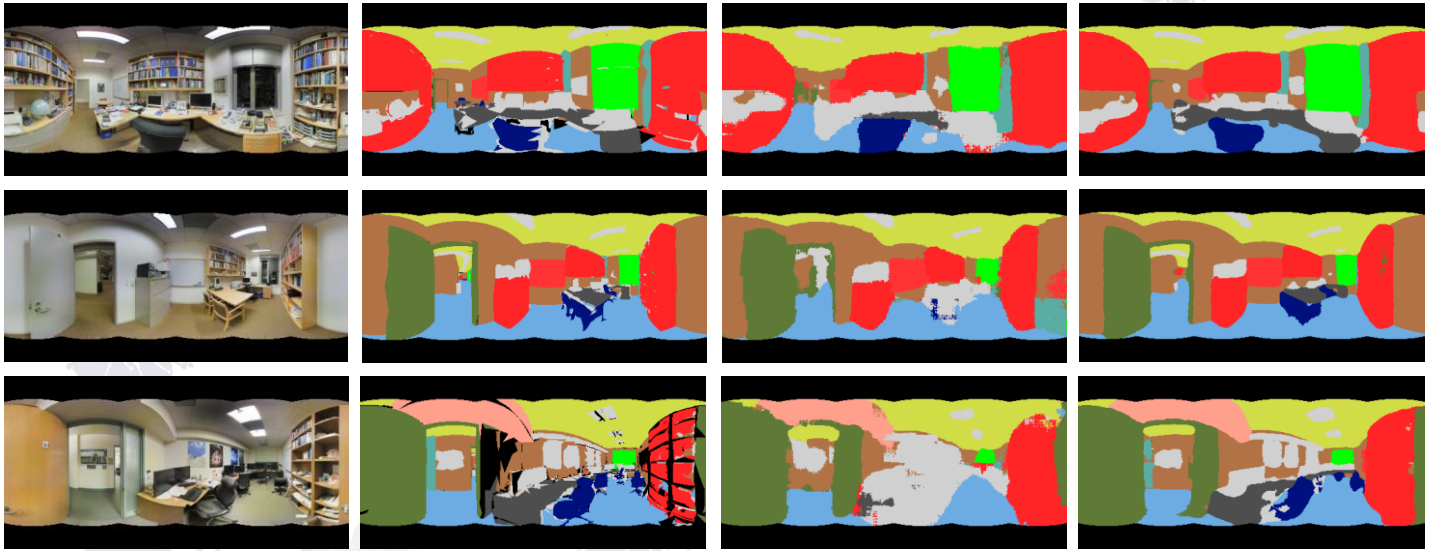
Input | Ground-truth | State-of-the-art | Our result

Surface Normal Estimation



Input | Ground-truth | State-of-the-art | Our result

Semantic Segmentation



Input

- ceiling
- floor
- wall

Ground-truth

- column
- beam
- window

State-of-the-art

- door
- table
- chair

Our result

- bookcase
- sofa
- board

Topic #3:
Instance-aware Colorization

- We introduce a instance-aware colorization method to improve the quality of image colorization results.

Grayscale

State-of-the-art

Our result

Ground-truth

Architecture

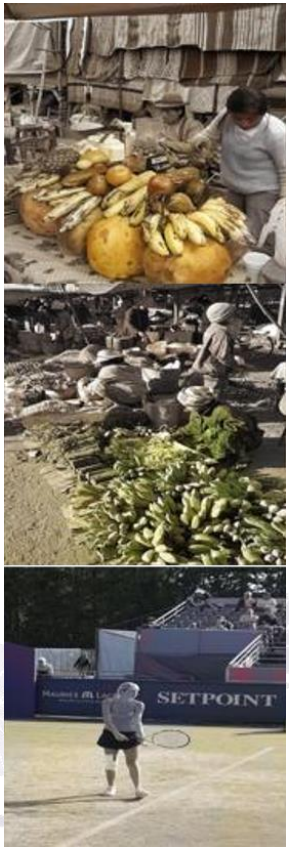
Instance Colorization
Deep Neural Network

Feature Fusion Module

Full-Image Colorization
Deep Neural Network

Results

Grayscale



State-of-the-art

Our result

Ground-truth