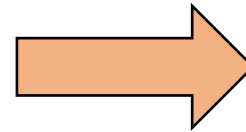
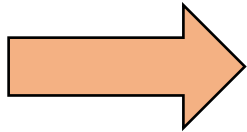


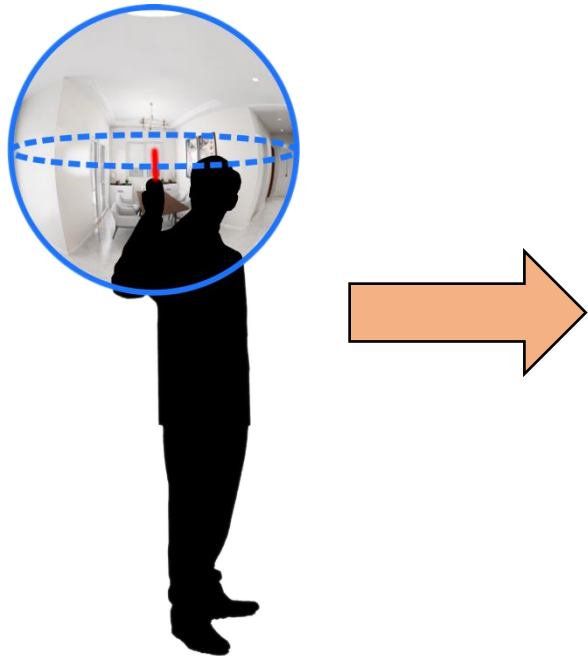
SESSION 6: CLOSING

Speaker: Enrico Gobbetti

Today's focus: panoramic imaging for indoors



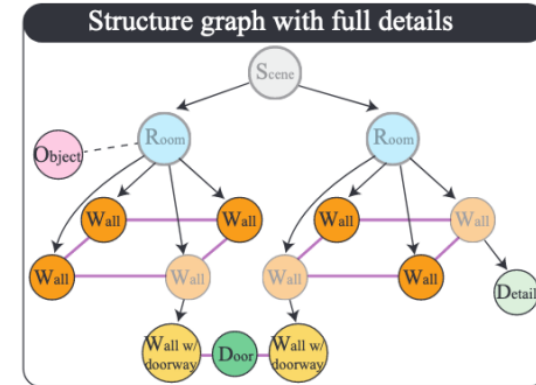
Why focusing on panoramic imaging?



- 1) MANY ACQUISITION SOLUTIONS AVAILABLE** (commodity and professional devices, stitching, ...)
- 2) EASY AND FAST ACQUISITION** (single shot takes few seconds and covers all scene around the viewer)
- 3) GLOBAL/WIDE CONTEXT FACILITATES ANALYSIS** (no clipping of objects/areas, possibility to look at scene regularities, ...)
- 4) EXPLORATION OF SINGLE IMAGE IS DYNAMIC/IMMERSIVE** (fundamentally different than standard 2D counterparts)

Why specialized solutions for interiors?

- Strong need for *structured indoor models*
 - High-level representation of main elements and their relations
 - Optimized to meet requirements of specific fields of application
 - Building Information Models (AEC domain): bare architectural structure
 - Emergency management, location awareness, routing: also interior clutter
 - Standard surface reconstruction does not guarantee this
- Deal with specific challenges of input data
 - Technological limitations of acquisition devices
 - Artifacts caused by properties of real-world interiors
 - Clutter, unreachable areas
 - Transparent/reflective + textureless surfaces



Ikehata et al. ICCV2015



Reconstruction of models from noisy, partial, imperfect data

- All methods use some **architectural priors** in addition to other surface reconstruction ones
- Historically, priors were exploited in **geometry-reasoning** solutions, that combined them with specific processes to extract models
 - E.g. extract edges and corners, filter according Manhattan direction, build model through connection/fusion, ...
- Nowadays, more and more solutions exploit **data driven priors**, i.e., common characteristics extracted from large sets of examples
 - Esp. deep-learning solutions
- The most common approach is a combination of both

Major directions

- Room modeling
 - Bounding surfaces, exploiting priors, deep learning solutions
- Integrated indoor model computation
 - Multi-rooms; Ensuring consistency; Finding and modeling connections
- Visual representation generation and exploration
 - Beyond geometric reconstruction; Appearance; panoramic exploration

Supporting material

- **Course web site:**

- <http://vic.crs4.it/vic/cvpr2023-tutorial-pano/>
- Updated in coming weeks with slides and bibliography

- **STAR + Tutorial notes on indoors**

- G. Pintore, C. Mura, F. Ganovelli, L. Fuentes-Perez, R. Pajarola, and E. Gobbetti. **State-of-the-art in Automatic 3D Reconstruction of Structured Indoor Environments.** Computer Graphics Forum, 39(2): 667-699, 2020. DOI: 10.1111/cgf.14021
- G. Pintore, C. Mura, F. Ganovelli, L. Fuentes-Perez, R. Pajarola, and E. Gobbetti. **Automatic 3D Reconstruction of Structured Indoor Environments.** In SIGGRAPH 2020 Courses. Pages 10:1-10:218, August 2020. DOI: 10.1145/3388769.3407469

SESSION 7: Q&A