Omnidirectional Image Data-set for Computer Vision Applications

Bruno Berenguel-Baeta, Jesus Bermudez-Cameo and Jose J. Guerrero

IX Jornada Jovenes Investigadores del I3A

Instituto Universitario de Investigación en Ingeniería de Aragón
Universidad Zaragoza

Abstract

In this paper we present an image data-set of different omnidirectional systems. The images include full information of colour, depth, instance segmentation and room layout. This dataset aims to help in the training and test of different neural networks and development of computer vision algorithms.

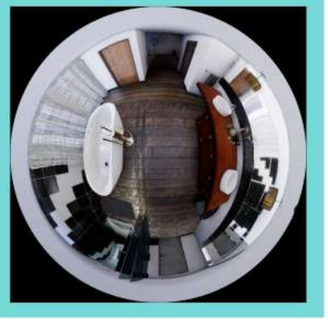
Image information

From the tool OmniSCV [1], different information can be obtained from Virtual Environments generated with the Unreal Engine 4. The direct information is: RGB, instance segmentation, depth.

Omnidirectional systems

Different omnidirectional systems are available. Central images come from the same cube-maps. The most used omni-directional systems are the fish-eye images, catadioptric systems and panoramas as the equirectangular.

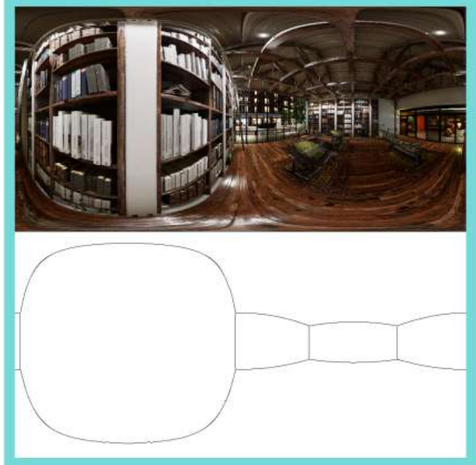
Other systems are also implemented. Non-central systems arenot obtained from a unique cube-map, so the acquisition is unique for each image. The implemented systems are the circular panorama and catadioptric systems.



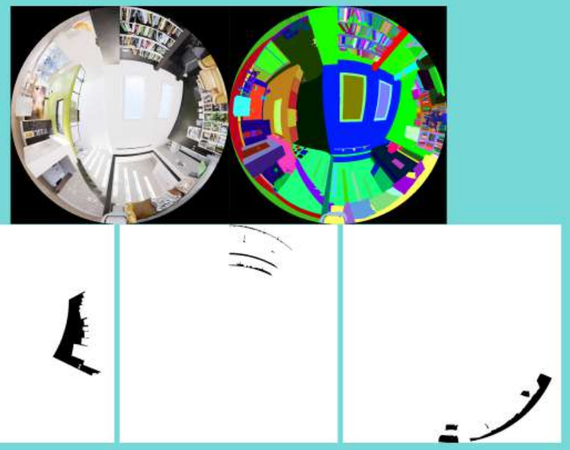
Applications

From the images that can be obtained with OmniSCV, a data-set of omnidirectional images has been generated. Also, different labelling have been implemented for different applications. Examples are:

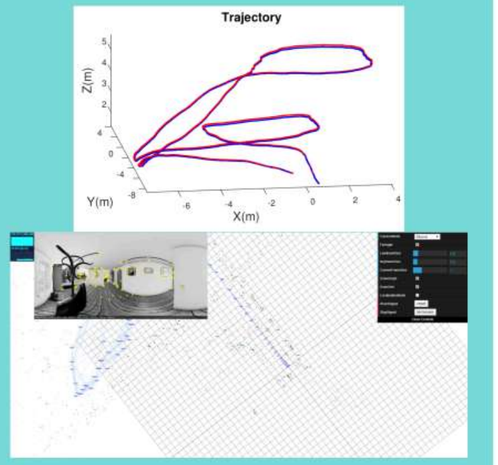
Layout recovery [2,3]



Instance segmentation



SLAM[4]



* Extra: Videos of SLAM implementations with omnidirectional images

[1] Berenguel-Baeta et al. 2020: OmniSCV: Omnidirectional Synthetic Image Generator for Computer Vision.
[2] Fernandez-Labrador et al. 2020: Corners for layout: End-to-end layout recovery from 360 images.
[3] Sun et al. 2019: Horizonnet: Learning room layout with 1d representation and pano stretch data augmentation.
[4] Sumikura et al. 2019: OpenVSLAM: A Versatile Visual SLAM Framework