Translation-capable Panorama Using Light Field Imaging
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Motivation
Current 360 degree camera create panorama enabling users to rotate views around. However, it has to stay in a fixed position, which is the center of the scene. We propose to solve this problem by using light field (LF) imaging technology to add translation capability to conventional panorama, since the LF’s ability of refocusing, linear translation and depth sensing has been proved in 2D planar case.

Imaging Setting
Camera: Lytro Illum, FOV 43.5°, keep the focal length to be 30mm, focal plane 26cm, ISO 250, shutter speed 1/20s.
Images taken at the position every 22.5°.

Panorama Reconstruction
Moving forward 2cm virtually in the scene 7.2cm
Virtual translation range for panorama in current imaging setting

Translation in Light Field Imaging
Moving forward 8cm virtually in the scene
Virtual translation range for single LF image in current imaging setting

Conclusion
Using LF Imaging, we demonstrate the translation capability in a panorama, which implies the 6-degree of freedom in a LF powered 360 degree image/video. Although the translation range is limited to several centimeters, it could be useful in micro-scene shooting.

Reference