Augmented Reality Using High Fidelity Spherical Panorama with HDRI - Demonstration

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Abstract

This demonstration presents an experimental method and apparatus configuration for producing spherical panoramas with high dynamic range imaging (HDRI). Our method is optimized for providing high fidelity augmented reality (AR) image-based environment recognition for mobile devices. We developed HDRI method that requires single acquisition which extends dynamic range from digital negative, this approach is to be used for multiple angles necessary for reconstructing accurately reproduced spherical panorama with sufficient luminance.

Proposed Method and Apparatus

There have been previous studies on using pre-produced panorama images for AR tracking in location-based real-world environments [Arth et al 2011; Langlotz et al. 2014]. However, most of these studies describe how the panorama images can be used for AR tracking, instead of specifying the method for high fidelity production of the source panorama images, especially for mobile AR. The demonstration operates an experimental camera mounting system for image-capture that will capture full immersive panorama images as shown in configuration of figure 1(a), figure 1(b) is proposed configuration deployed for nadir acquisition.

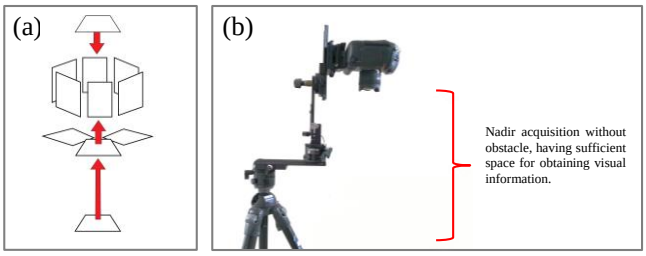

Figure 1: *(a) Proposed configuration for multiple image. (b) Deployed configuration in nadir acquisition position.*

Figure 2 describes a method for multiple angle HDRI reproduction for spherical panorama, optimized for high fidelity mobile AR. The demonstration involves HDRI that is reproduced from a single acquired RAW (digital negative) for having its dynamic range extended from RAW, instead of using multiple exposures. The HDRI reproduced from a single acquisition avoids obstacles and issues that occur in HDRI reproduced from multiple exposures. This provides an outcome with zero misalignment issue, zero ghosting error and minimum acquisition time. Figure 3 shows AR authoring process of using the panorama source content produced from our proposed method and making image-based environment recognition possible for a mobile AR user experience. High fidelity spherical panorama is reproduced with the high dynamic range and least distortion, producing a result very similar to the original scene condition for high feature-matching mobile AR.

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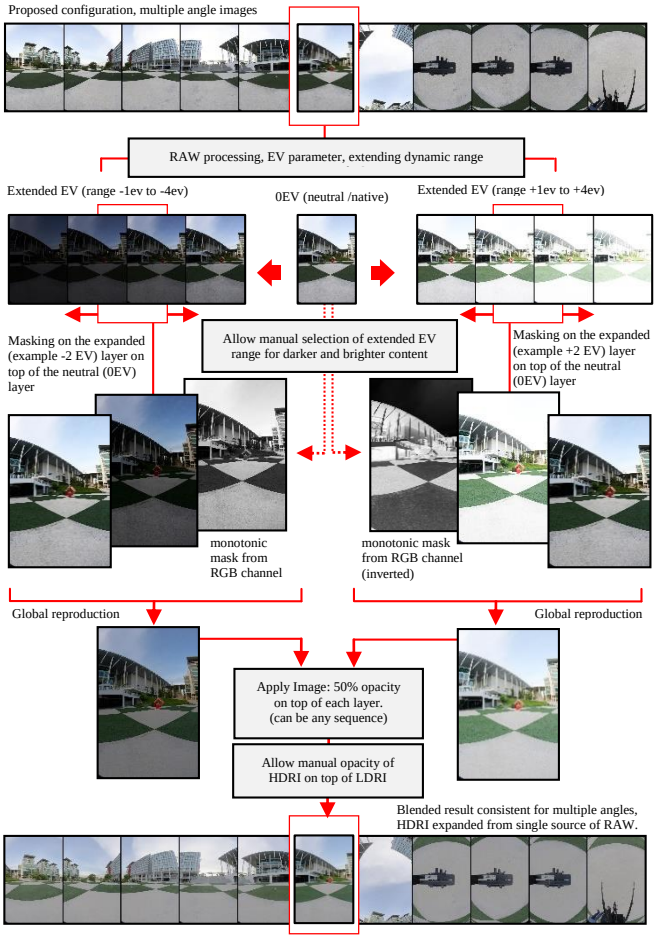

Figure 2: *Proposed multiple angles HDRI for high fidelity AR.*

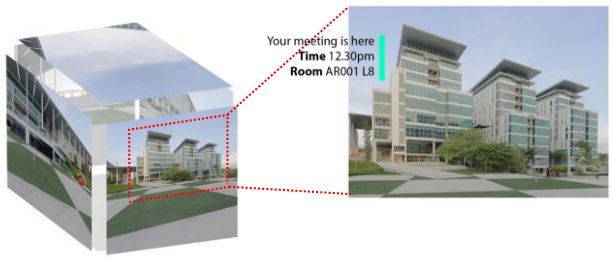

Figure 3: *AR authoring process for environment recognition.*

References

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