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Title: **EPFL Light-Field Image Dataset**

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Purpose: Proposal, discussion

1 Introduction

Emerging popularity of plenoptic images and research interests in light-field image data compression require suitable light-field image data of high quality. This document introduces a new publicly available dataset of light-field images acquired with Lytro ILLUM camera [1].

2 Image Acquisition

Nowadays, several commercial light-field cameras are widely available to public. Two main manufacturers of light-field camera are Raytrix and Lytro. Raytrix has several models of plenoptic cameras for industrial and scientific applications, with effective resolutions ranging from 1 to 7.25 megapixels. Lytro commercializes the light-field cameras mainly for consumer use. In 2011, Lytro introduced its first-generation pocket-sized light-field camera, capable of refocusing images after being captured. In April 2014, Lytro released its second-generation light-field camera, called Lytro ILLUM, which resembles a traditional DSLR, for commercial and advanced photographers. Lytro ILLUM camera was used for acquisition of our image dataset.

3 Light-field image dataset

The light-field image dataset contain images in LFR, as provided by the Lytro ILLUM camera, accompanied by their thumbnails, corresponding depth maps and relative depth of fields coordinates (*lambdamin* and *lambdamax*). It also contains Lytro camera calibrating data. Each LFR file has a resolution of 5368 x 7728 pixels. LFR files (Light-field RAW Format) contain the whole light-field and have size of 55MB each. In LFR file light-field is stored in "raw form" as uncompressed lenslet image before demosaicing with 10 bits per pixel in little-endian.

The proposed dataset contains 119 light-field images classified into various categories. The categories are the following: Buildings, Grids, Mirrors and Transparency, Landscapes, Nature, ISO and Color charts, People, Studio, Urban, and Light. Each category contains images illustrating specific aspects of light-field imaging. For example, the People category offers a large number of images that can be used for face recognition or privacy protection applications. The distribution of light-field images over each category is illustrated in Figure 1.

Finally, the dataset contains the camera specific calibration data in the folder Camera Calibration Data as provided by the camera. Please note that each camera has different calibration data and one shall always decode LFR files with their corresponding calibration data.

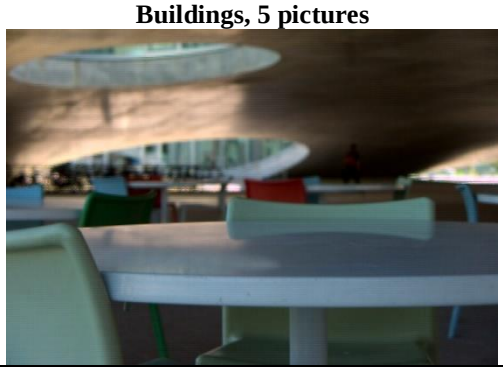
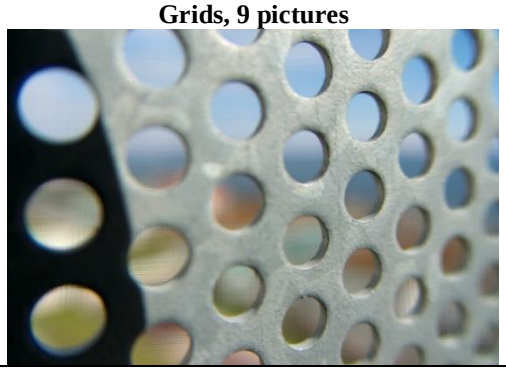
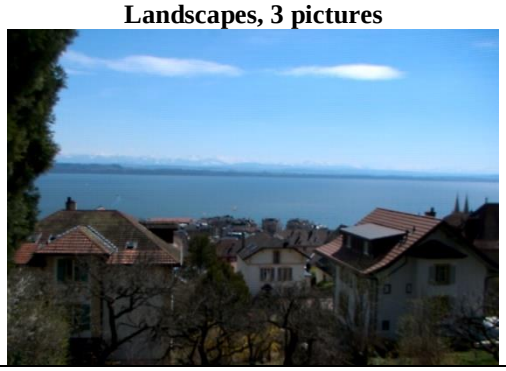
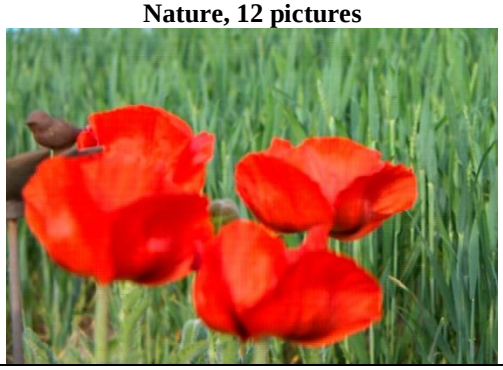
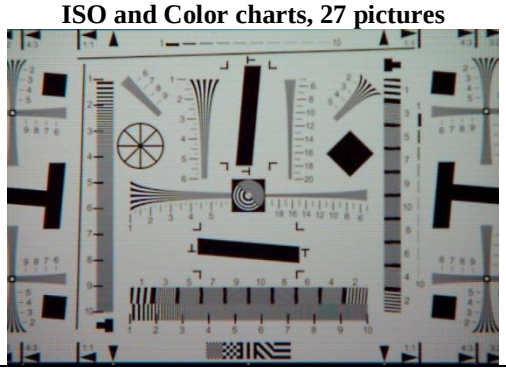
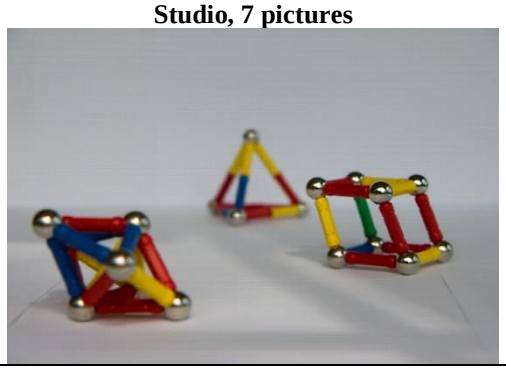
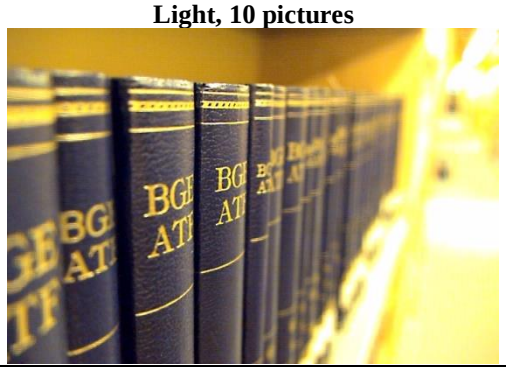
Buildings, 5 pictures 	**Grids, 9 pictures** 
Mirrors and Transparency, 11 pictures 	**Landscapes, 3 pictures** 
Nature, 12 pictures 	**ISO and Color charts, 27 pictures** 
People, 18 pictures 	**Studio, 7 pictures** 
Urban, 17 pictures 	**Light, 10 pictures** 

Figure 1: Example thumbnail of image data for each category.

4 Availability

The EPFL Light-field Image dataset including LFR files, thumbnails, depth maps, and camera calibration data is available at **ftp://tremplin.epfl.ch.**
All detailed information how to access the FTP server including related copyright information can be found at **http://mmspg.epfl.ch/EPFL-light-field-image-dataset**

5 Acknowledgement

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References

[1] Lytro Technical Specifications https://www.lytro.com/illum/specs/
[2] DANSEREAU Donald, 2015. Light-field Toolbox for Matlab. http://www.mathworks.com/matlabcentral/fileexchange/49683-light-field-toolbox-v0-4