Project Proposal

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EE368/CS232 - Digital Image Processing

Overview:

Title: Effective Thumbnails for Light Fields

Android Device: None.

Background and Context:

Light field (LF) cameras are gaining popularity because of advances in lens technologies and new post-processing capabilities [1]. Consequently, new products are constantly being developed that are designed to attract more consumers. For examples, there are currently several projects to develop and apply LF technology on phone cameras (i.e. Linx and Pelican Imaging). As the technology becomes more readily available to everyday consumers, new and creative rendering procedures will be required to maximize the utility of the captured data. For the technology to be adopted, the rendered images must provide fun/creative attributes that are beyond conventional image manipulation (i.e. social media).

Project Goals:

Given the growing availability for consumer cameras, there is an increasing potential for using light fields online in applications such as social media or advertising [2]. For this project, we propose to develop a robust workflow to generate effective, practical, and dynamic thumbnails from light field images (i.e. gif). Currently available thumbnails for light fields require the user to click on them to refocus or perform simple sweeps that are not visually appealing. We intend to explore and define universally applicable and visually attractive filters/effects that could then be presented as short gif thumbnails such as camera shake effect, camera focusing effects etc. During the project, we plan to explore various optical flow techniques and apply the ones within our reach that help provide better rendering of the image [3].

Resources

We plan to use publicly available LF images to perform our project. We will obtain images from the Stanford lightfields webpage as well as a dataset created by Rerabek and Ebrahimi [4] made up of images that were obtained by a Lytro Illum light field camera. The latter dataset is categorized based on the content of the images.

References

[1] M. Levoy and P. Hanrahan. Light field rendering. In *Proceedings of the 23rd annual conference on Computer graphics and interactive techniques*, pages 31–42. ACM, 1996.

[2] R. Ng, M. Levoy, M. Brédif, G. Duval, M. Horowitz, and P. Hanrahan. Light field photography with a hand-held plenoptic camera. *Computer Science Technical Report CSTR*, 2(11):1–11, 2005.

[3] P. O'Donovan. Optical flow: Techniques and applications. *The University of Saskatchewan*, 2005.

[4] M. Rerabek and T. Ebrahimi. New light field image dataset. In *8th International Conference on Quality of Multimedia Experience (QoMEX)*, number EPFL-CONF-218363, 2016.