## Research Log - Week 10

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## July 28, 2016

July 17, 2016 Spent a couple of hours working on demonstration code in OpenGL and OpenCV.

July 18, 2016 Spending day working on thesis document. Sections worked on include:

- Intrinsic Calibration Matrix
- Fundamental Matrix

July 19, 2016 Continuing to add material to thesis document, including:

- Extrinsi Calibration Matrix
- Fundamental Matrix

Going back to reread first parts of Chapter 6 from [Hartley2004] [1], as I need clarification on some aspects of the *calibration matrix*. Namely, I *still* do not understand how  $\mathbf{X}(\lambda) = \mathbf{P}^+\mathbf{x} + \lambda \mathbf{C}$  represents the equation of a ray passing through *optical center*  $\mathbf{C}$  in *world space*, with *projection matrix*  $\mathbf{P}$ .

July 20, 2016 Added material on fundamental matrix calculation from data to thesis document. Reading additional material from [Hartley2004] [1] on fundamenta matrix theoretical calculation.

July 21, 2016 Continuing to read [Martin2008] [2]. See questions below.

Question for Kamangar: I don't understand the difference between forward mapping and backward mapping.

I'm a bit confused about most of the material being discussed in [Martin2008] [2]. Will read [Karathanasis1996] [3] for background on disparity estimation using dynamic programming.

**UPDATE:** My question on July 13, 2016 may have been worded wrong: The dynamic programming is used for estimating disparity, which in turn is used for point correspondance. The dynamic programming is not used DIRECTLY, in calcuating point correspondance.

Orignal question still holds though:

Question for Kamangar: I understand ALL of the following to be TRUE, which one needs to be FALSE (or my understanding revised):

- Point correspondence is needed to compute rectifying homographies.
- Rectifying homography is needed to compute disparities.
- Disparity is needed to compute point correspondence.

July 22, 2016 Started reading [Karathanasis1996] [3], no new information from first few sections.

## References

- [1] R. I. Hartley and A. Zisserman. *Multiple View Geometry in Computer Vision*. Cambridge University Press, ISBN: 0521540518, second edition, 2004.
- [2] N. Martin and S. Roy. Fast view interpolation from stereo: Simpler can be better. In Fourth International Symposium on 3D Data Processing, Visualization and Transmission, Proceedings of 3DPVT'08, 2008.
- [3] J. Karathanasis, D. Kalivas, and J. Vlontzos. Disparity estimation using block matching and dynamic programming. In *Electronics, Circuits, and Systems, 1996. ICECS '96., Proceedings of the Third IEEE International Conference on*, volume 2, pages 728–731 vol.2, Oct 1996.