1 Progress

1. Aaron and Thomas met to gather more test photos and discuss ideas for dealing with 360 photos.

2 Aaron Spaulding

1. Faces a problem with the Sum of Squared Differences method used previously. We think it is because matching areas in other sections may be very warped due to the spherical projection. It may be possible to circumvent this by "rotating" the image or by using another correlation method.

2. Aaron came up with a method of determining distance for spherical photos. This however only works if the matching points on two images actually can be matched. The method is detailed below.

2.1 Aaron's Method

We regard the two camera centers as the points x_1 and x_2. Observe the line x_c drawn connecting these two points. Observe a point P in space with lines a and b connecting x_1 and x_2 respectively to P. Observe angle α_1 and α_2 formed by the lines a and b and x_c. We wish to find the distance of the median drawn from the midpoint of x_c to P as a function of x_c, α_1, and α_2. Call d this distance. Observe the following equation:

$$d = x_c\sqrt{\frac{2sin^2(\alpha_1)cos^2(\alpha_2) + 3sin(\alpha_1)cos(\alpha_1)sin(\alpha_2)cos(\alpha_2) + 2cos^2(\alpha_1)sin^2(\alpha_2) + sin^2(\alpha_1)sin^2(\alpha_2)}{4(sin^2(\alpha_1)cos^2(\alpha_2) + 2sin(\alpha_1)cos(\alpha_1)sin(\alpha_2)cos(\alpha_2) + cos^2(\alpha_1)sin^2(\alpha_2))}} \tag{1}$$

3 Thomas

1. Explored the possibility of applying the plane sweeping algorithm.

2. Looked up how to compose the camera matrix, made some progress.