

MOBILE VISUAL COMPUTING PROGRAMMING ASSIGNMENT [2]

In this assignment we were required to create a camera image processing pipeline by using the concept of perspective projection through which we can map 3d points of an image to 2d coordinates.

The approaches suggested by the assignment was either using transformation matrix or taking the approach of finding the focal length through angle of view and then using similar triangles method to solve the problem.

In my approach I have used the concept of similar triangles, In this technique the first step that we wanted was knowing the angle of view which was 90 degrees, by knowing the angle of view and using the $\tan(\theta) = \text{perpendicular/base}$ formulae we can calculate the focal length which was eventually one(1), after using this approach, we can use similar triangle approach, In this approach we calculate the new points using the old points and focal length. Eventually after calculating the new points, i.e $[(x = -(x * (f/z))), (y = -y * (f/z))]$ where x, z and y are points and f is the focal length. Here we are giving minus(-) value for the z coordinate which in-turn makes the entire equation negative, we are giving the negative value for z coordinate because apparently the z-axis is in negative direction at the place where the points are projected, if we will not assign negative value for z we might get an inverted image.

This is method that I used for implementing perspective projection.