

## **Aerial Robotics Kharagpur Documentation Template**

### **Disparity Map**

**Disparity map has been made by calculating the change in the pixel value and the corresponding value was scaled between 0 and 255 and the image is displayed. This map is used to find the depth of images just like our eyes which can perceive depth. In robot motion, it needs to perceive depth to avoid obstacles and plan a path.**

### **I.INTRODUCTION**

We are given a pair of stereo images and we have to find the disparity map. Initially, i tried taking the difference of both the images and checked the result. It terribly failed. I kept playing with the differences till i learnt about the epipolar geometry, camera calibration and stereo.

## **II. PROBLEM STATEMENT**

A pair of stereo images are given. A disparity map has to be calculated without using the existing functions. The apparent shift in the pixels of a particular thing in the image is to be found

## **III RELATED WORK**

Initial approaches were around finding the differences of both the images and outputs were too noisy and then I studied about epipolar geometry and related stuff and came to my final approach.

## **IV. INITIAL ATTEMPTS**

I used the inbuilt function to check how the output was. Then started using differences, sum of squares and so on. Then I started learning about epipolar geometry and camera calibration and parameters. Then started to aim for rectification.

## **V.FINAL APPROACH**

A part of image is taken on the left. A window was taken and moved along the other image. The sum of squared differences are calculated for each pixel value and we take the best window. We calculate the change in pixel value. That change is scaled between 0 and 255. A disparity map is created.

## **VI. RESULTS AND OBSERVATION**

The code is not efficient for unrectified images. This code should be improved by putting in the mathematics for rectifying the image and smoothening it.

## **VII.FUTURE WORK**

Not having rectification is a major problem and I wish to work on that, learning its mathematics and putting that to code. Stereo vision and stuff also drew my attention like never before. I want to complete a course on that

## **CONCLUSION**

Disparity Map is computed by finding the shift of each object. Rectifying the image was needed. Disparity maps are very useful for AR bots because as they move they need to perceive depth like humans and turn around the obstacles.

## **REFERENCES**

Udacity course on stereo vision

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