

DISPARITY DETERMINATION IN STEREO VISION

Raphael Ullmann, Michael Haberl, Lu Sang

KEYWORDS:
2D IMAGE
3D RECONSTRUCTION

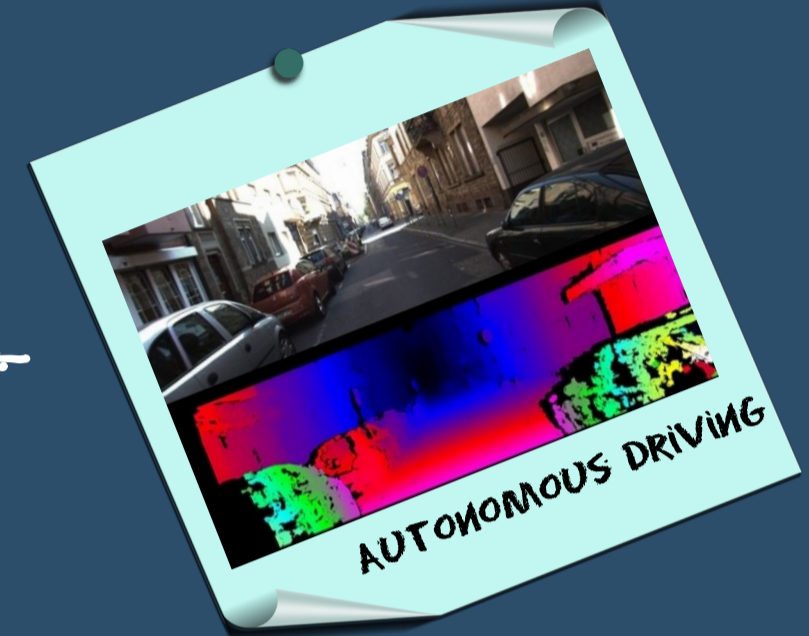
WHAT DO WE WANT TO DO?

Calculate distance information out of two 2D images taken by two cameras next to each other.

HOW DO WE GET IT?

WHY DO WE WANT TO DO IT?

- Object recognition
- Robotic vision
- Autonomous driving




STEP 1. PREPROCESSING

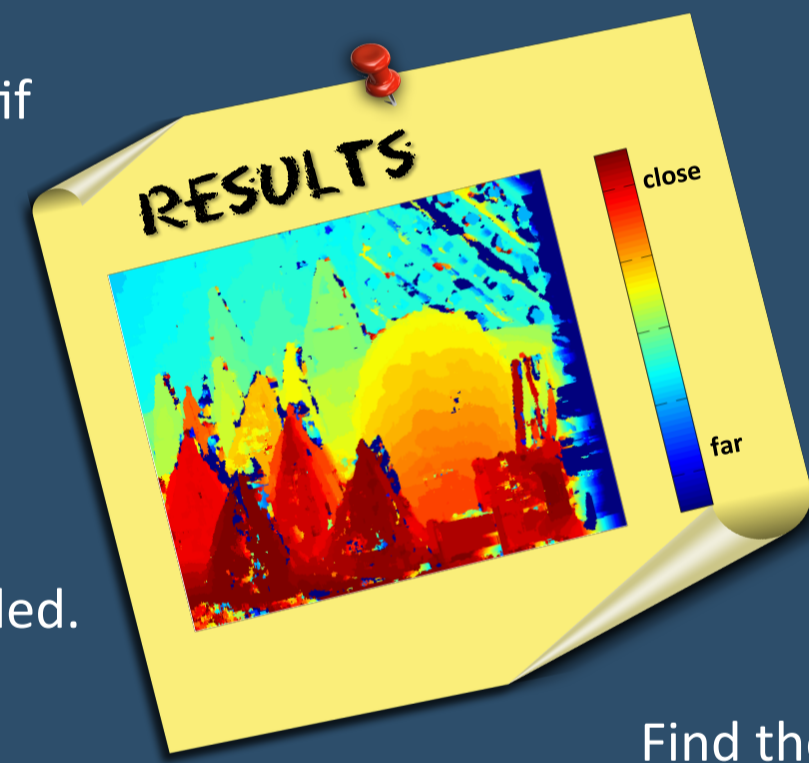


- UNDISTORTION makes straight lines on the motif to straight lines in the image.
Aim: obtain real coordinate of the pixel.
- RECTIFICATION aligns the two pictures.
Aim: make pixel and its corresponding point located in the same line, only 1D search is needed.



STEP 2. SIMILARITY FUNCTION

Establish a function to evaluate the similarity.
For each pixel in the left image calculate the similarities of the pixels in the right image by comparing the surrounding areas .




STEP 4. DISPARITY MAP

The disparity map shows how corresponding pixels moved in the right image.
With this disparity it is possible to calculate the distance of an object to the cameras.

STEP 3. MAXIMIZE SIMILARITY FUNCTION

Find the pixel which maximizes the similarity function. This pixel should then be the corresponding pixel of the left image.
The distance between these two pixels is called DISPARITY of the pixel.

Max Similarity
For the pixels in .

