Stereo

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3D Cameras
How Do We See 3D?

Left Eye Image
How Do We See 3D?

Right Eye Image
Stereo Image Pairs

Image pixels are aligned one horizontally.
But not vertically.

The displacement of each pixel is not uniform: the closer the point, the bigger the displacement.
Profile Matching by DP

Right profile

Left profile
Profile Matching by DP

Right profile

Left profile

Find the best pixel to pixel matching from the right profile to the left profile so that the corresponding pixels have similar color and the matching is smooth.
Depth Map without Smoothness
Depth Map
Another Image Pair

Left Image

Right Image
Depth Map
Depth Map