An Autostereogram Decoder

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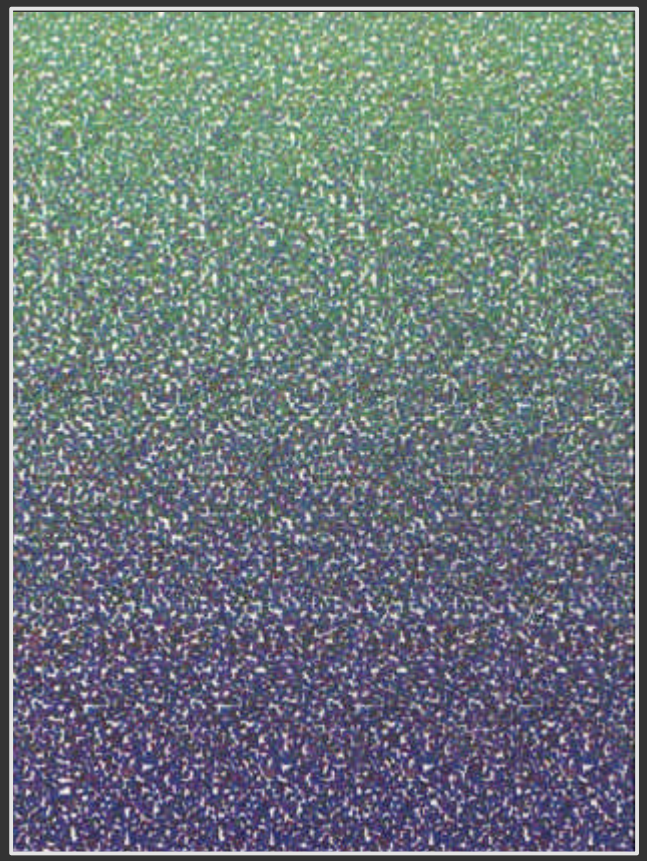
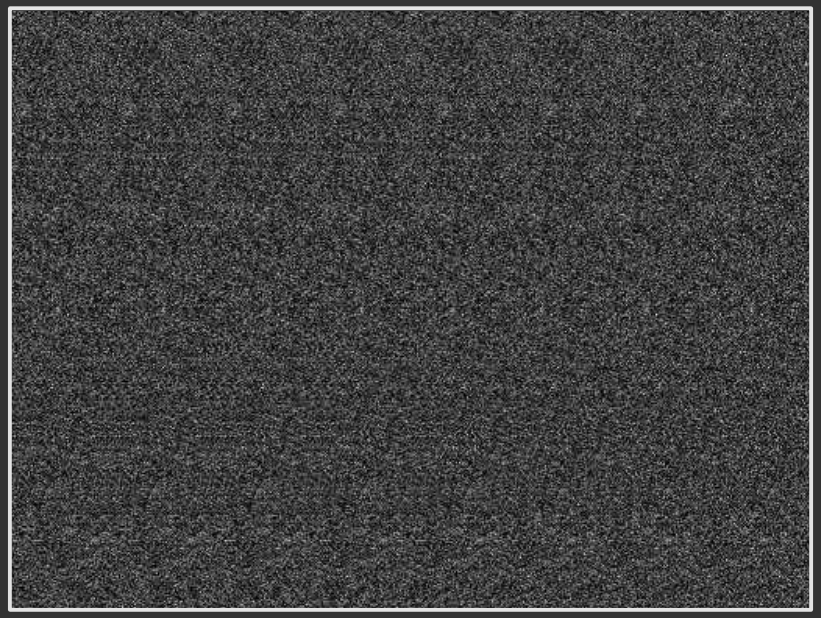
April 17, 2003

Autostereograms





Decoding autostereograms

Observation:

- **Autostereograms encode a depth image**
- **Depth image can be difficult to see**

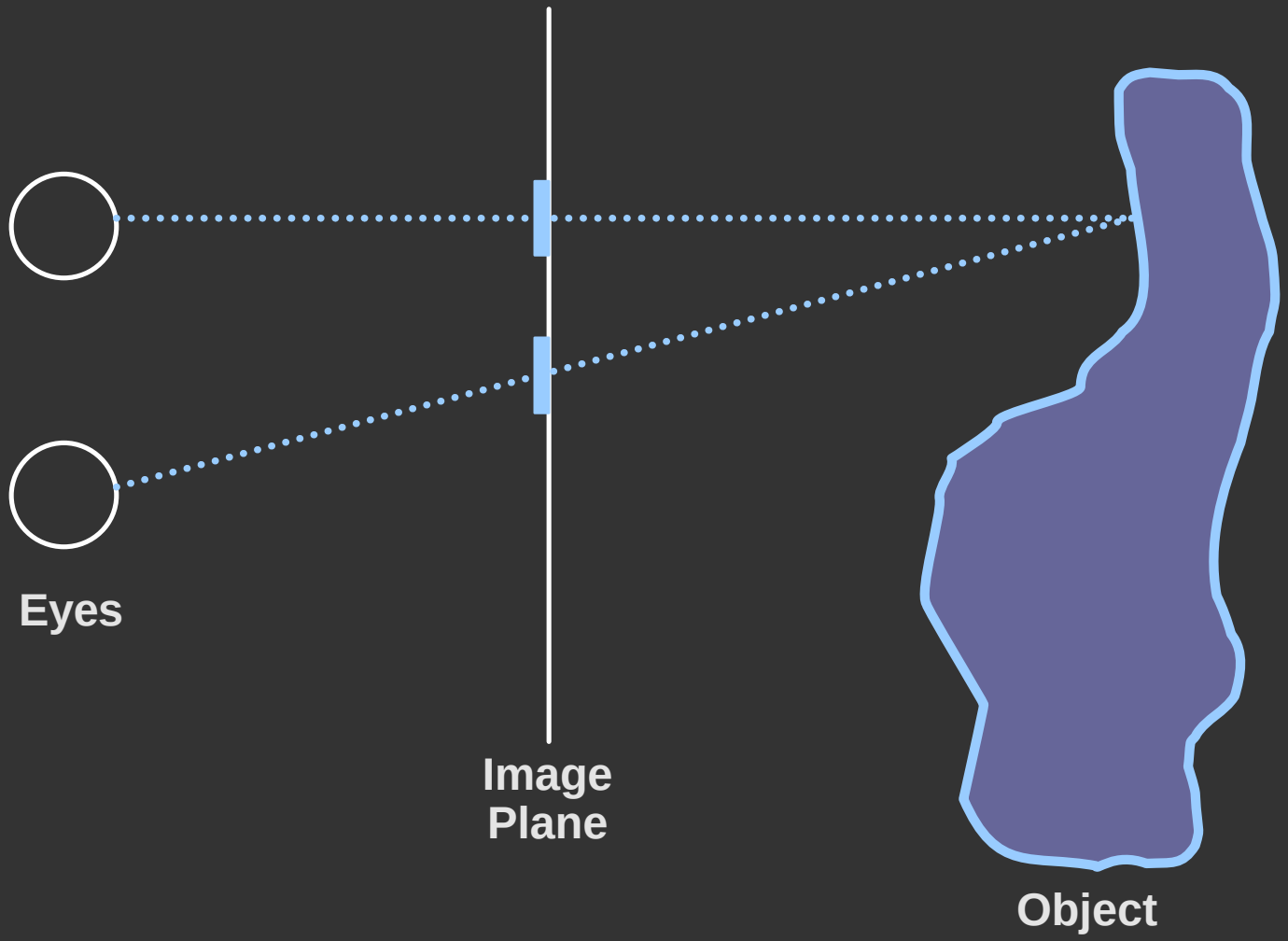
Goal:

Make depth image visible

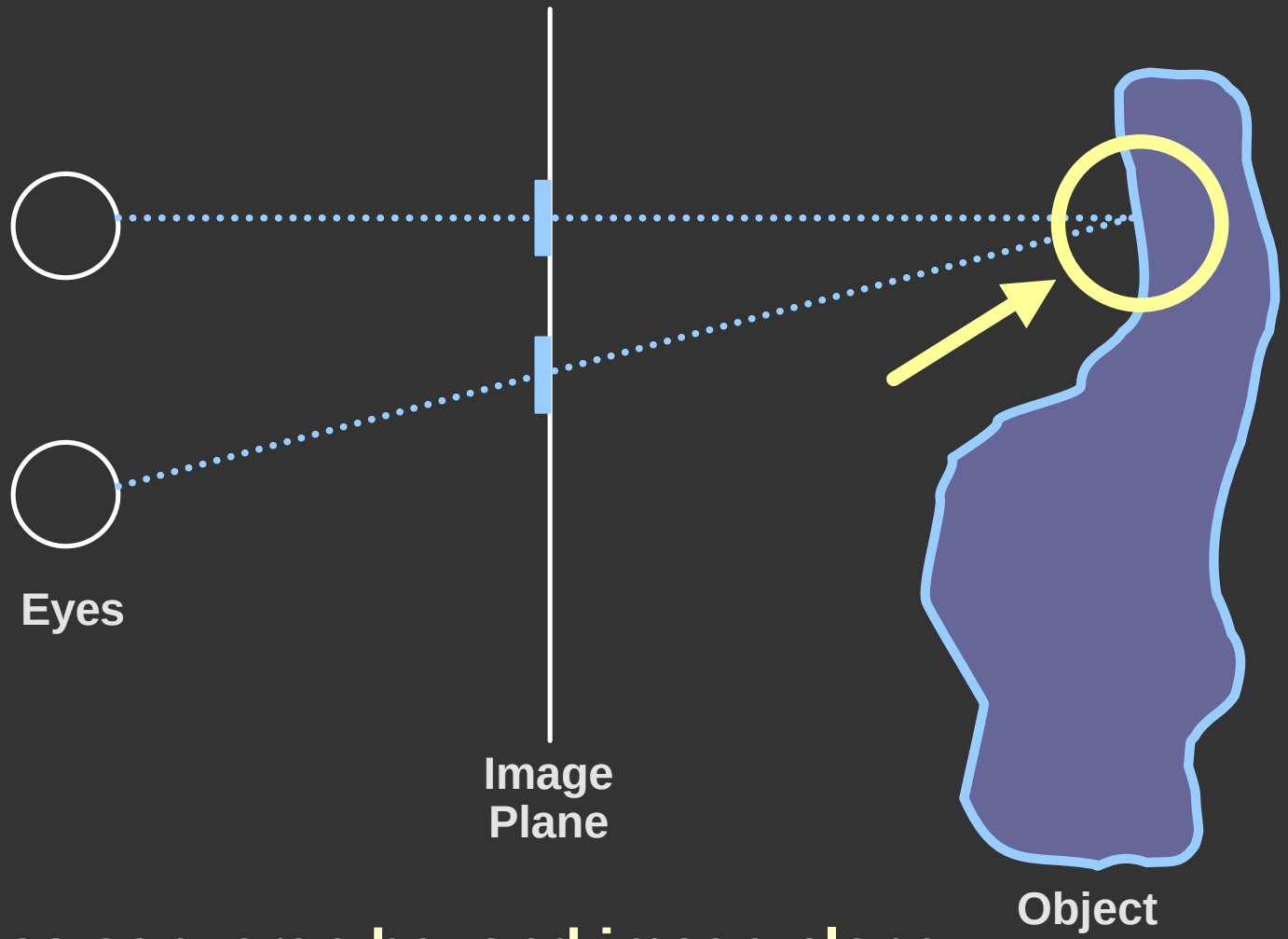
Method:

Extract depth image using a computer

Making a hidden object

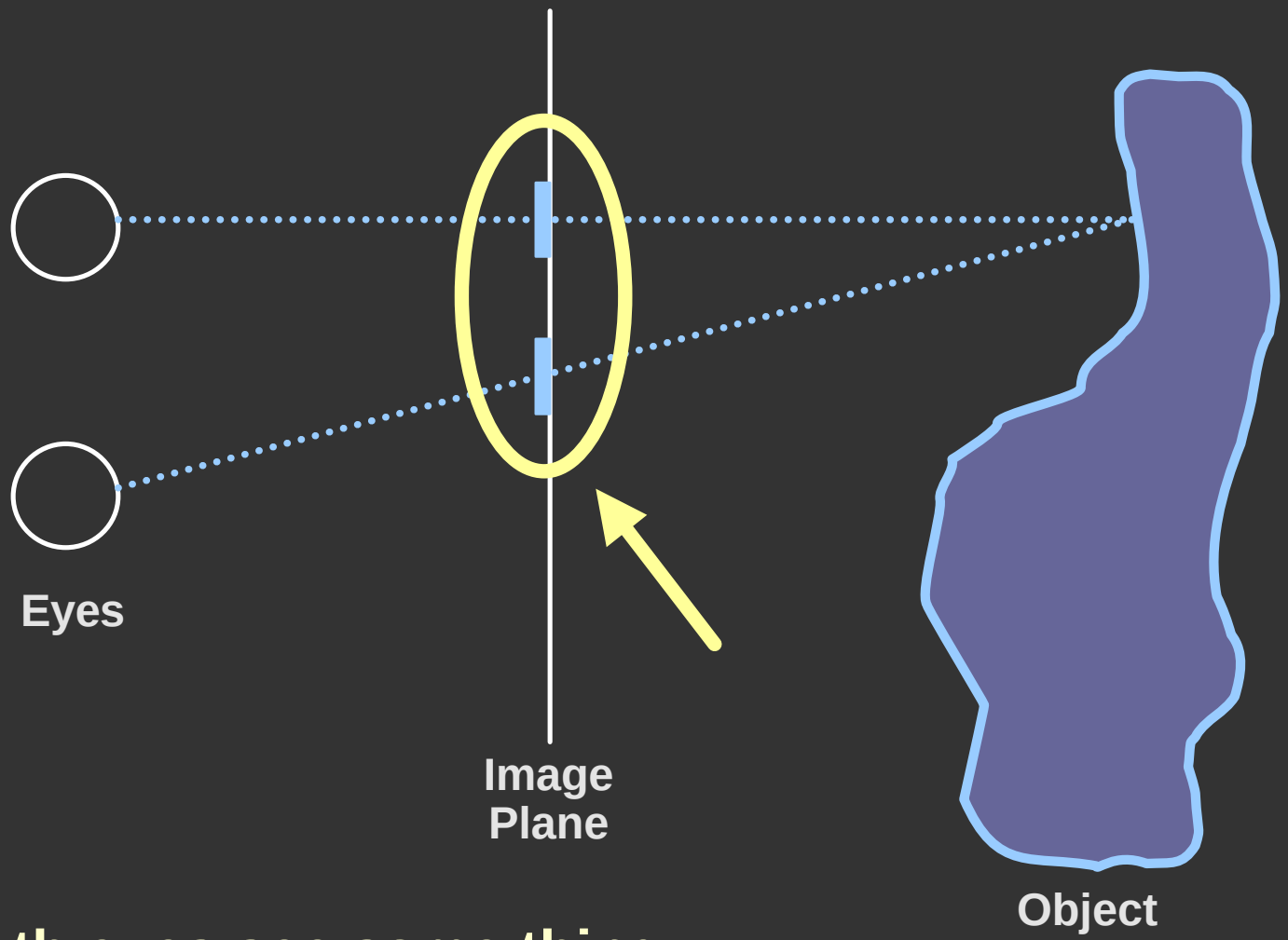


Making a hidden object



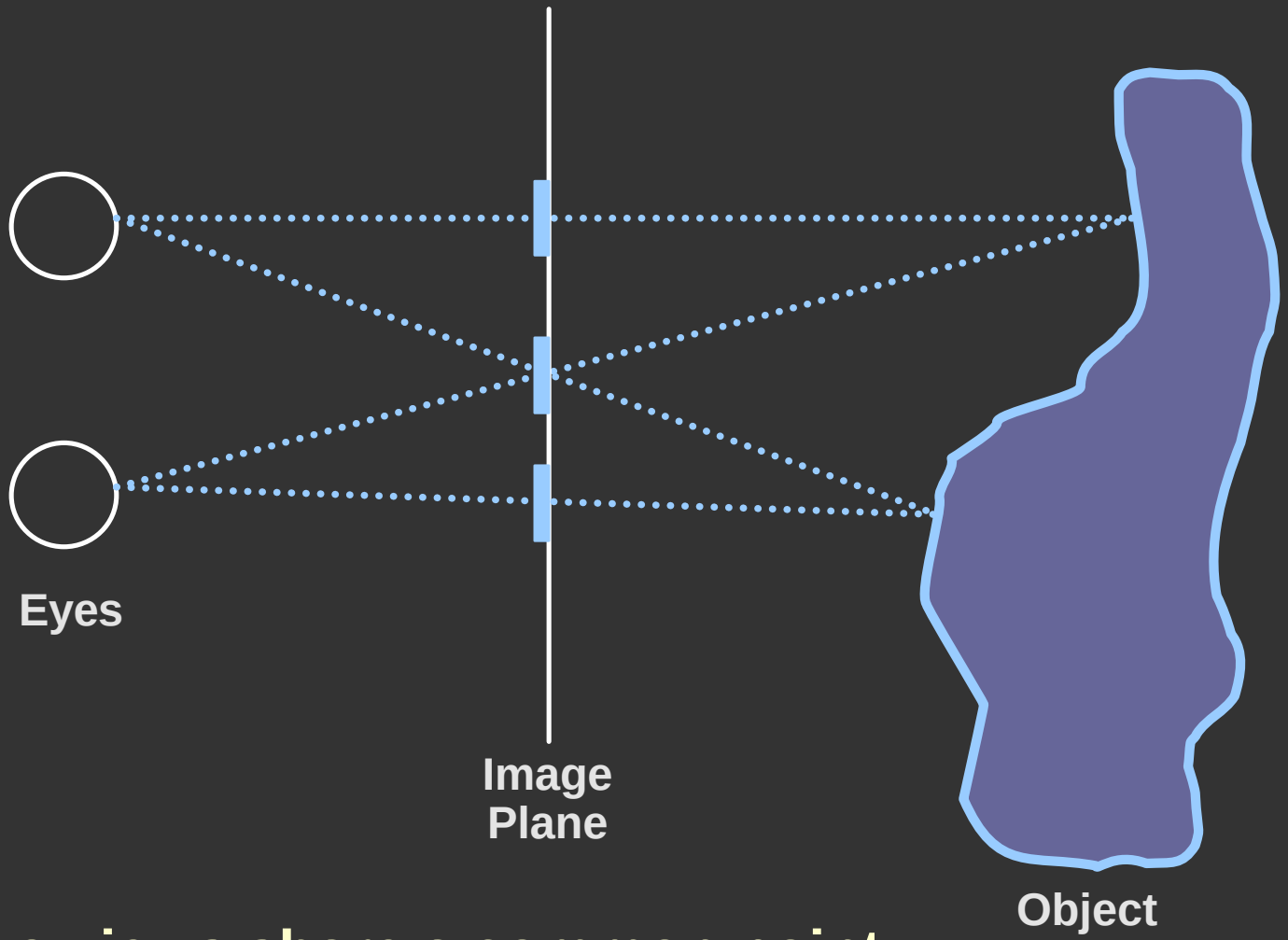
Eyes converge beyond image plane

Making a hidden object



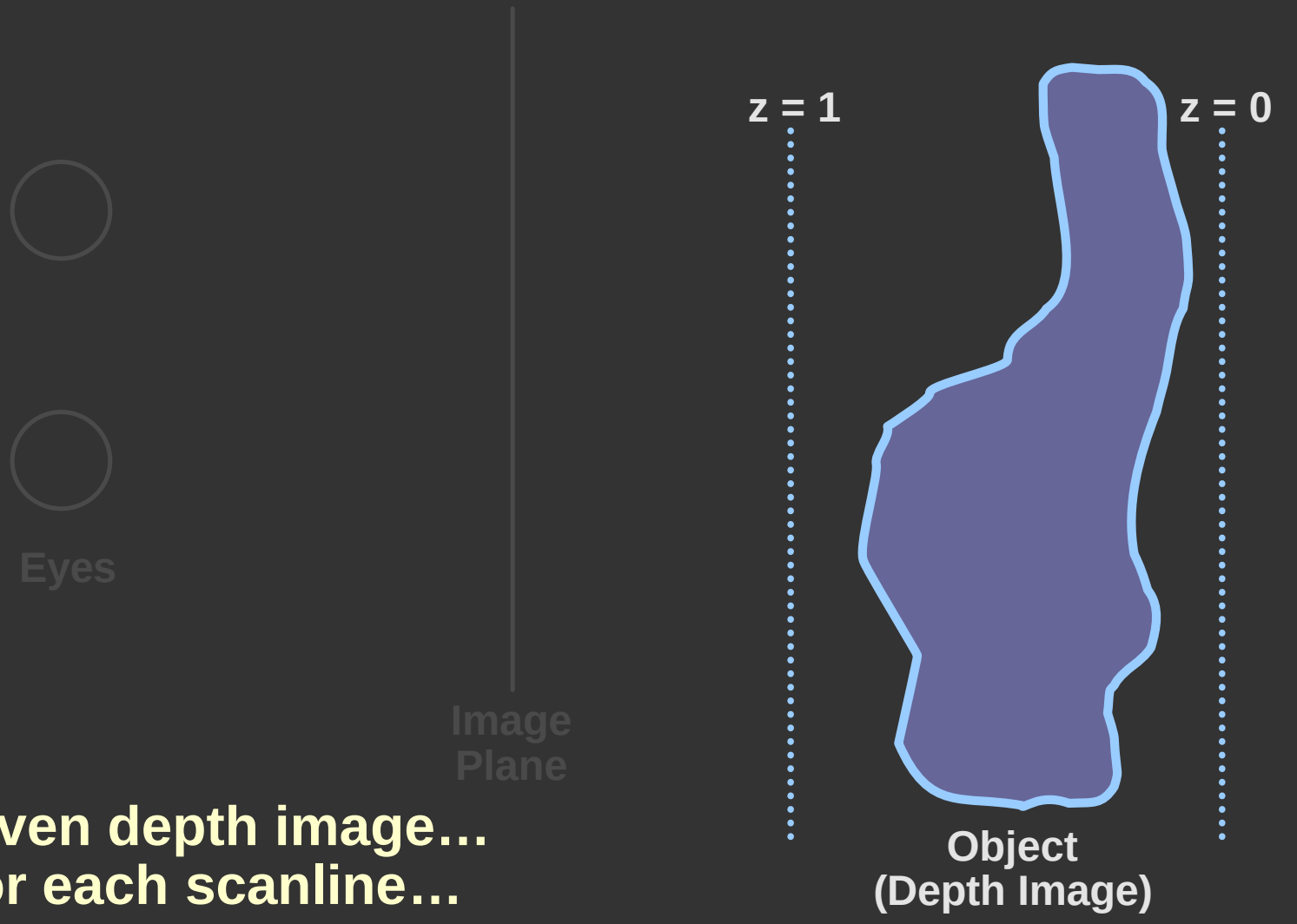
Both eyes see same thing

A special case



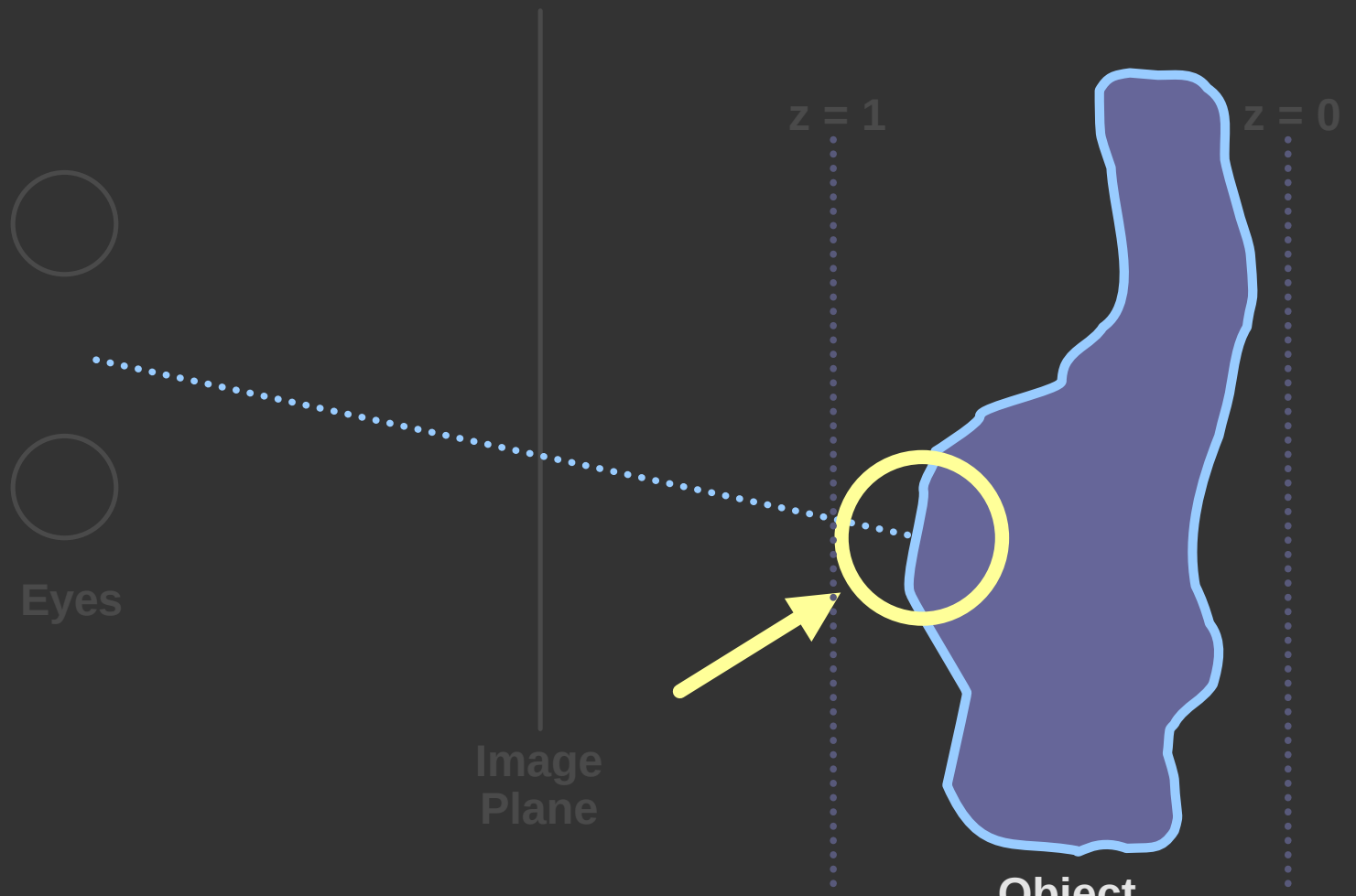
Two views share a common point

Making the autostereogram



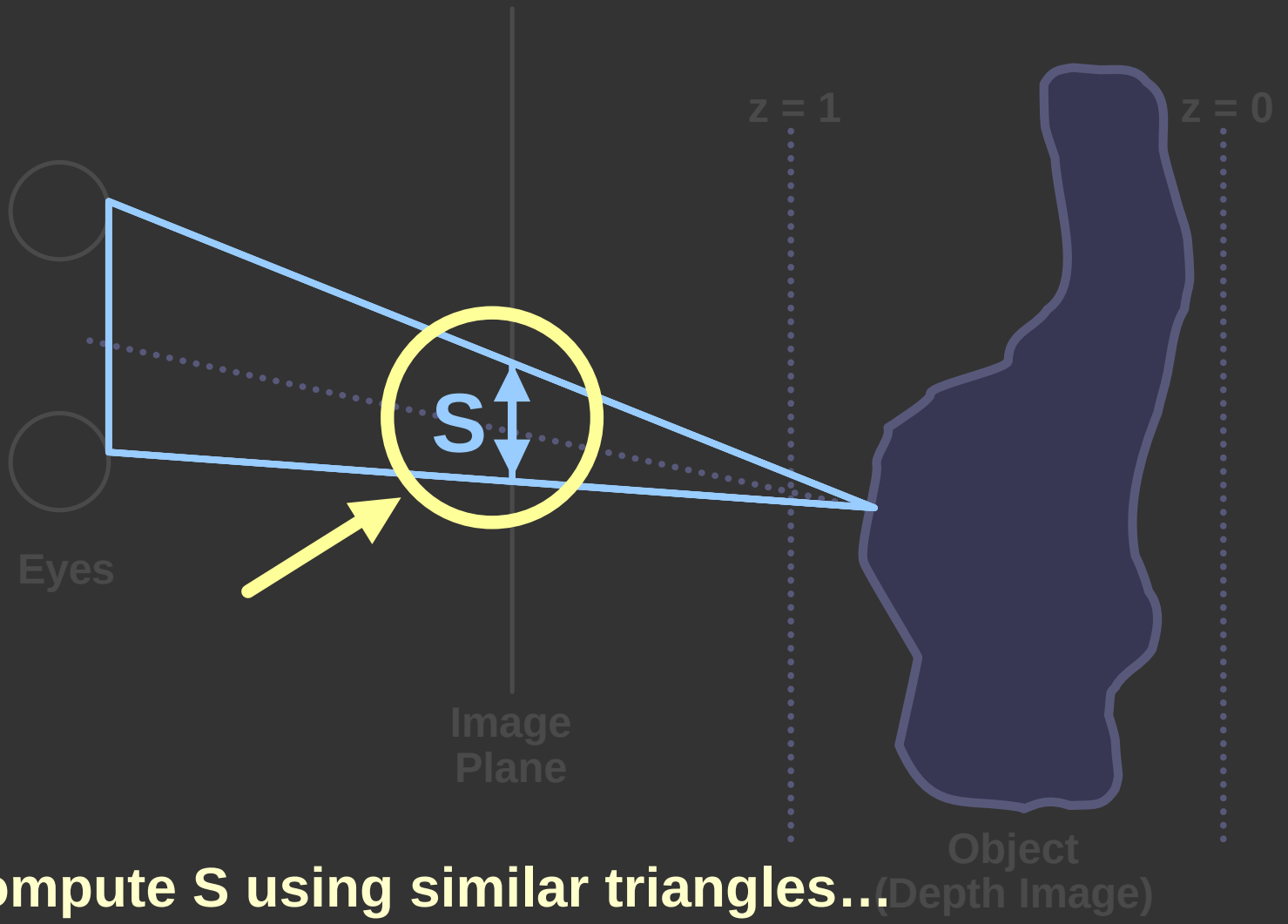
Given depth image…
For each scanline…

Making the autostereogram



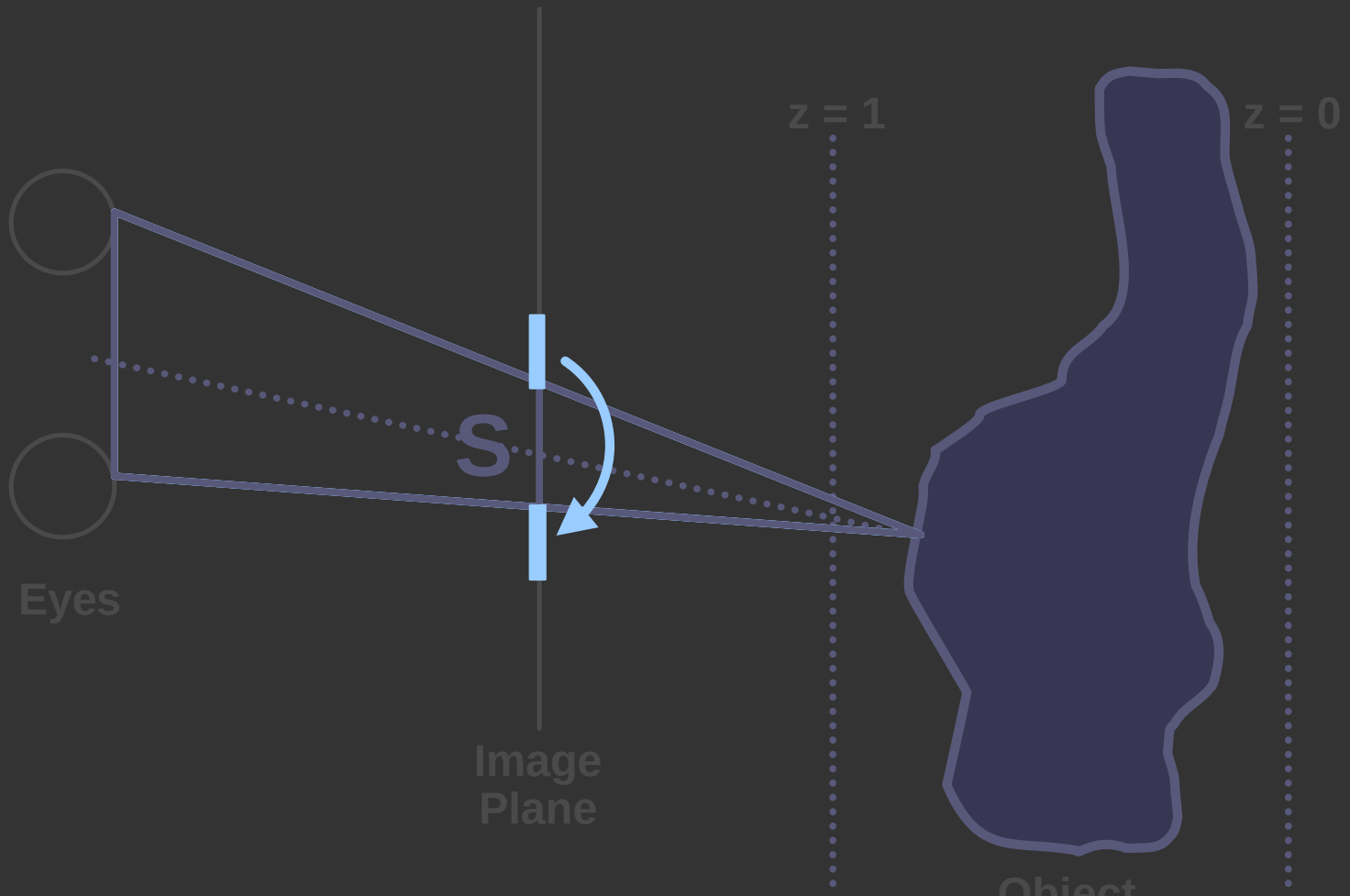
Lookup depth sample…

Making the autostereogram



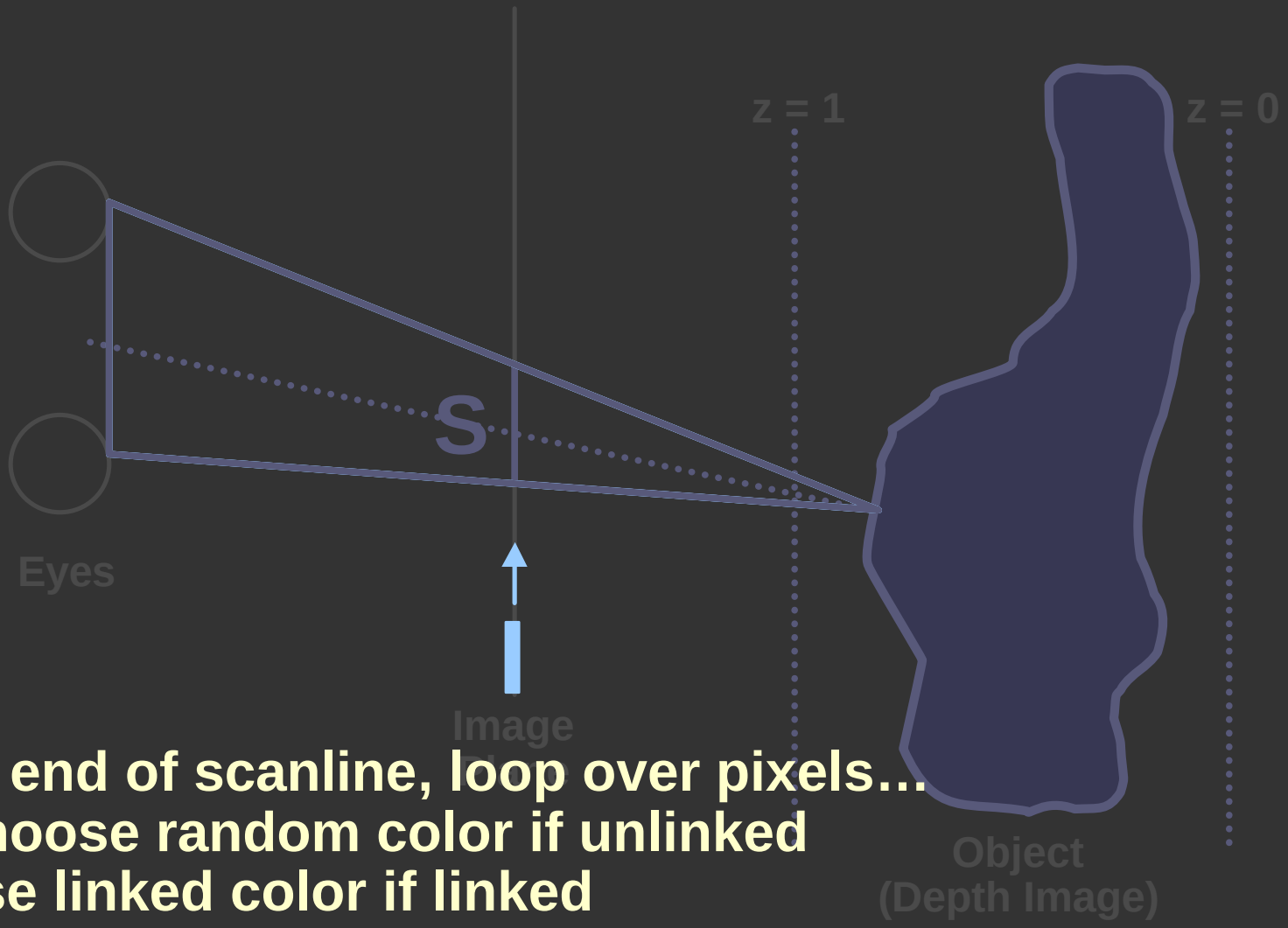
Compute S using similar triangles…

Making the autostereogram



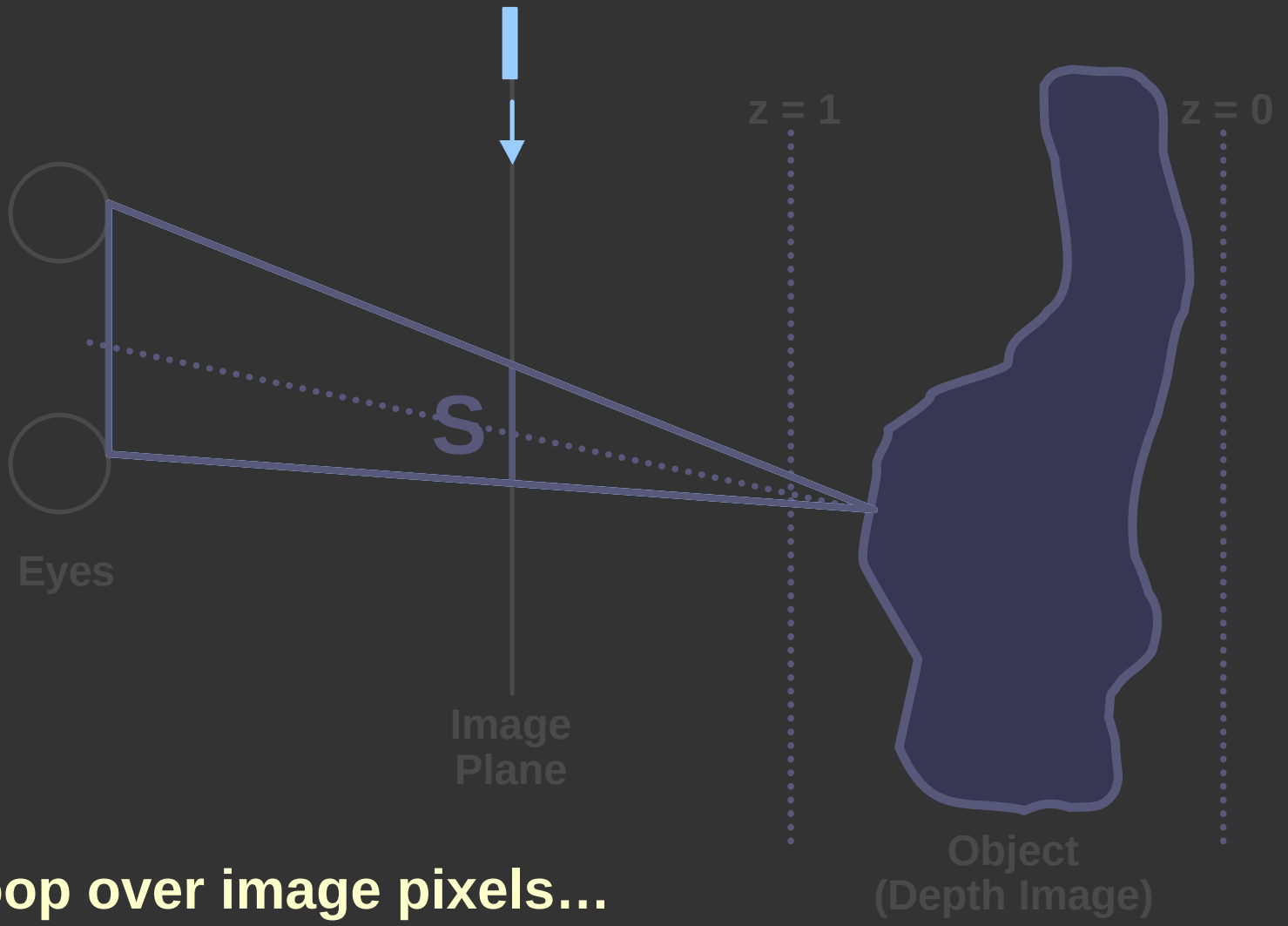
Link image pixels separated by S to be the same

Making the autostereogram



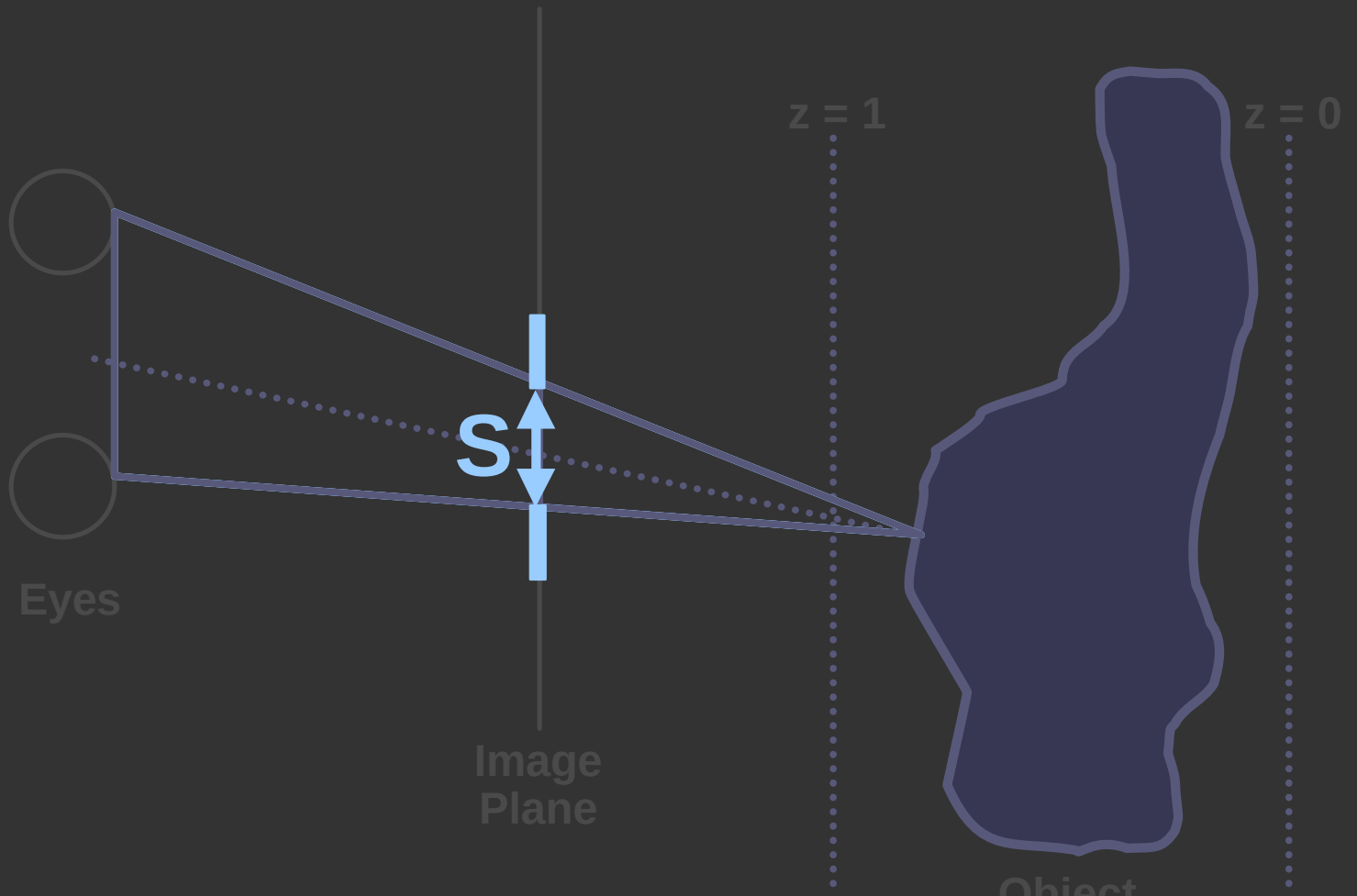
At end of scanline, loop over pixels…
Choose random color if unlinked
Use linked color if linked

Decoding the autostereogram



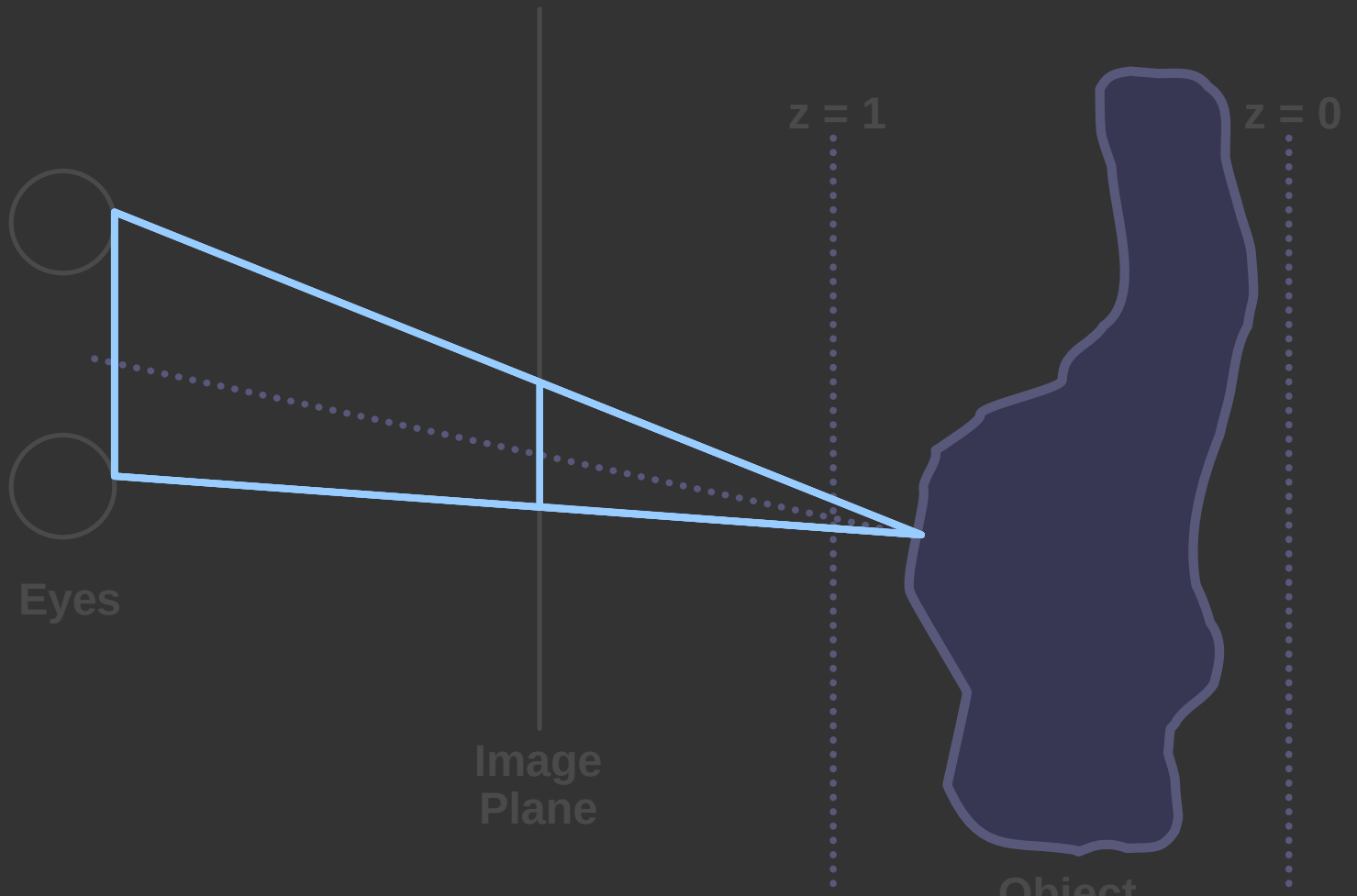
Loop over image pixels…

Decoding the autostereogram



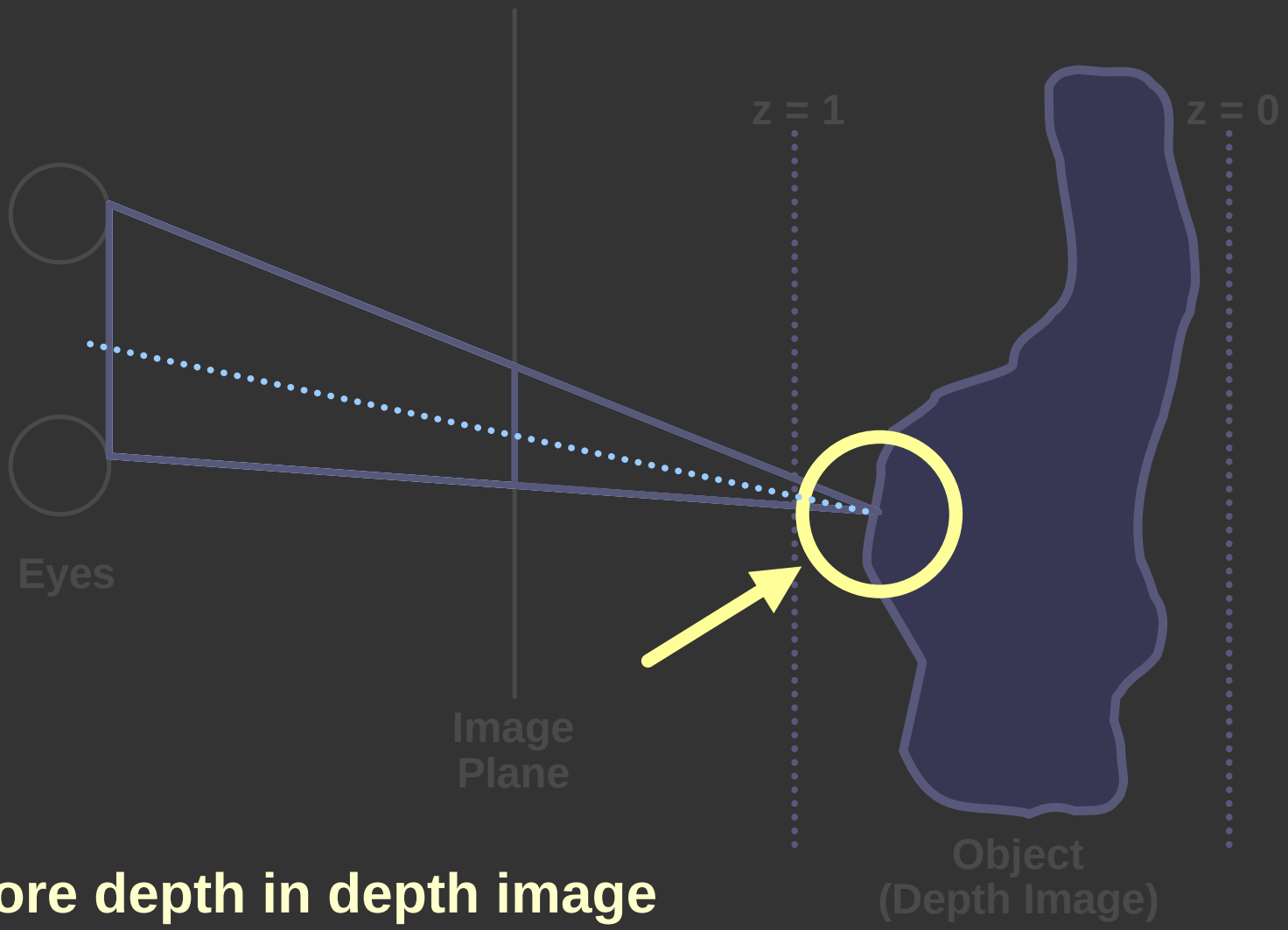
Recover S by searching for correspondence…

Decoding the autostereogram



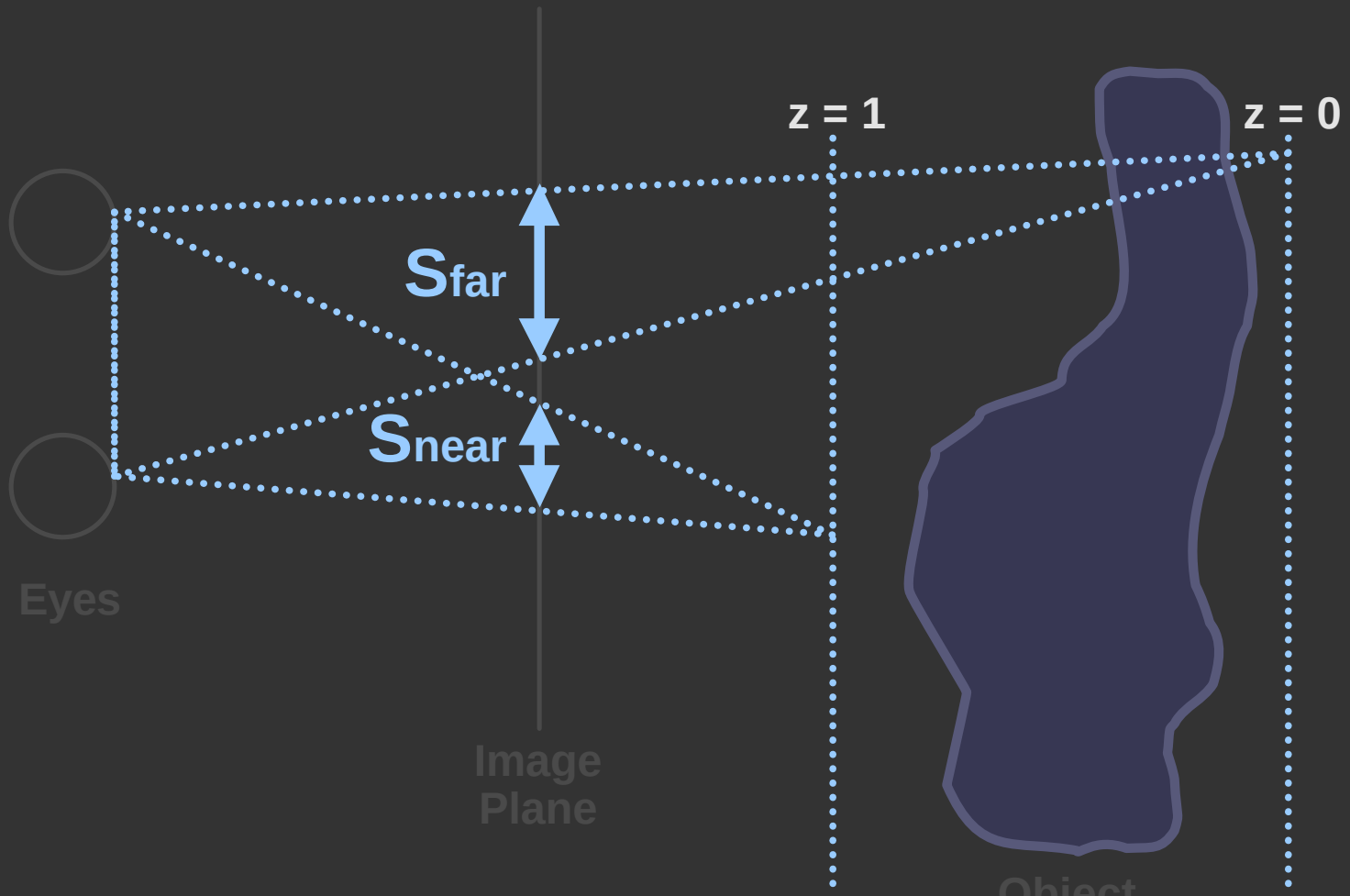
Compute depth using similar triangles…

Decoding the autostereogram



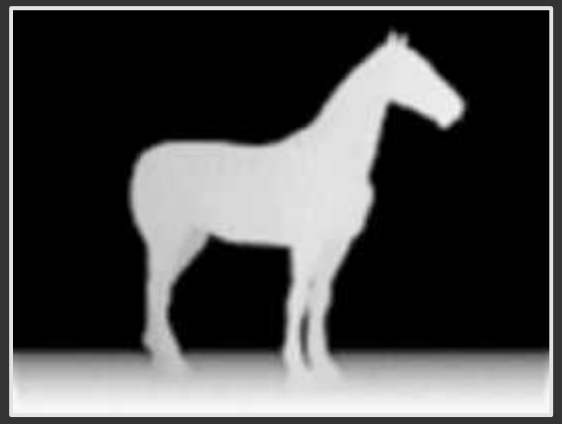
Store depth in depth image

Limiting the search

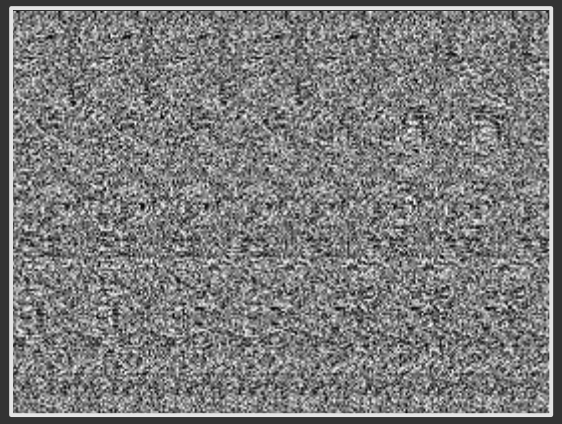


Use S for near and far planes to limit search

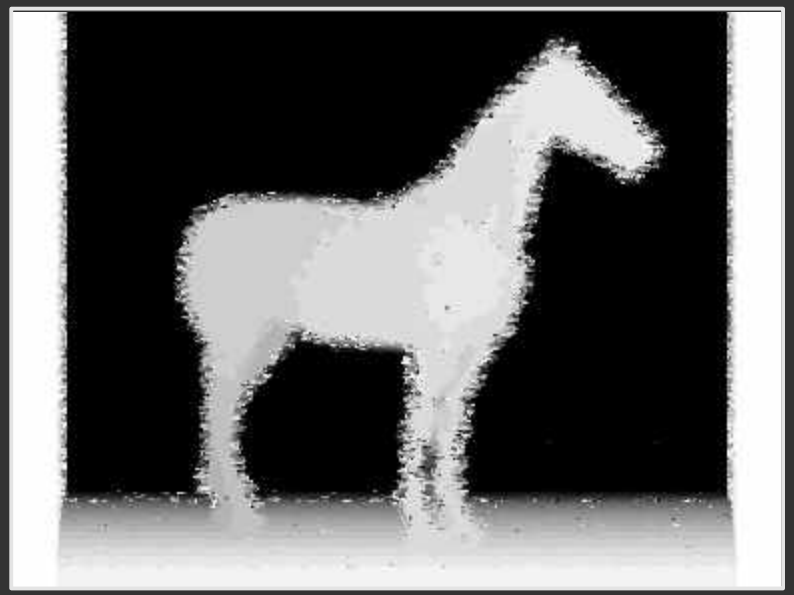
Results



Original depth image

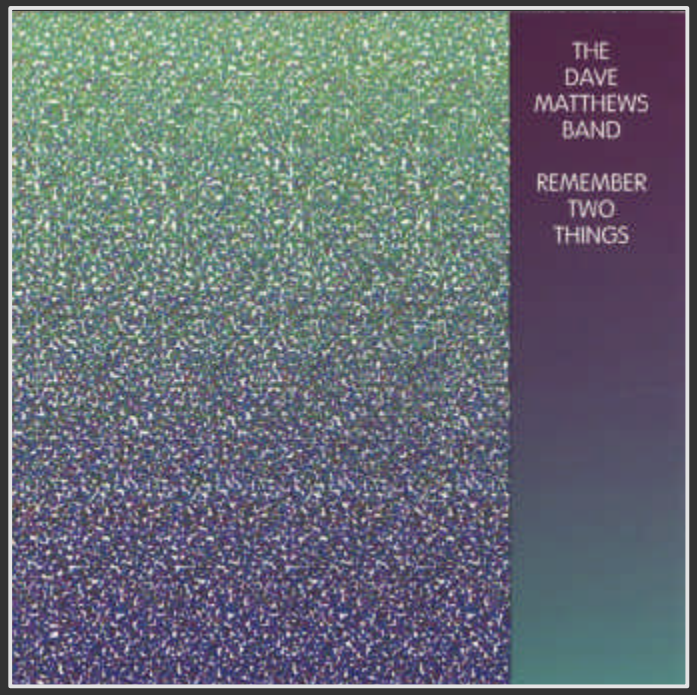


Autostereogram



Decoded depth image

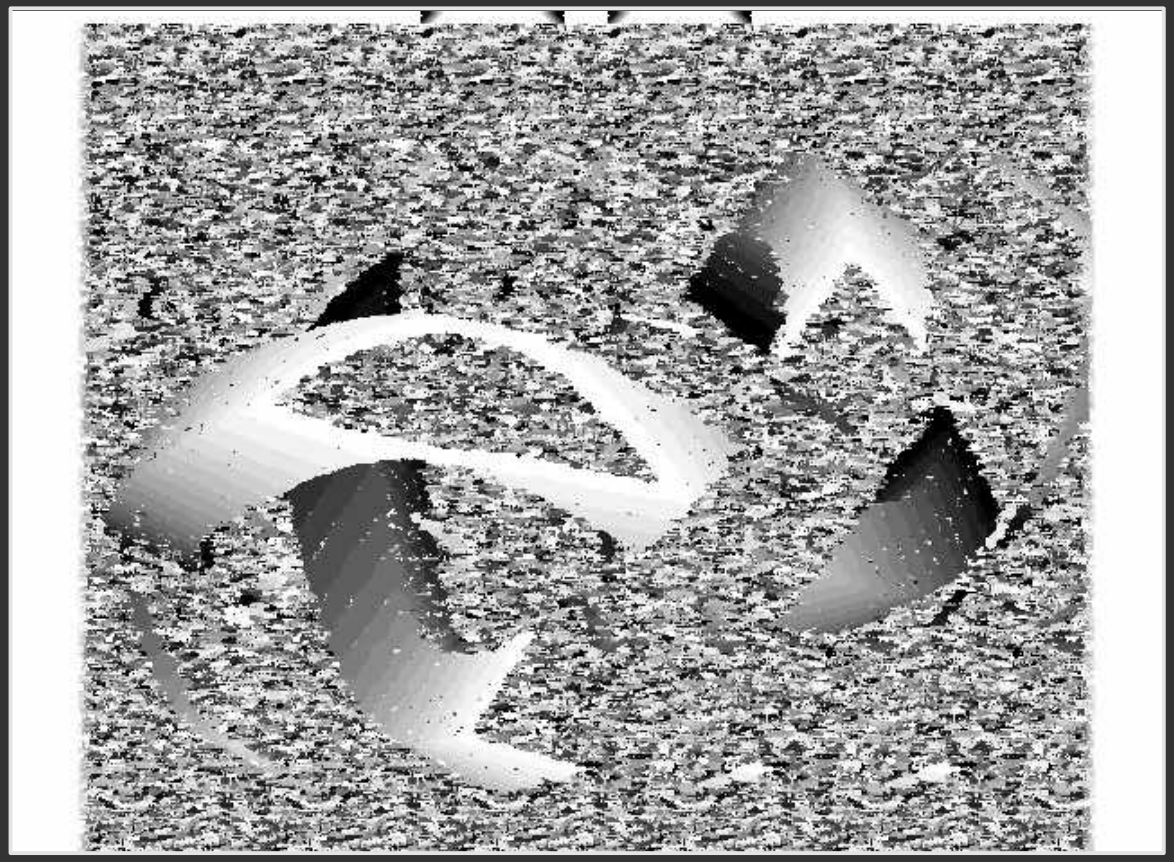
Results



Album cover

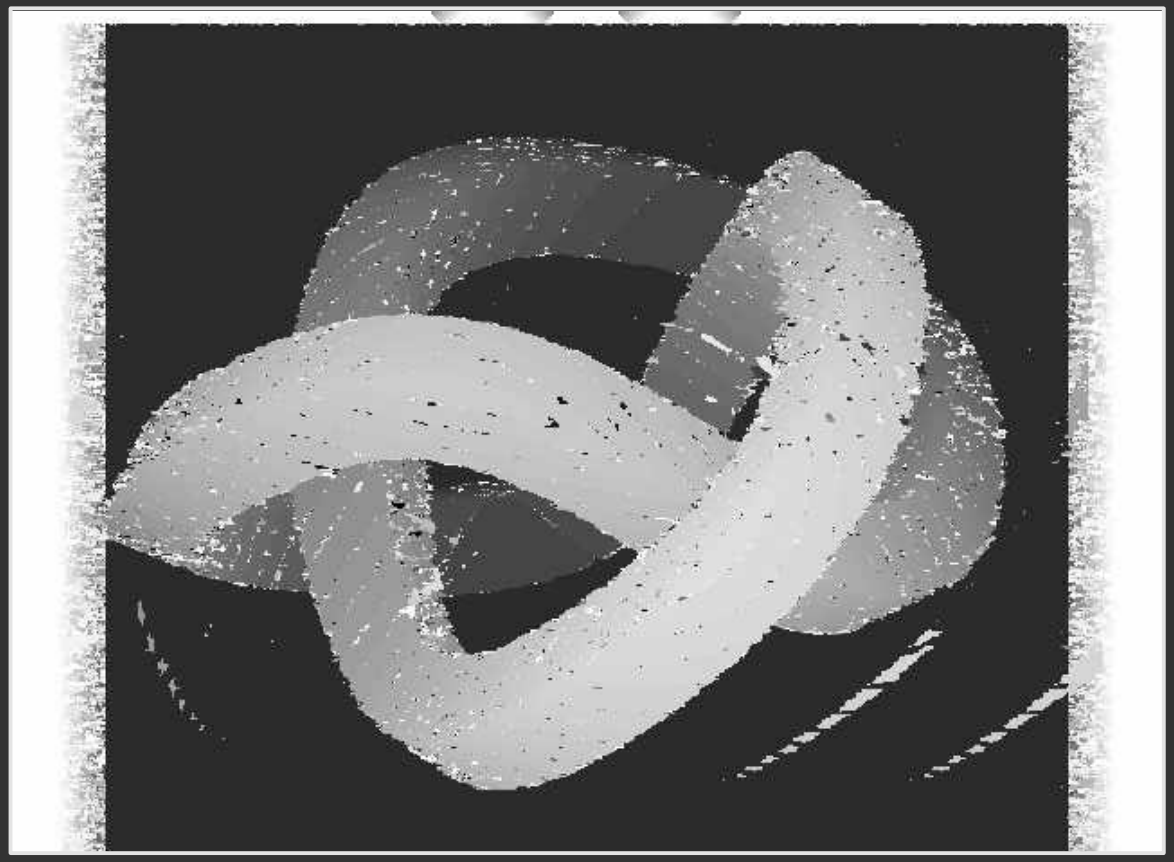
Peace sign

Problems



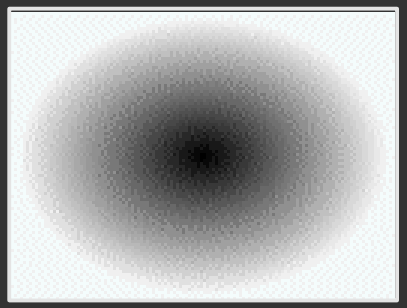
Insufficient search for corrsponding points

Problems

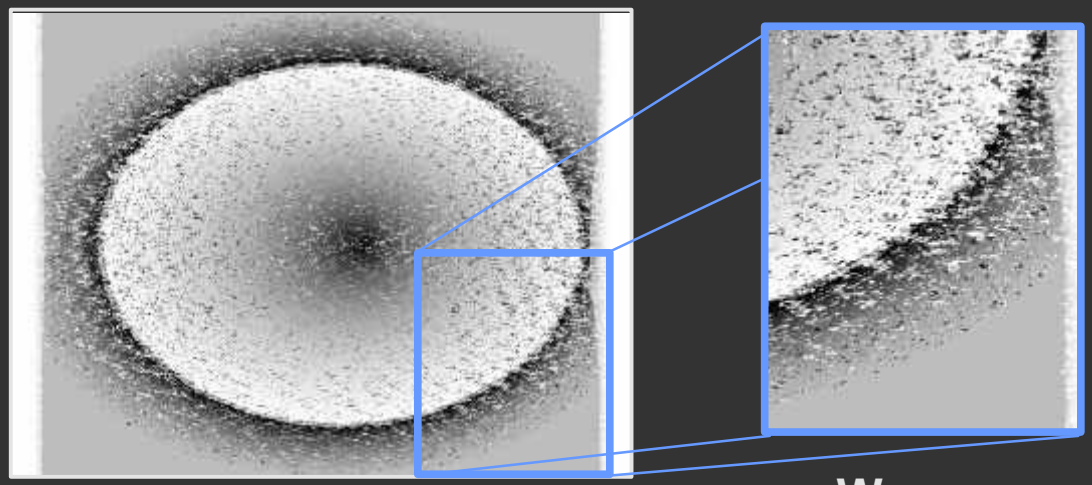


Searching nearer and farther fixes depth image

Problems

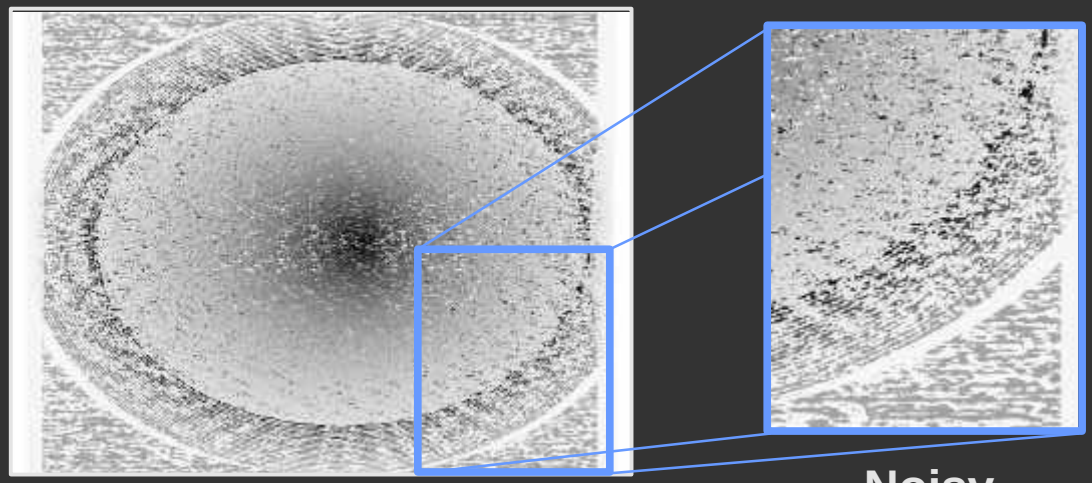


Correct depth image



Near = 70

Wrong depths



Near = 40

Noisy background