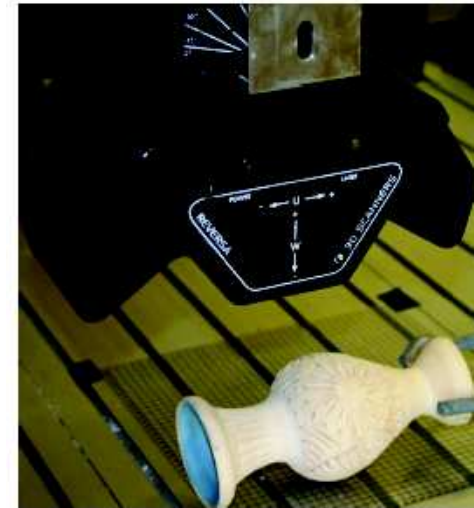
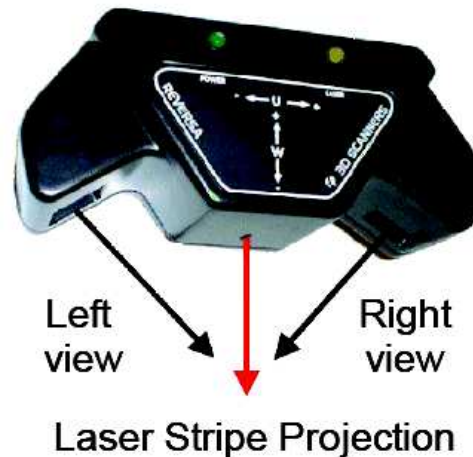
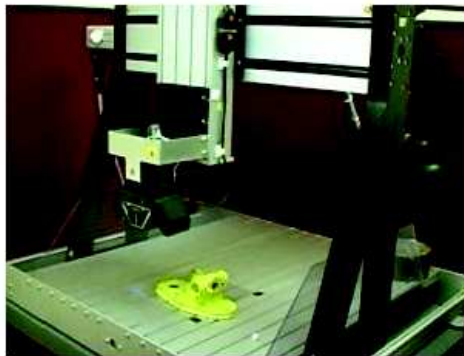


Examples of Range Data

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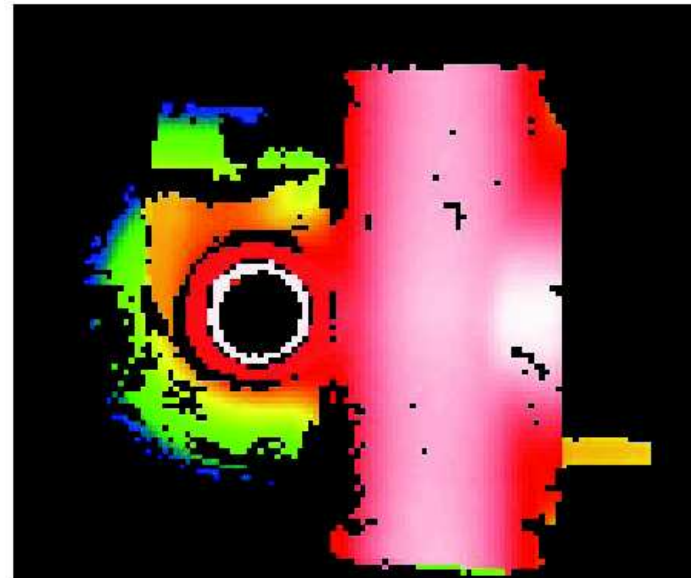
Example: Reversa 25 Range Scanner



Laser scan head mounted on XYZ robotic gantry

- Accuracy X/Y: 0.05mm, Z(depth): 10 μm
- Cost c. £50,000
- Flat bed object capture via dual camera triangulation

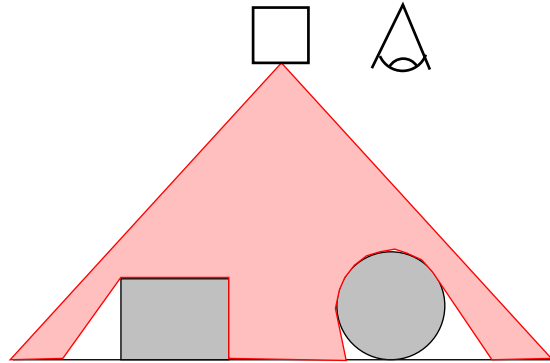
Example Scans



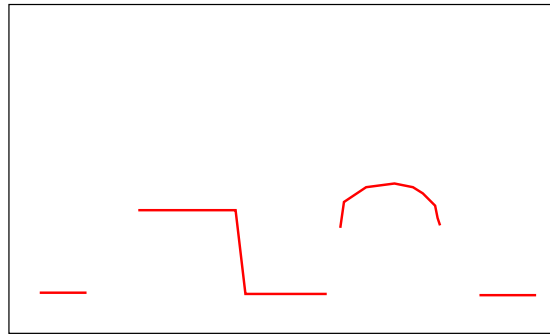
Point cloud (left) and depth coded range image (right)

Problem of Observed stripe

If scene scanned from above:



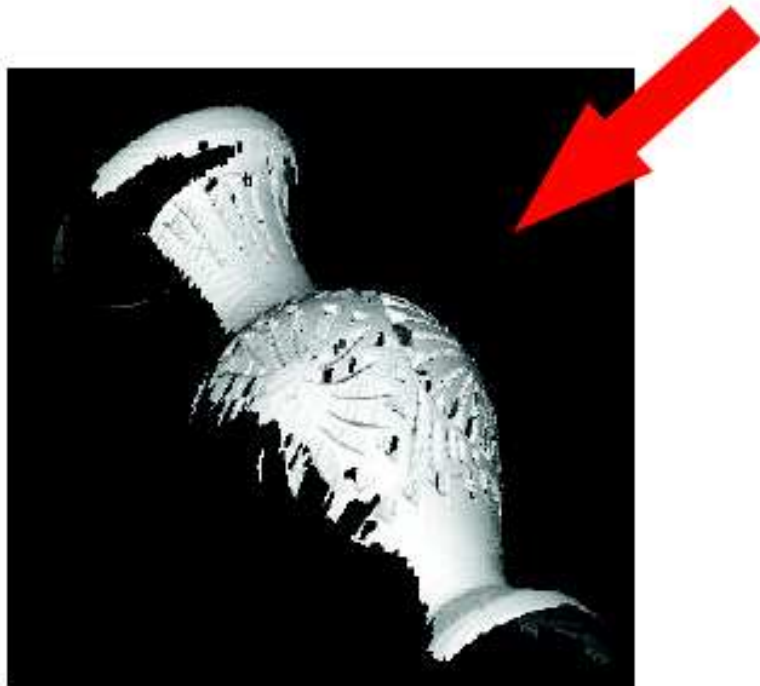
The TV camera sees:



Each row r corresponds to a different depth $z(r)$
Gives a linear set of range values

Incomplete data

Have depth/3D knowledge in only 1 direction:

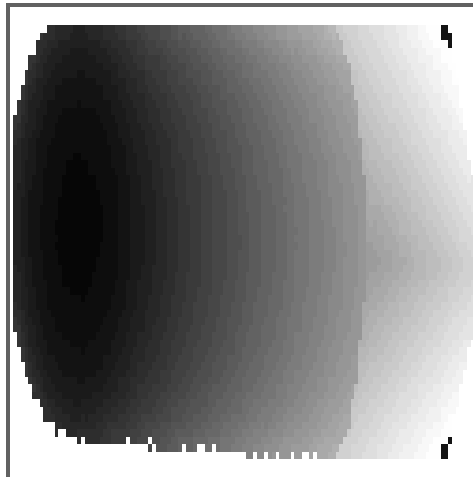
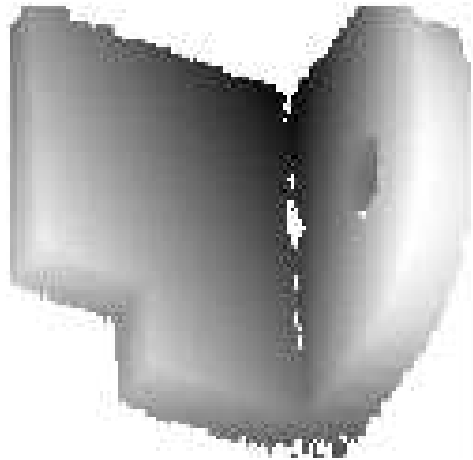


Possible solutions (both difficult):

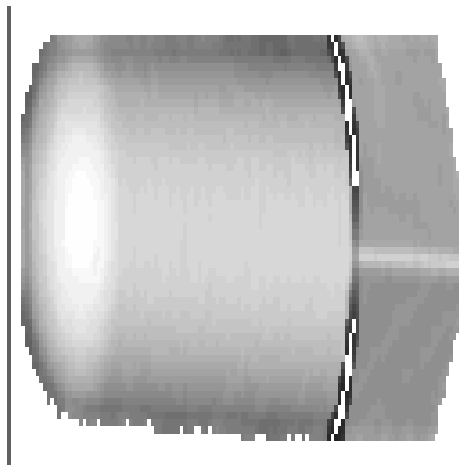
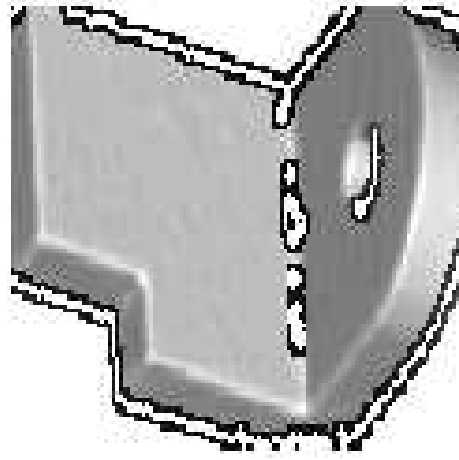
- Capture from different directions and merge
- Infer missing data from observed data

Range image examples

Raw range image



Cosine shaded



More range image examples



Kinect

- Structured light: IR random dot pattern - covers 2D simultaneously rather than a swept stripe
- Depth by triangulated matching patterns
- Typical image 640 x 480, captured from c. 1-4m
- Typical depth point spacing 1mm x 1mm x 2mm (gets larger as target is further away)
- Can get RGB for every pixel, but not synchronised with depth image
- Cheap and reliable!

What We Have Learned

- Some example range images
- Some typical problems with range data
- Some example sensor systems