## Examples of Range Data

Robert B. Fisher
School of Informatics
University of Edinburgh
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Range Data Examples
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## Example: Reversa 25 Range Scanner



Laser scan head mounted on XYZ robotic gantry

- Accuracy X/Y: $0.05 \mathrm{~mm}, \mathrm{Z}($ depth $): 10 \mu \mathrm{~m}$
- Cost c. £50,000
- Flat bed object capture via ? $\square$ camera triangulation
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Range Data Examples

## Problem of Observed stripe

If scene scanned from $\square$ :


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 ?


Possible solutions (both difficult):

- Capture from different directions and merge
- Infer missing data from observed data
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Range Data Examples

## More range image examples



## Range image examples

## Raw range image


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Range Data Examples

## Kinect

- Structured light: IR random dot pattern - covers 2D simultaneously rather than a swept stripe
- Depth by triangulated matching patterns
- Typical image $640 \times 480$, captured from c. $1-4 \mathrm{~m}$
- Typical depth point spacing $1 \mathrm{~mm} \times 1 \mathrm{~mm} \times 2 \mathrm{~mm}$ (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?
- Some typical problems with range data
- Some example sensor systems
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