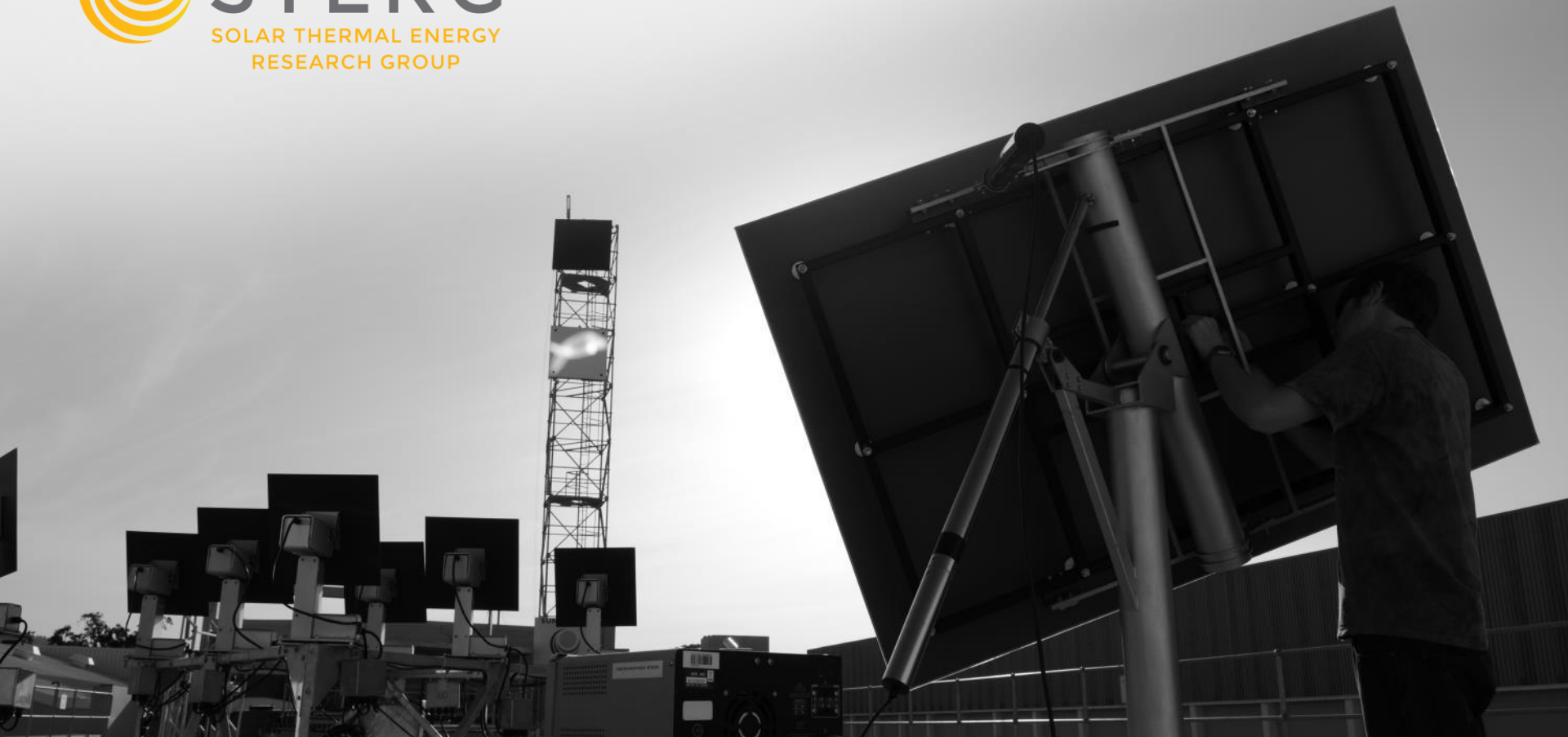




STERG

SOLAR THERMAL ENERGY
RESEARCH GROUP



Obstacle Avoidance for an UAGV

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University of Stellenbosch

Overview



- Background
- Detection
- Physical Setup
- Algorithm Flow
- Calibration
- Rectification and Pre-filtering
- Disparity Maps
- 3D reconstruction and Depth Estimation

Background



Detection

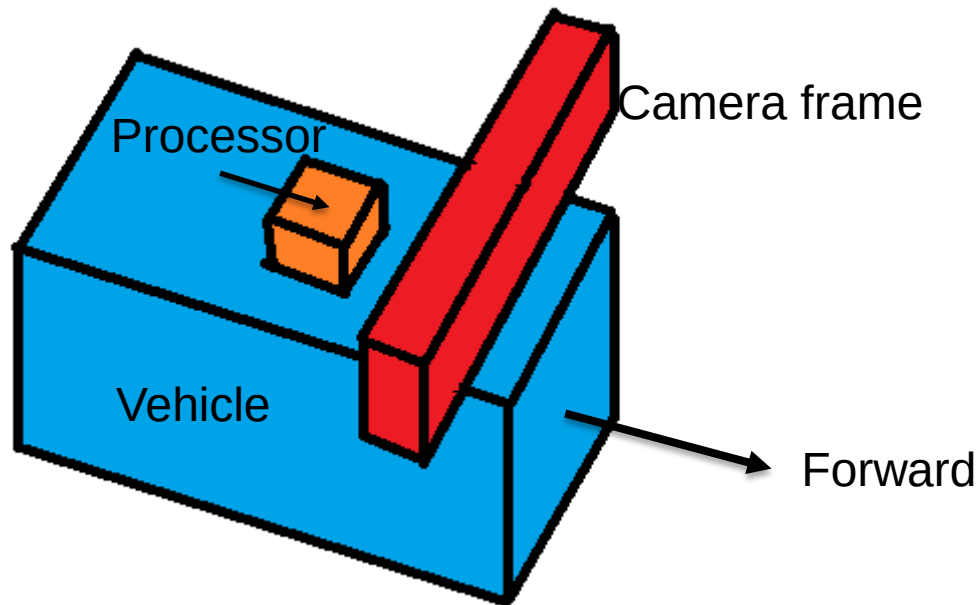
Lidar and Camera



Physical Setup



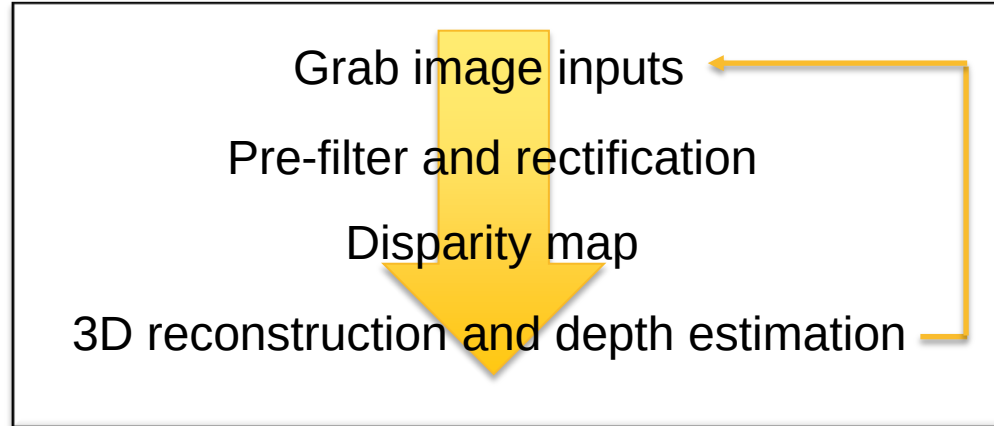
Physical Setup



Algorithm Flow



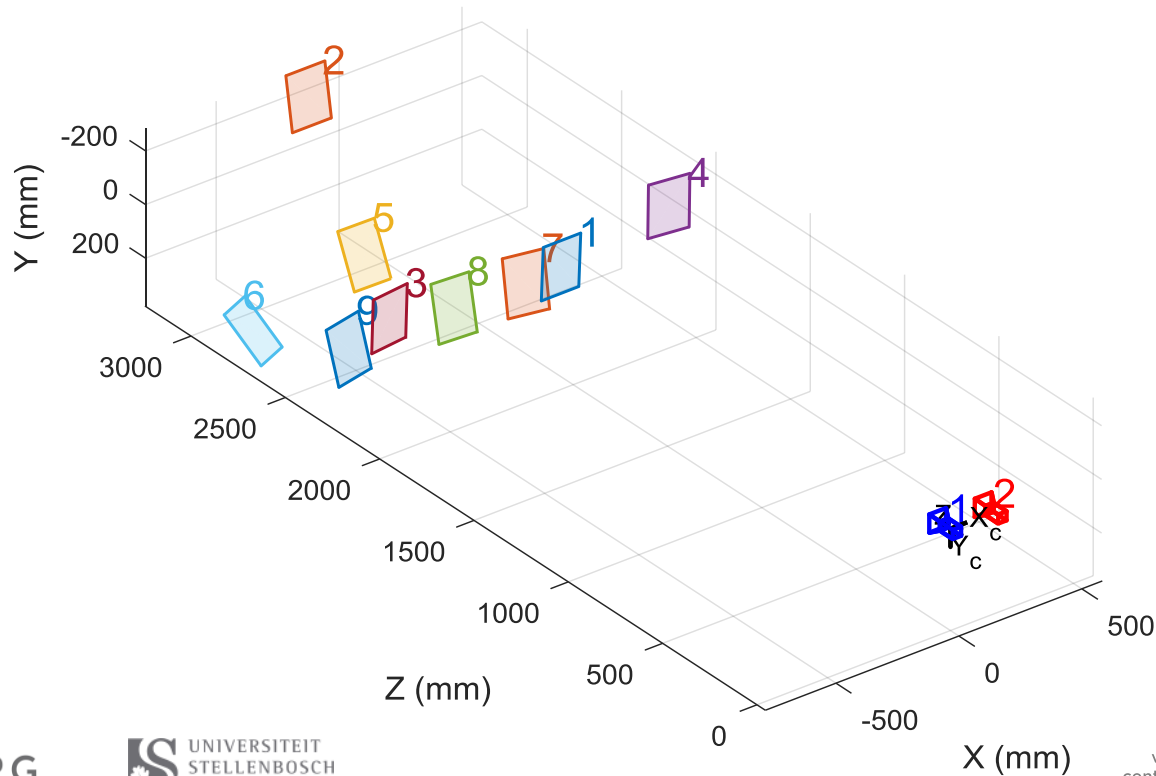
Pre-calibrated



Calibration



Extrinsic Parameters Visualization



Rectification and Pre-filtering



Sample Images

Left Camera



Right Camera



Rectification and Pre-filtering



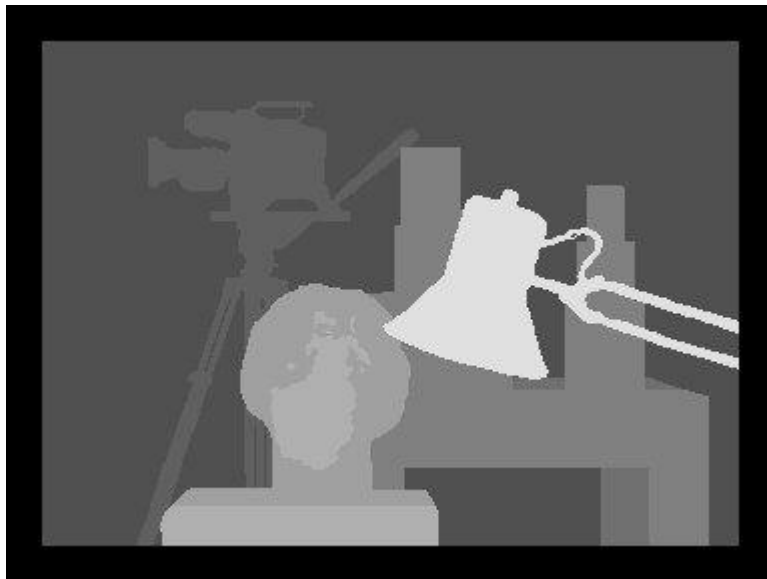
Stereo Anaglyph



Disparity Maps



Disparity map example



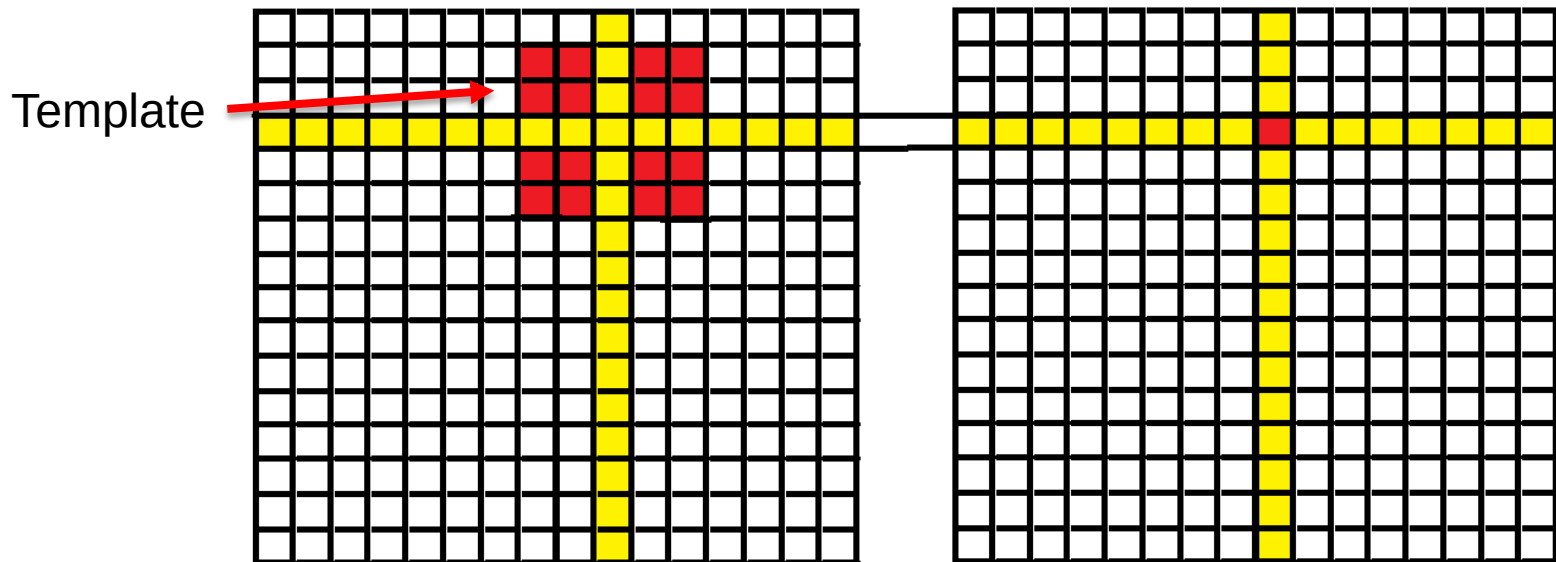
Disparity Maps



Box Filtering

Left Image

Right Image

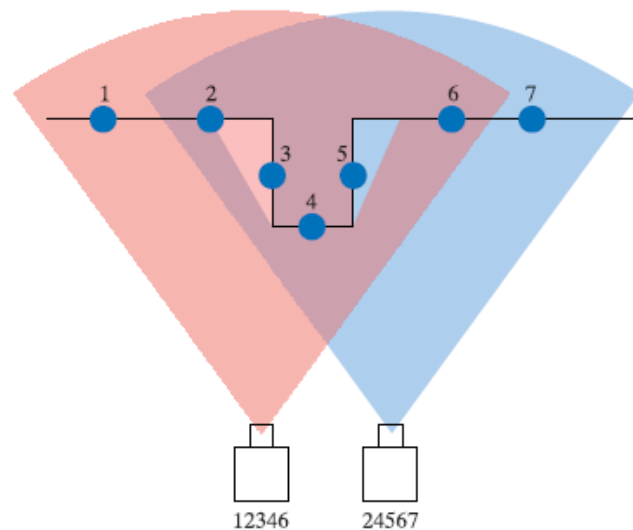
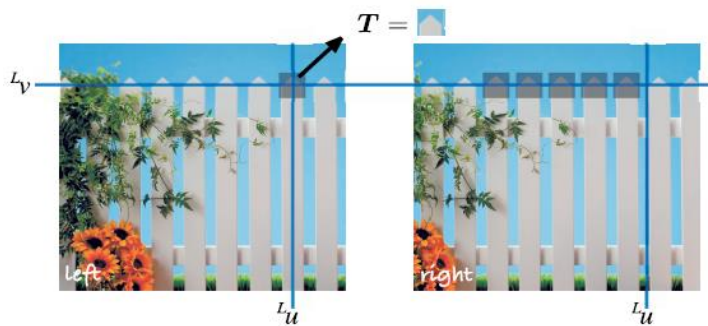


Disparity Maps



Problem Areas

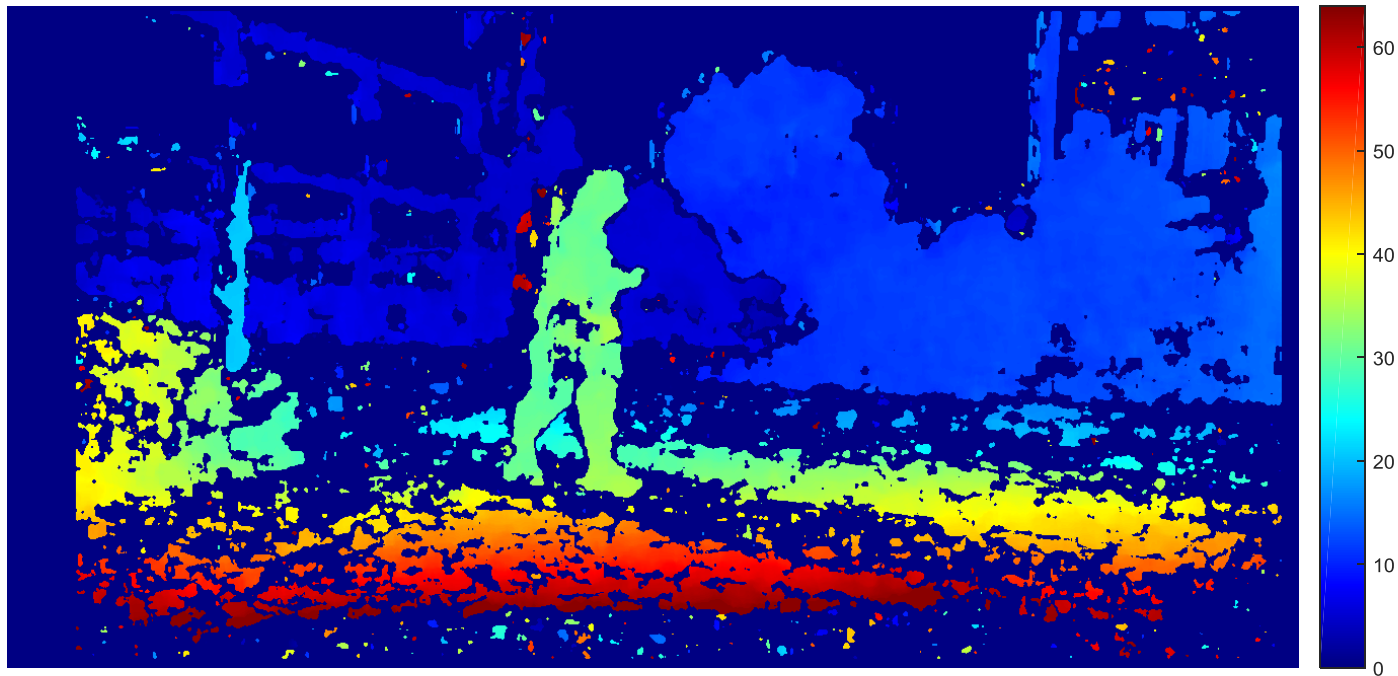
- Spatial Aliasing
- Occlusion
- Low Textures



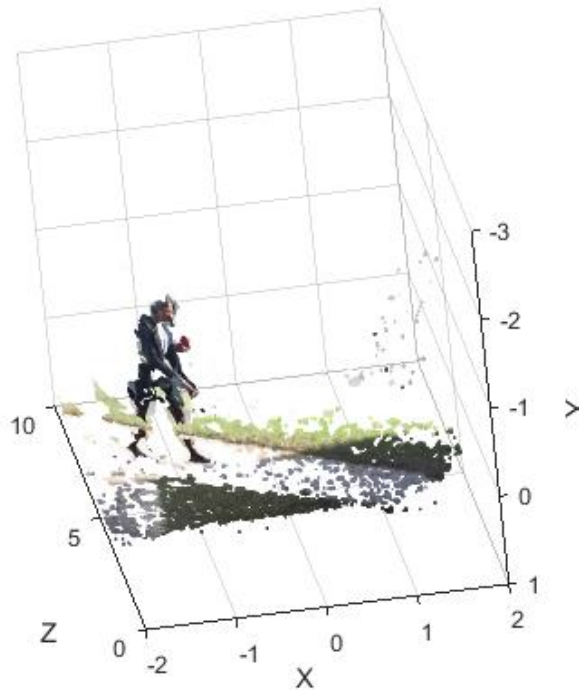
Disparity Maps



Disparity Map

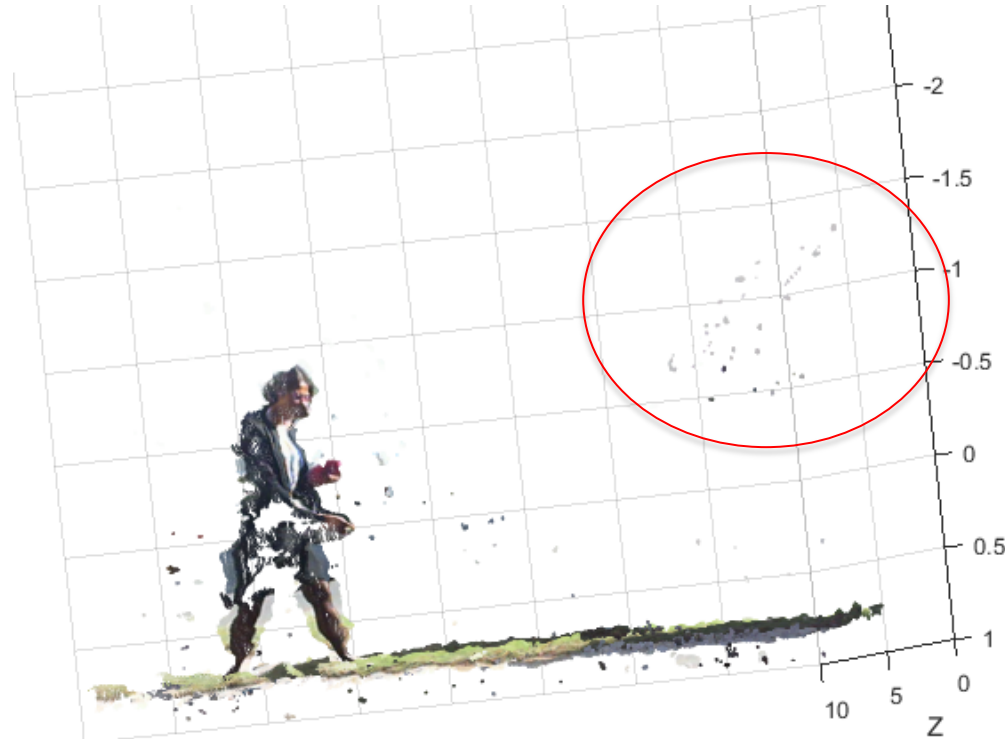


3D reconstruction and Depth Estimation



Axis In meters

3D reconstruction and Depth Estimation



THANK YOU



ACKNOWLEDGEMENTS:

Dr Willie Smit
NRF

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