

OPTIMIZATION OF THE ACCURACY OF REAL-WORLD COORDINATE CALCULATIONS FROM STEREOSCOPIC IMAGES

MOTIVATION

Aim:

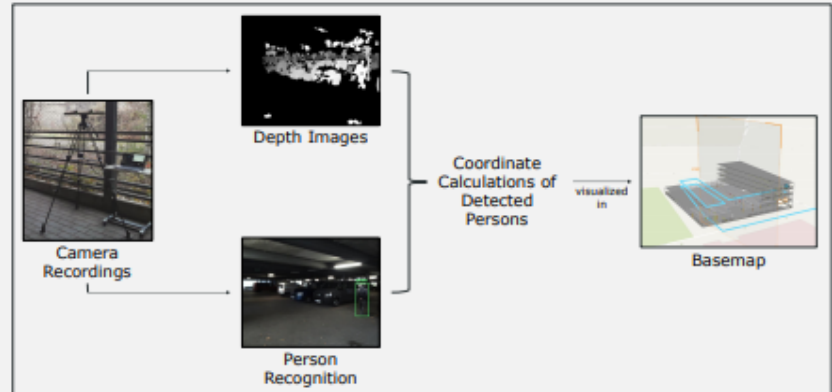
Calculate real-world positions of persons from video data

Technologies:

- Photogrammetric methods for 3d coordinate calculation from stereo images
- Machine learning algorithms for the recognition of persons

Research Goal:

Achieving accurate precision of position calculations by developing optimization methods



With figures from FusionSystems (2020):
The combination of coordinate calculation and person recognition enables the calculation of positions of the real world and a representation in an app (Basemap)

OPTIMIZATION METHODS

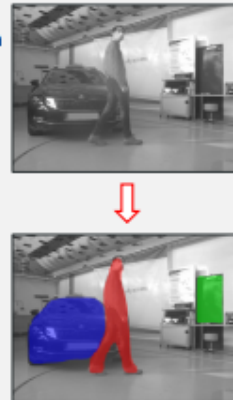
Problem: Within the calculated bounding boxes there are elements that do not belong to the recognized person

Solution: Implementation of three different optimization methods for filtering relevant pixels

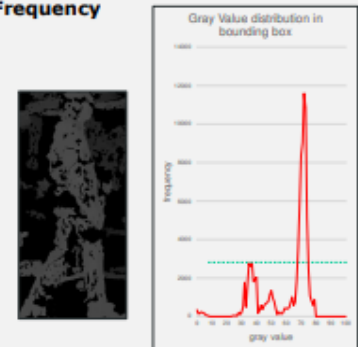
Threshold



Semantic Segmentation



Relative Frequency



With Figures from FusionSystems (2020)

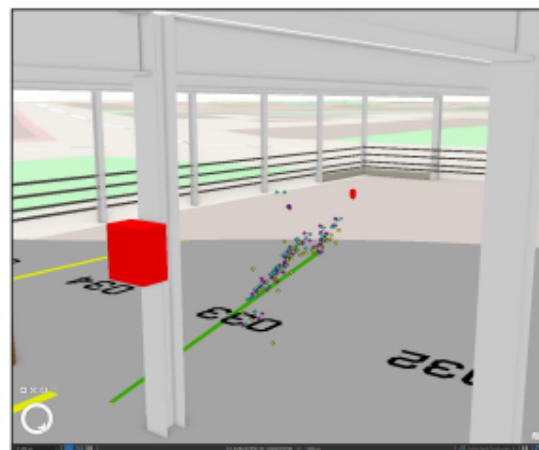
RESULTS

The results achieved by the optimization procedures can be summarized as follows

Method	Performance	Accuracy
Threshold	+ Slightly worse runtime than for relative frequency	+ highest accuracy
Semantic Segmentation	- worst runtime	- Medium accuracy, but strong outliers
Relative Frequency	+ best runtime	o medium accuracy, but high variance

CONCLUSION

- Position determinations are possible, but with the data used the results are too imprecise for application in practice
 - Further research in this subject area is necessary to further improve the accuracy of the resulting coordinates
- Threshold operation well suited as optimization method
- Result accuracy depends on illumination situation



Visualization of calculated and target coordinates in the basemap