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A Novel Method for the Visualization of Deformation Data

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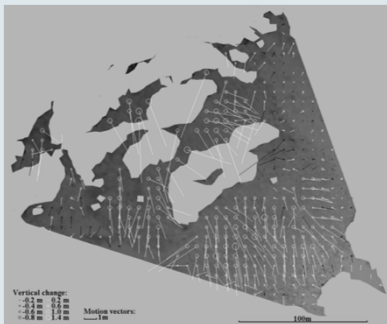
Contact: alexander.reiterer@tuwien.ac.at



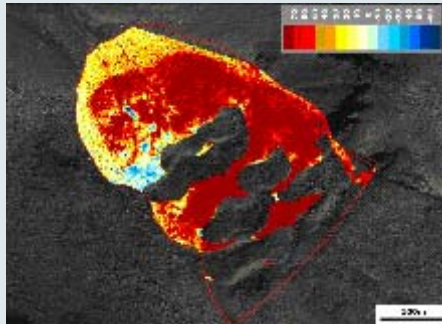
Alexander Reiterer
A Novel Method for the Visualization of Deformation Data

Motivation

Visualization of deformation data based on high-density point clouds.

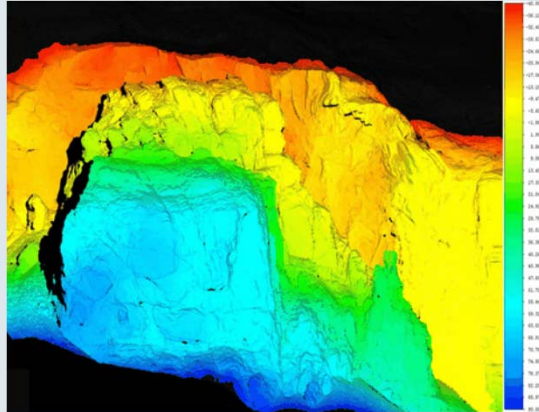


Plotted displacement vectors



Colour coded visualization.

Motivation



→ Plotting becomes cluttered and the user may get a confusing impression about the existing movements and deformations!

Motivation

- Development of a new Visualization Technique which is based on Caricaturistic Visualization!
- Exaggerated Visualization

Data Acquisition



Image-Based Total Station



Laser Scanning Device

Result: High-Density Point Cloud incl. Texture (e.g. Image).

Caricaturistic Visualization – Exaggerated Visualization



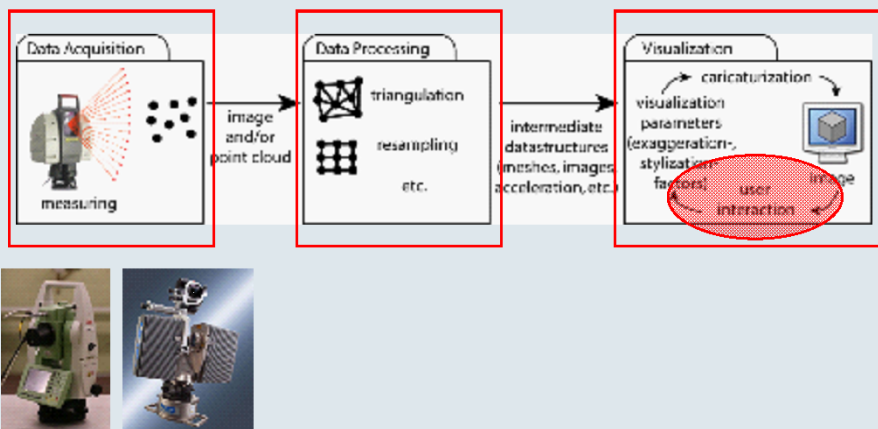
- Reference model
- Comparison with specimen
 - Corresponding features
 - Estimating deviations
- Exaggeration of deviations
- Features consist of measurable properties

Caricaturistic Visualization – Exaggerated Visualization

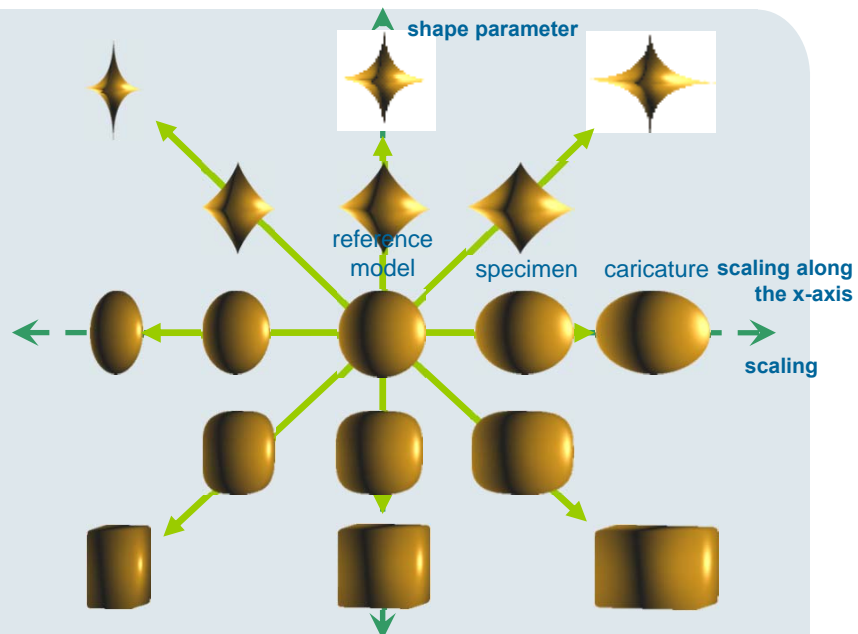
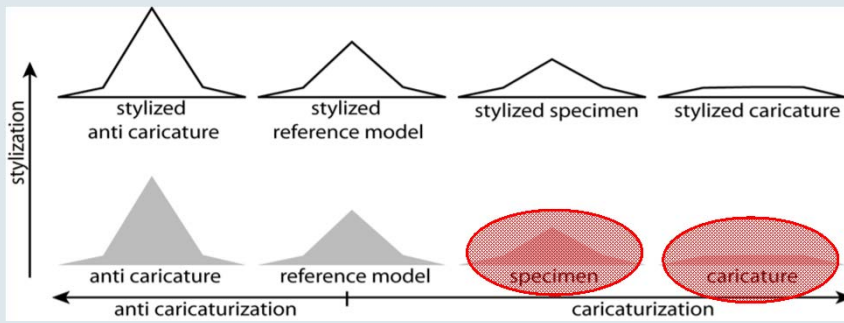


- Measurable properties
 - For example
 - Scaling
 - Shape
 - Position
 - Rotation
 - etc.

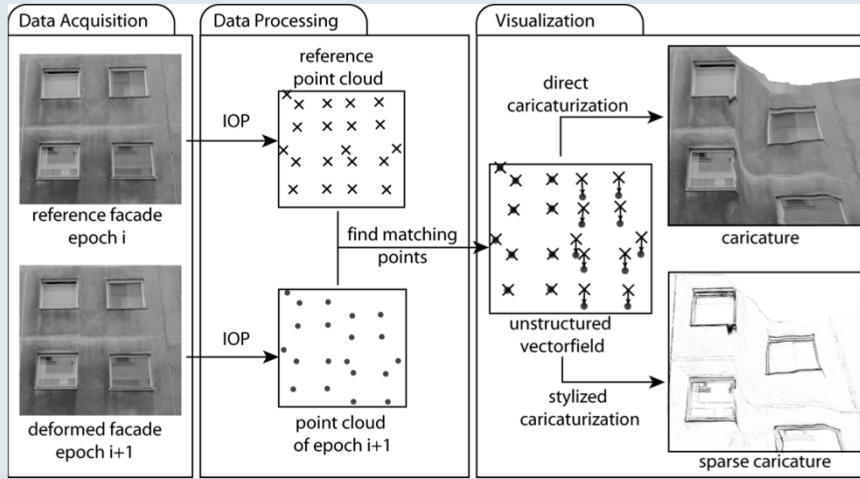
Process of Exaggerated Visualization



Process of Exaggerated Visualization



Examples – Deformation of a Façade



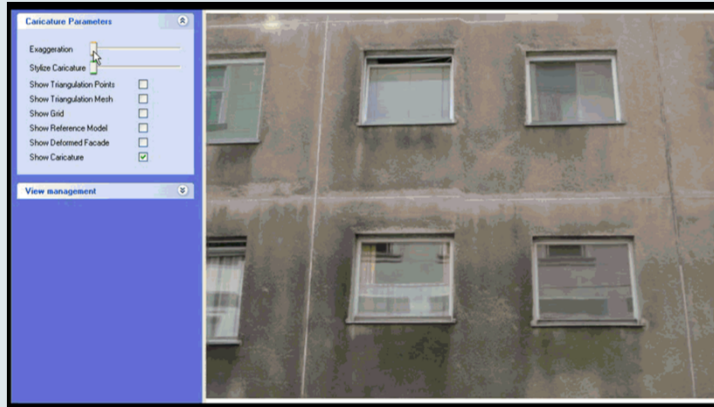
Example – Deformation of a Façade



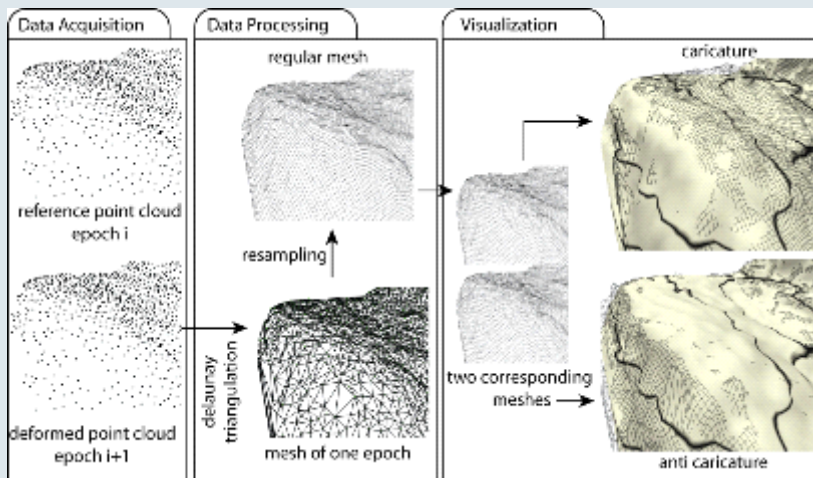
Reference Model
 (undeformed)

Caricature

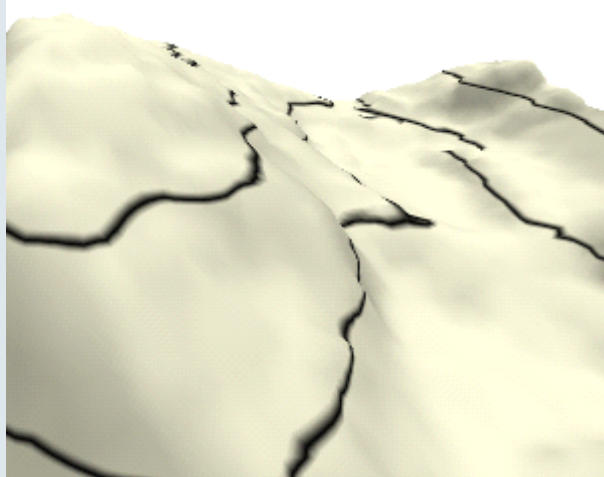
Example – Deformation of a Façade (User Interface)



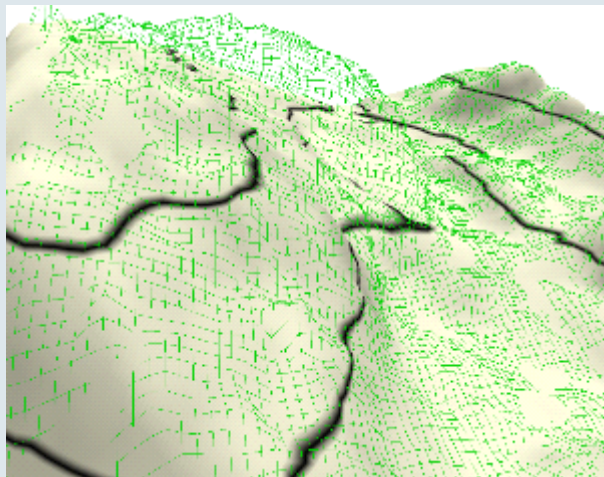
Examples – Landslide



Examples – Landslide (Animation)



Examples – Landslide (Exaggerated Visualization)



Conclusion

- More than one feature can be visualized (e.g. displacement vectors, threshold for a maximal deformation rate, etc.). This makes the visual interpretation of complicate deformation behavior including influence factors possible.
- Visualization can be done (if necessary) in the 3D space without a transformation into separated 2D representations.
- Visualization can combine/fuse measurement data and images and can be used for animated and/or interactive representation.
- Datasets can be compared to a reference model, a global threshold, or a locally modeled threshold.

Thank you for your attention!

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