Mobile 3D Reconstruction

"Turn your smartphone into an interactive 3D scanner!"

Dr. Olivier Saurer
saurero@astrivis.com

ASTRIVIS

Astrivis

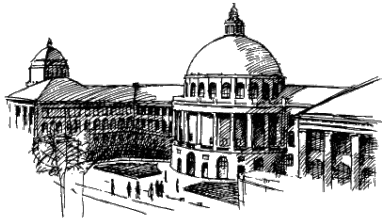
Innovative ETH spin-off
based in Zurich

Developing software solutions
for mobile 3D scanning

Company founded in March 2016

Over 10 years of experience in
3D Computer Vision

ASTRIVIS

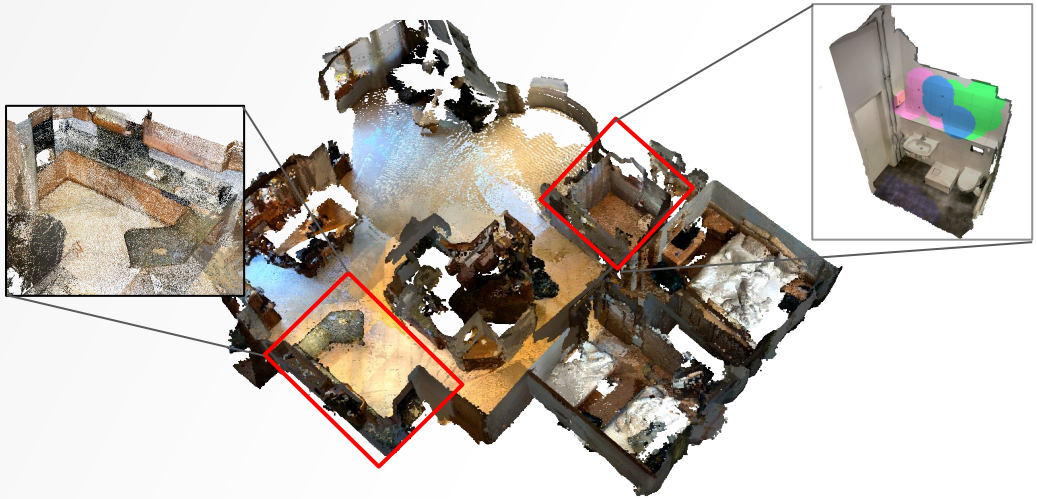


Spinoff ETH zürich

Why a Mobile 3D Scanning Solution?

- It’s an easy and efficient way to acquire 3D
- No need for expensive hardware
- No dedicated scan operator required
- Democratizing 3D scanning

Construction / Inspection



Construction

- Renovation planning / visualization
- Extract measurements after the fact
- Current state vs. planned state (BIM)

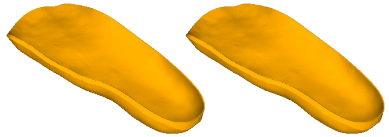
Inspection

- Degradation monitoring
- 3D Documentation

Health Care

Point Cloud

Colored Point Cloud



Insoles

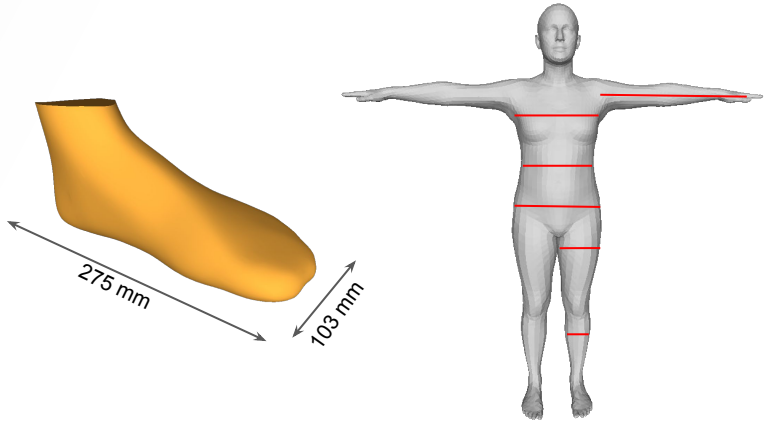
Treatment Planning

- Preview outcome of medical therapy
- Monitoring of healing process

Custom Orthotics

- Custom medical insoles
- Custom medical stockings

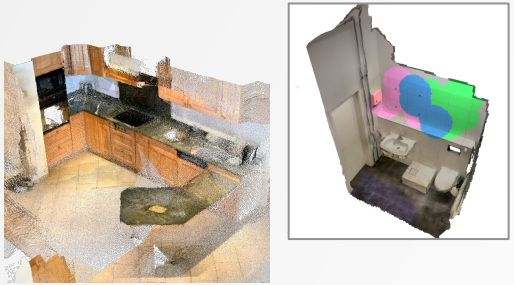
eCommerce



3D Visualization of Products Digital Twin

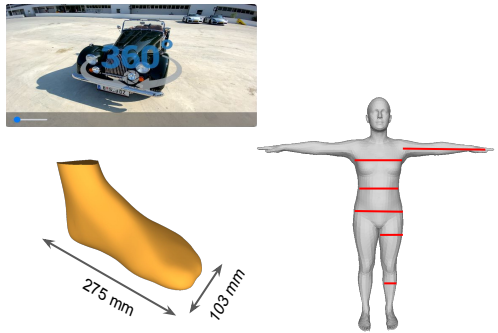
- Enhanced customer experience (3D/AR/VR)
- Online inspection of second hand products
- Provide correctly sized product
- Reduce return rates

Industries

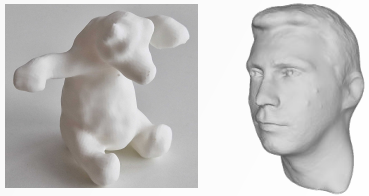


Construction / Inspection

Health-care



eCommerce



3D Printing

Digital Assets

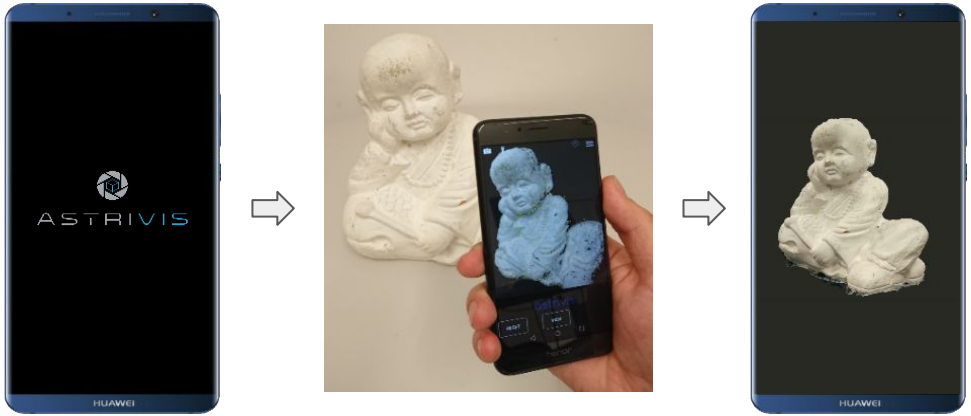
(AR / VR / Gaming)

Scan with your Phone

Our software stack turns any Smartphone into a 3D Scanner

The solution is:

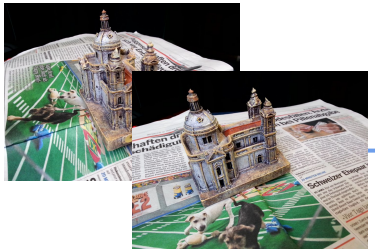
- 100% Mobile
- 100% Software
- Real-time
- Hardware agnostic
  (iOS, Android, Windows, Mac, Linux)

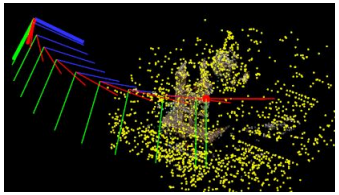


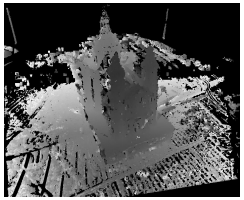
Watch Video

Reset
View
Scanner

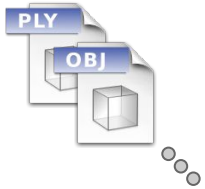
Mobile Photogrammetry

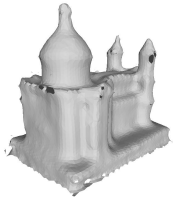




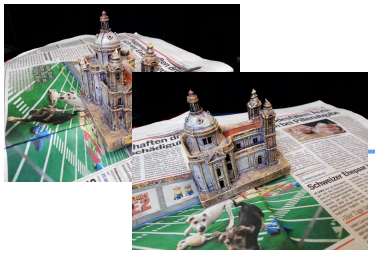


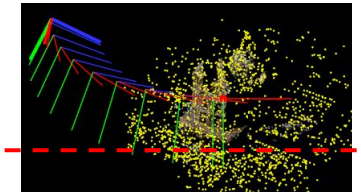
Tracking → Stereo → 3D Fusion → Meshing → Texturing → Export

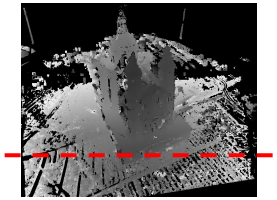




Mobile Photogrammetry



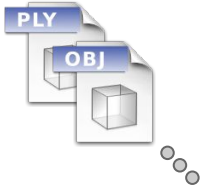


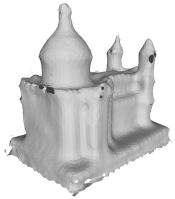


Tracking → Stereo → 3D Fusion

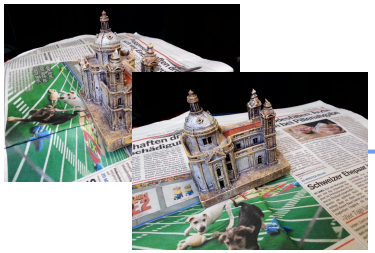
Realtime

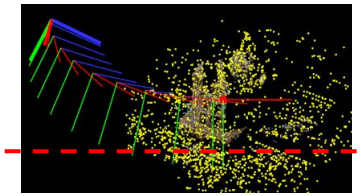
Meshing → Texturing → Export

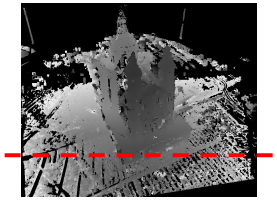




Mobile Photogrammetry

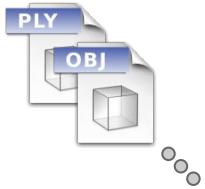






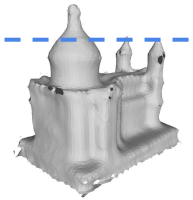
Tracking → Stereo → 3D Fusion

Realtime



Export ← Texturing ← Meshing

Post processing

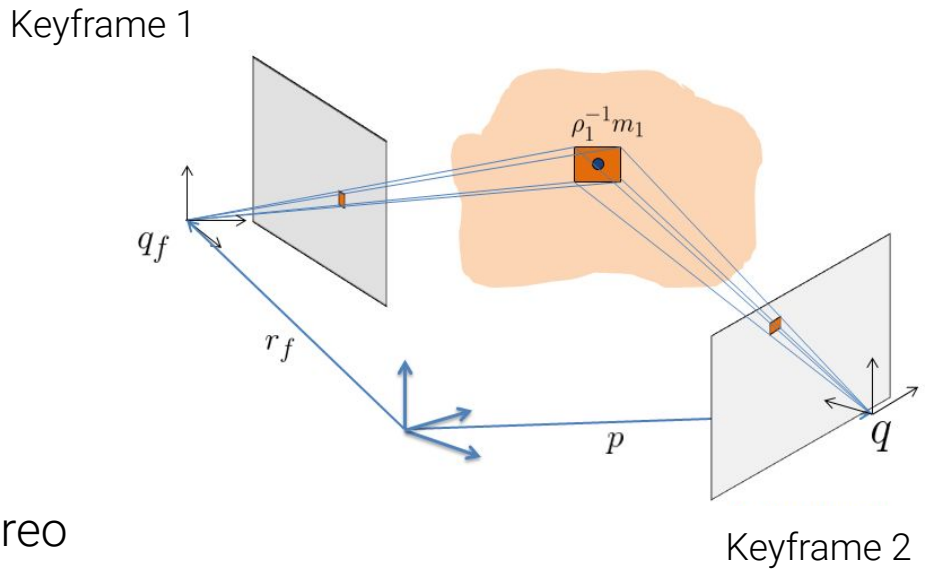


Pipeline: 6DoF Tracking

Images are streamed with 30Hz from camera

Estimate camera pose for each image

Automatically select Keyframes for Stereo computation



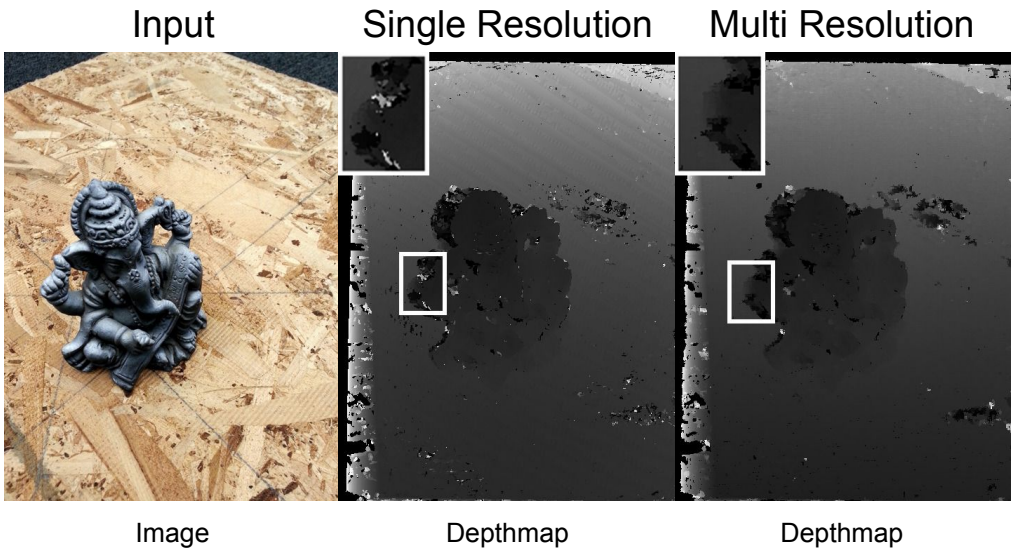
Pipeline: Stereo

Find pixel correspondences between keyframes

MVMR Stereo (temporal)
(Multi-View-Multi-Resolution)

Depthmap regularization

Processing: 2 Hz / depthmap



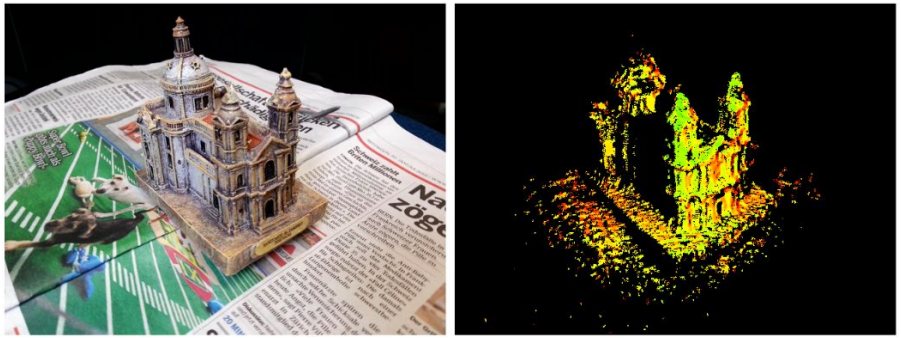
Pipeline: Fusion

Fuse depthmaps into one Point-Cloud

Each point is represented by
Position, Normal and Color

Spatially unbound reconstruction

Confidence-based 3D Point-Cloud Fusion



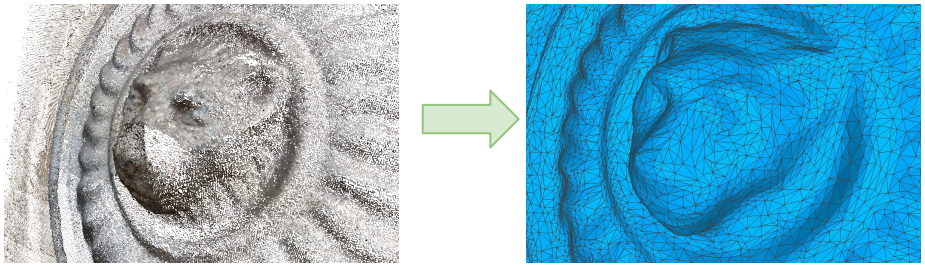
Confidence
(Quality)

Pipeline: Meshing

Convert point-cloud into a mesh

Implicit surface reconstruction

Fill holes & cleanup mesh



Point Cloud

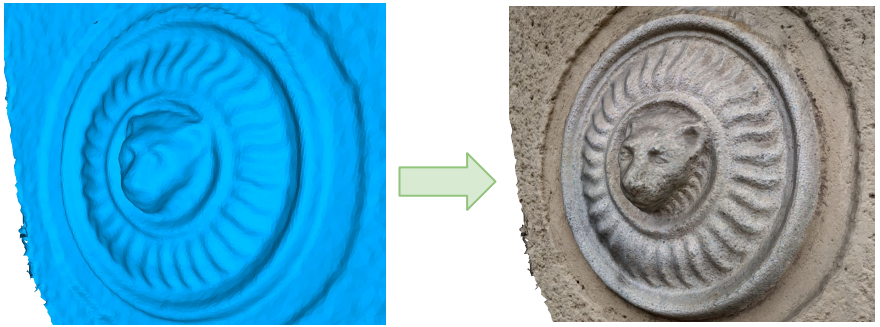
Mesh

Pipeline: Texturing

Project all images onto the mesh to create the final model

Seam blending

Global light correction



Mesh

Textured Mesh

Photogrammetry at all Scales

< 0.05 m

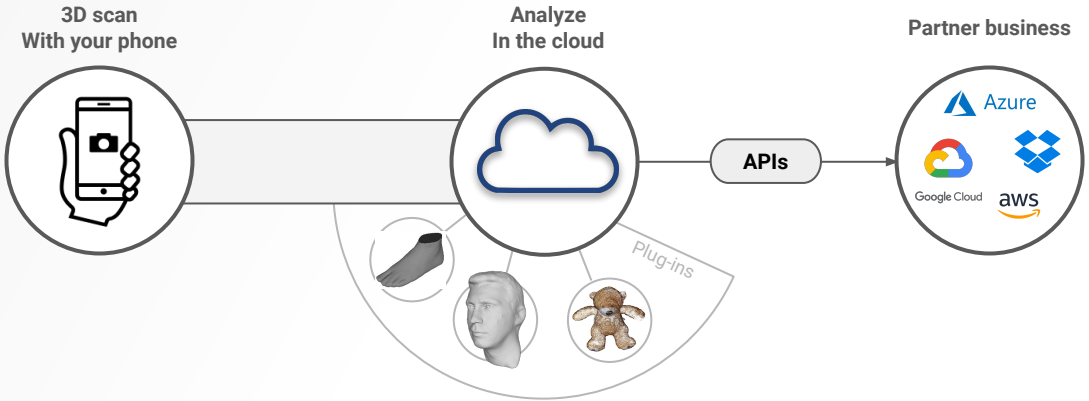
> 0.25 m

> 1 m

> 100 m

Astrivis' Solution

We provide a unified ecosystem
for scanning and data analysis.



Thank you!