A Workflow for High-Quality 3D Digitization and Realistic Web Visualization of Apparel Items

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Why 3D in E-Commerce?

- **Reason** for 22% of Returns: “Item looks different than expected.” [2]


- **Environmental Impact** of Returns

[1] https://www.ft.com/content/52d26de8-c0e6-11e5-846f-79b0e3d20eaf
Why 3D in E-Commerce?

- **Reason for 22% of Returns:** “Item looks different than expected.”
- **Return Costs from UK Retailers:** 60 Bio. £ / year, 20 Bio. £ from Online Shopping [1]
- **Environmental Impact of Returns**

3D Visualization brings Customer

“Closer to the Real Item”

➡ Reduced Return Rates, Increased Satisfaction!

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Bottle Neck #1: 3D Digitization

- 3D CAD data not ready-to-visualize, needs additional data prep steps.

- 3D CAD data not always existing.

- Alternative: **3D Scanning**
  - Complex process
  - Goal: **Photo-realistic** 3D assets
**Bottle Neck #1: 3D Digitization**

- Photogrammetry Workflow
  - Ensure controlled lighting environment
  - Capture high-resolution pictures from various angles
  - Ensure coverage of cavities / hard-to-reach regions
  - Separate object from background
  - Align images in 3D
  - Reconstruct 3D point cloud
  - Create high-res mesh
  - Project images onto high-res mesh (texturing)
  - Reconstruct material properties, map to mesh

Pictures courtesy of Fraunhofer CultLab3D ([https://www.cultlab3d.de/](https://www.cultlab3d.de/))
Bottle Neck #1: 3D Digitization

- Photogrammetry Workflow for Retail: More complex than product photos!

- Specific hardware and software needed

- Object must be captured from all angles
  => re-arranging object/camera is time-consuming
Bottleneck #1: 3D Digitization

- One Solution: ZEISS RealScan
  - Glass turntable + movable cameras
  - No manual re-adjustment => High throughput
  - HDR Scanning
  - Controlled lighting

- Reconstruction of reflectance properties (PBR Material)
- Automated cleaning and alignment

- Scan time (automatic): ~5 minutes
Bottleneck #2: 3D Data Optimization

Automatically obtain a **compact** & **visually similar** representation!

- We want a low-poly model!
- Model should look like original!
- Semi-manual process of ~30 mins per object
- Result in optimized format (e.g., glTF + Draco, USDZ, X3DB, …)
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Problem Case: AR App

Model Creation
- 3D Scan
- CAD

Post-Processing

Visualization
- AR
Problem Case: 3D Social Media Ad

Model Creation
- 3D Scan
- CAD

Post-Processing

Visualization
- 3D Web
**Problem**

Model Creation
- 3D Scan
- CAD

Post-Processing

Visualization
- 3D Web
- VR
- AR

Manual work 30 m
Solution

Model Creation
- 3D Scan
- CAD

Post-Processing
- Rapid Compact

Visualization
- 3D Web
- VR
- AR

100x faster
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**UPLOAD A NEW MODEL**
Various Interfaces

- CLI / C++ SDK / REST API for Users with IT Know-How
- Web Portal and Desktop UI for Easy Semi-Manual Usage
Full solution

- Digitization ~5m
- Optimization ~10s for one target (example: “AR Hololens”)
- Full, automated pipeline scans 3d object and delivers versions for Web, AR and VR within less than 6 minutes.
Demo

Original Model:
- 3D Scan (ZEISS RealScan)
- 100K Polygons
- OBJ/MTL + PBR Textures
- 16 MB

Online Version:
- Generated by RapidCompact
- 40K Polygons
- glTF 2.0 (.glb)
- 2.34 MB

https://dgg3d.com/demo/glove/
DGG Case Study: 3D Automation in E-Commerce

- Participate! Sign up until **August 18, 2019**!

- **What you provide:**
  - 1-3 of your 3D models (3D Scan or CAD, as OBJ, glTF, PLY, STEP, IGES, STL or CTM)
  - A brief description how you’d like to visualize them (AR, VR or Web)
  - Feedback on the results (1 minute survey)

- **What you will get:**
  - A PDF report with before/after comparisons and detailed statistics (size, mesh stats, processing time)
  - Web- and AR-ready versions of your data sets (glTF, OBJ, USDZ)
  - Online 3D Web and AR-demos
Thanks for Your Attention!

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