

## Challenges We Faced (and Are Facing) in Implementing An Automated Solution for Digital Anthropometry

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### Abstract

#### Digital Anthropometry's Significance:

- In the ever-evolving landscape of technology-driven solutions, the realm of digital anthropometry has emerged as a pivotal field with vast implications for various domains, from healthcare and fashion to ergonomics and biometrics.
- This tech paper delves into the intricacies of 3D anthropometric measurements, providing a comprehensive framework for accurate and repeatable data acquisition for these diverse purposes.

#### About 3D Measure Up:

- We begin by introducing the context of Sisyphus and Proteus, highlighting the importance of precise anthropometric data in various applications.
- The paper further focuses on the innovative, cutting-edge 3D Measure Up system that combines advanced scanning techniques with intelligent algorithms to provide accurate and precise measurements.



Fig: 3D Measure Up

#### Digital Anthropometry Pipeline:

- The Digital Anthropometry Pipeline, which comprises several critical stages: Pose, Capture (2D/3D), Analyze the mesh, Preprocess, Measure, Validate, Export, and Share.

## **Address Digital Anthropometry Challenges:**

Furthermore, the presentation addresses the challenges of digital anthropometry, discussing factors such as:

### **1. Analyzing the input mesh to fine tune the measurements:**

This diagnostic process encompasses several crucial aspects:

- Posture detection and dependency
- Scan measurement unit
- Scan orientation/alignment
- Scan quality - holes, stray meshes, rough surfaces, self intersecting meshes
- Scan of full body, partial body
- Scan size and resolution
- Scan with multiple meshes
- Scan rigged with skeleton

### **2. Scan quality:**

- Scan with blurred faces
- Incomplete scans - cut feet, hand/palm
- Scans with background and platforms
- Scans from old scanner versions.

### **3. Bone based landmarks:**

- Adams Apple
  - Present in Men
  - Absent Female
  - Difficult to detect in Obese
- Shoulder
  - Sloping shoulder
  - Square shoulder
  - Rounded shoulders
  - Scoliosis
- Waist v/s Trouser waist
- Measuring the Neck
  - Axis of the neck
  - Shapes of the neck
  - Hairy challenges

### **4. Identifying the Navel landmark**

- Scan of a clothed person
- Shape of the abdomen

### **5. Leg and Arm: Left and Right Leveled or Actual**

### **6. Aligned to skeleton:**

- Determining the axis of skeleton
- Identifying the section boundaries
- Identifying the axis of the section

### **7. Measuring obese bodies:**

- Trouser Waist
- Navel point

### **8. Accuracy:**

- Verifying accuracy of the Measuring tool/software
- Verifying accuracy of the scan
- Solution to access accuracy

These diagnostic steps are vital prerequisites to ensure the accuracy and reliability of subsequent measurements and analyses conducted on the scan data.

At the core of its capabilities, 3D Measure Up is designed to seamlessly take input from any scanner (handheld, turntable, booth, Lidar), allowing for compatibility and flexibility in the scanning process. Once the scans are acquired, 3D Measure Up takes charge, acting as a centralized hub for storing, collecting, visualizing, and refining the measurements.

**Conclusion:**

In conclusion, this paper delves into the vital realm of digital anthropometry, showcasing the innovative 3D Measure Up system. This cutting-edge technology addresses complex challenges, from posture detection to accuracy verification. Our framework streamlines data acquisition, ensuring reliability and repeatability across various applications. With compatibility and seamless integration, we offer a transformative solution for precise anthropometric measurements, bridging the gap between technology and diverse industries.