Superimposition-Based Augmented Reality for Clothing Design Simulation Using Fabric Pattern Images

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ABSTRACT

Selecting appropriate clothing often presents a challenge for consumers due to size mismatches and the difficulty of visualizing fabric patterns before a garment is produced. Data from Narvar (2017) indicates that approximately 43% of clothing is returned, with 70% of returns attributed to incorrect sizing and color. This study developed an Android-based application named Clothfy that implements augmented reality (AR) using the superimposition based method and a real-time clothing size recommendation system. The application accepts input in the form of a fabric pattern photo along with the user's physical data including height, weight, age, and gender. The recommendation system utilizes body mass index (BMI) calculation and chest circumference estimation to automatically generate size recommendations (S, M, L, XL, XXL). The selected fabric pattern is then visualized directly onto the user's body through the front camera using the superimposition based AR method supported by body pose estimation. Test results demonstrate that the application operates stably across a lighting range of 43–914 Lux, achieves an average response time of 0.384 seconds, and produces size recommendations with a 100% success rate across all test data samples.

Keywords*: superimposition based, clothing visualization, size recommendation, body pose estimation*