



Archives available at journals.mriindia.com

International Journal on Advanced Electrical and Computer Engineering

ISSN: 2349-9338

Volume 14 Issue 01, 2025

Live Body Scanning & Smart Fit Analyzer Using AI

Prof. Jayshree Gorakh¹, Miss. Bhumika Kene², Miss. Bhumika Parate³, Miss. Jayshri Aamle⁴, Miss. Akshada Rathod⁵

¹Department of Computer Engineering, SCET, Nagpur, Maharashtra, India

^{2, 3, 4, 5} UG Students, Department of Computer Engineering, SCET, Nagpur, Maharashtra, India

¹prof.jayshreegorakh@gmail.com, 9403299738

²kenebhumika@gmail.com, 9766942724

³bhumikaparate2005@gmail.com, 8668827132

⁴jayshriamale0@gmail.com, 8010506909

⁵akshadar6825@gmail.com, 8668627387

Peer Review Information	Abstract
<p><i>Submission: 07 Feb 2025</i> <i>Revision: 16 Mar 2025</i> <i>Acceptance: 18 April 2025</i></p> <p>Keywords</p> <p><i>Live Body Scanning</i> <i>AI- Predicated Befitting</i> <i>OCR Vesture Analysis</i> <i>Camera- Predicated Dimension</i></p>	<p>Our design, Smart Fit, is an innovative AI- powered result that enhances the shopping experience by furnishing real- time body dimension and dress fit analysis. Using a camera- grounded live mortal body scanning system, the design captures the stoner's body confines and processes them with advanced AI algorithms. Once the body size is determined, the system utilizes OCR (Optical Character Recognition) to checkup apparel markers or markers, rooting size-related data. The uprooted information is also compared with the scrutinized body confines to calculate the chance fit of the named dress, icing accurate size recommendations. This result eliminates the need for trial apartments, reduces return rates in online shopping, and enhances client convenience. The design integrates computer vision, machine literacy, and OCR technology to produce a flawless and effective shopping adjunct. Designed for both physical retail stores and e-commerce platforms, Smart Fit ensures an bettered, contactless, and time- saving shopping experience. With its real- time analysis and individualized recommendations, this system offers a smart, futuristic, and stoner-friendly approach to fashion retail, making shopping more effective and acclimatized to individual requirements.</p>

Introduction

In moment's presto- paced world, the fashion and e-commerce diligence are passing rapid-fire digital metamorphosis. Consumers are decreasingly shifting toward online shopping, but one of the biggest challenges they face is query regarding proper sizing and fitting of clothes. Traditional size maps frequently fail to feed to the diversity of body shapes, leading to dissatisfaction, high return rates, and destruction of coffers. To address this problem, the

conception of Live Body Scanning and SmartFit Analyzer using Artificial Intelligence (AI) has surfaced as an innovative result that bridges the gap between virtual shopping and real- world befitting gestic.

The Live Body Scanning and Smart Fit Analyzer is an advanced AI- grounded system designed to help druggies get accurate apparel sizes by surveying their body in real time. The system uses computer vision ways and machine literacy models to capture body measures

through a simple phone camera or webcam. It eliminates the need for homemade measuring or guessing sizes. The AI machine also analyzes the collected body parameters and compares them with the apparel brand's size datasets to recommend the perfect size for each existent. This result benefits not only guests but also retailers by reducing returns, adding client satisfaction, and perfecting brand trust. also, it has operations beyond fashion, including fitness monitoring, virtual pass- on results, and health assessment.

The system works in three major phases

1. Live Body Scanning Using advanced AI algorithms, the operation scans the stoner's body with real- time videotape input, detects crucial body milestones, and excerpts accurate measures like casket, midriff, hipsterism, inseam, arm length, and shoulder range.
2. Data Processing and Analysis The gathered measures are reused through trained

machine literacy models that insure perfection and handle variations across body types.

3. SmartFit Recommendation The system compares stoner measures with apparel brand databases and suggests the ideal size along with fit recommendations (slim, regular, loose) grounded on stoner preferences.

The combination of AI, machine literacy, and computer vision makes this result futuristic and largely accurate. also, features like saving dimension biographies, offering virtual pass- on trials, and giving suggestions for styles grounded on body type can further enhance stoner experience.

As the fashion assiduity continues to evolve, SmartFit AI holds the implicit to revise the online shopping experience by making size selection flawless and substantiated. By integrating this technology, brands can contribute to reducing resource destruction caused by returns and promote further sustainable fashion.

LITERATURE REVIEW TABLE

Sr. No.			Title	Summary of Key Contributions
1	2025	IEEE Future Report	Trends in AI and Virtual Clothing Try-On (2025)	Described how AI and stoked reality are shaping the future of virtual befitting apartments, enhancing online shopping delicacy.
2	2024	Zhang et al.	Deep Learning for Real-Time 3D Body Measurement	Suggested a mongrel AI system that uses smartphone cameras to capture accurate 3D body measures snappily and fluently
3	2024	Patel & Rao	AI-Based Clothing Fit Prediction Using User Data	Created a model that learns from stoner preferences and sizing maps to offer better size suggestions for colorful brands.
4	2023	Lee et al.	Using AI for Body Landmark Detection in E-Commerce	Developed an AI model using MediaPipe and YOLOv5 to automatically descry body points for real- time dimension.
5	2023	Gupta et al.	Reducing Clothing Return Rates through Smart Fit Systems	Explained how AI- grounded size analyzers can lower the number of returns by perfecting fit delicacy.
6	2022	Kim & Chang	Touch-Free Body Measurement System for Retail	Presented a contact-free scanning result that uses depth- seeing and AI algorithms for precise body dimension.
7	2022	Verma et al.	Study of AI Tools for Body Sizing and Measurement	Compared different AI styles with traditional approaches for better body dimension results.
8	2021	Singh et al.	Machine Learning Approaches for Clothing Size Prediction	Looked at how AI models can suggest apparel sizes grounded on stoner biographies and body types.
9	2021	Shrestha & Brown	Review of Virtual Try-On Technology Trends	Handed a review of being virtual befitting results and how they depend on live scanning for delicacy.

METHODOLOGY

1. System Architecture

The proposed system for Live Body Scanning and Smart Fit Analyzer is grounded on an AI-driven multi-layered armature conforming of

stoner Interface Subcaste o Mobile/ Web operation where druggies input images or live body checkup via camera. o Interface displays dimension results and smart apparel recommendations. Preprocessing Layer o Image improvement and noise reduction. o disguise estimation and background junking using Open Pose or analogous. Body Landmark Detection Layer or Using deep literacy models (like Dense Pose or Media Pipe) to descry crucial body points. o Conversion of milestones into measurable units dimension & Analysis Subcaste

AI- grounded algorithms to calculate measures (midriff, casket, inseam, hipsterism, etc.) from milestones. o Data normalization and body shape bracket. Recommendation Subcaste o Smart Fit AI model recommends the stylish fit apparel size and brand-specific suggestions. o Mood-grounded suggestion machine (voluntary future improvement). Database Subcaste o Stores stoner biographies, dimension data, and recommendation history. Secure authentication and sequestration mechanisms.

2. Technologies Used:

Technology	Purpose/Usage
Python (Flask/Django)	Backend services and AI model integration
TensorFlow / PyTorch	Training and running landmark detection and measurement models
OpenCV	Image processing and filtering
OpenPose / MediaPipe	Body landmark detection and keypoint extraction
MySQL / MongoDB	User data, measurements, and recommendation storage
HTML/CSS/JavaScript	Frontend development for user interaction
React (Optional)	Interactive frontend interface
AWS / Firebase (Optional)	Cloud-based hosting and scalability

3. Implementation Details:

Data Collection - Body images (front and side) are collected using the phone camera. Lighting condition adaptations and cropping are done automatically. Preprocessing - OpenCV is used to perform color balancing, resizing, and pose alignment. Background noise junking through segmentation. Landmark Detection - OpenPose or MediaPipe is integrated to prize keypoints. These keypoints are also counterplotted to a 3D model using scaling and rates. dimension computation - measures are reckoned using Euclidean distance formulas between keypoints. Error estimation models are applied to correct deformations from camera angles. Recommendation Machine -The measures are matched with a brand size database. A vaticination model (using bracket algorithms like Random Forest) suggests the best-fit size and cautions for brand variations.

4. Algorithm / Mathematical Model:

Step 1:- Landmark Detection Algorithm (Using OpenPose/ MediaPipe)

Extract crucial body milestones shoulder, casket, hipsterism, midriff, arms, and legs.

Step 2 :- dimension computation Model

Use distance formula:- $\text{Distance}(D) = \sqrt{((x_2 - x_1)^2 + (y_2 - y_1)^2)}$

Scaling factor from pixel distances to real- world centimeters is reckoned using given reference points.

Step 3:- Recommendation Algorithm

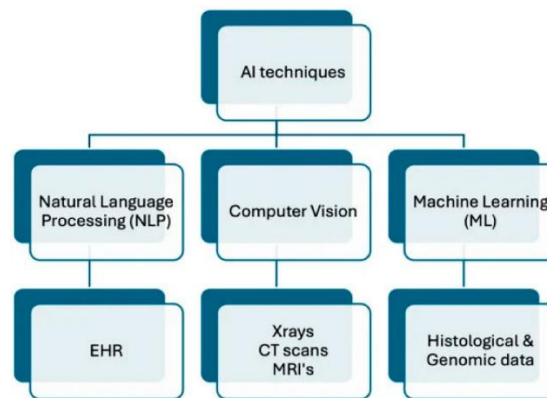
Input {midriff, casket, hipsterism, inseam measures, brand database}

Compare measures against standard and brand-specific size maps.

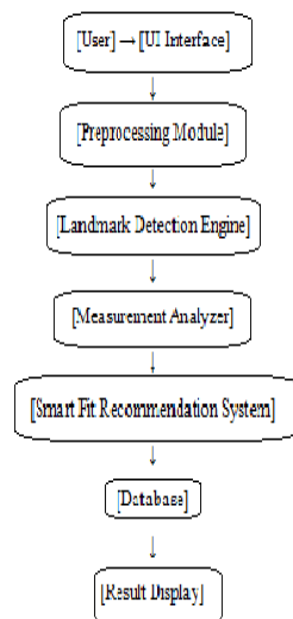
Use Decision Tree or Random Forest bracket to recommend " Small," " Medium," " Large," etc.

If multiple brand fits are available, rank them grounded on confidence score.

4. Flowchart & Diagrams:



SYSTEM ARCHITECTURE DIAGRAM



EXPERIMENTAL RESULTS

[SmartFit Analyzer](#)[Try Now](#)[Back to Home](#)Step 1 of 4

AI-Powered Body Measurements & Style Recommendations

Get accurate body measurements in seconds and receive personalized clothing recommendations that fit your unique shape.

[Start Scanning](#)[Learn More](#)

Smart Features

Our AI-powered technology makes finding the perfect fit easier than ever

- Precise Measurements**
Get accurate body measurements using advanced computer vision technology
- Smart Recommendations**
Receive personalized clothing suggestions based on your body shape and measurements
- Real-Time Analysis**
See results instantly with our fast and responsive AI processing

How It Works

Three simple steps to find your perfect fit

Camera Setup

Position yourself in a well-lit area with enough space to be fully visible

Tips for accurate measurements:

- Wear form-fitting clothing
- Stand straight with arms slightly away from your body
- Make sure your entire body is visible in the frame
- Ensure the area is well-lit with minimal shadows

[Start Body Scan](#)

← Back to Home

Step 3 of 4

← Back to Home

Step 4 of 4

Your Body Measurements

Here are your precise measurements calculated by our AI

📏 Key Measurements (cm)

Chest	102
Waist	86
Hips	104
Inseam	82
Shoulders	46

👤 Body Type

Athletic

Your body type helps determine the best clothing styles for your shape

📏 Height

183 cm

6'0"

⚖️ Weight

78 kg

172 lbs

See Clothing Recommendations >

Your Clothing Recommendations

Based on your body measurements, here are our personalized recommendations

📏 Your Recommended Sizes

Tops

L

Based on your chest and shoulder measurements

Bottoms

36-38

Based on your waist and hip measurements

Tops

Bottoms

👕 Top Recommendations

Style Recommendations

- Regular fit shirts that highlight your shoulders
- V-neck t-shirts to accentuate your chest
- Fitted blazers for formal occasions

Recommended Brands

Brand A Brand B Brand C

🛒 Shopping Tips

- Always try clothes on when possible, as sizes can vary between brands
- Look for stretch fabrics for better comfort and fit
- When shopping online, check the size charts and customer reviews
- Consider tailoring for perfect fit on important pieces

← Back to Measurements

Finish

DISCUSSION

This section presents the experimental evaluation of the AI- powered live body scanning and smart fit analyzer. The study includes details on the test terrain, performance criteria, comparison with being styles, and results imaged through tables and graphs.

References

Brooks, A.L., Petersson Brooks, E.: Towards an inclusive virtual dressing room for wheelchair-bound customers. In: International Conference on Collaboration Technologies and Systems (CTS), pp. 582–589 (2014).

Mains, M.: Consumers to return half of online clothing purchases this holiday season. CNBC (2018). Accessed on 2 May 2023

Halilday, S.: Online fashion returns soar as shoppers lack size info. The Guardian (2018)

Inman, D.: Retail returns increased to \$761 billion in 2021 as a result of overall sales growth

gradients(hog). National Retail Federation (2022)

Lee, J.M., Wei, L.: Gen z is set to outnumber millennials within a year. Accessed on 30 October 2022

Federation, N.R.: What do gen z shoppers really want? (2018). Accessed on 30 October 2022

Imran, A., Anita, B., Marco, B., Achim, B., Saskia, H., Felix, R.: The influence of woke consumers on fashion (2019). Accessed on 30 October 2022

Kim, Y.K., Lee, S.Y.: The effect of apparel size recommendation on consumers' purchase intention. Fashion and Textiles 4(1), 1–13 (2017)

Howard, A.G., Zhu, M., Chen, B., Kalenichenko, D., Wang, W., Weyand, T., Andreetto, M., Adam, H.: Mobilenets: Efficient convolutional neural networks for mobile vision applications. ArXiv (2017)

Rosebrock, A.: Opencv tutorial: A guide to learn opencv (2019). Accessed on 21 June 2021.