

Scholarships and Research
Highlights

Portfolio

2011–2025

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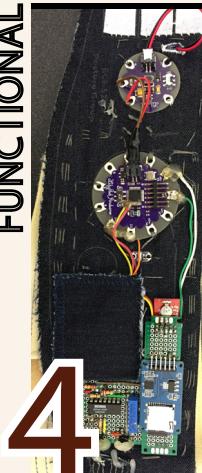


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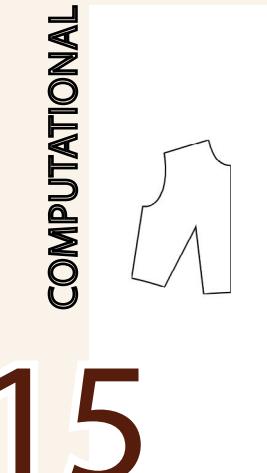
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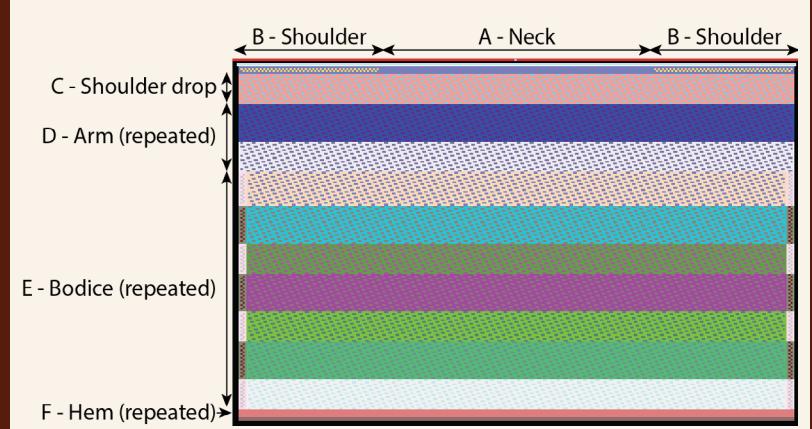
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The Wave Dress

A sewing-free whole garment innovation on a v-bed knitting machine (2025)



Sibei Xia, Ph.D.



This study presents a sewing-free whole garment dress produced on a fully fashioned V-bed flatbed knitting machine, typically used for panel construction. Inspired by Hokusai's The Great Wave off Kanagawa, the design employs intarsia and floating jacquard techniques with cotton and elastic yarns to achieve a dynamic, undulating surface. The garment was knitted as a seamless tube on a Shima Seiki SSR 112, with shaping formed through controlled front-back needle bed connectivity. Using the jacquard's technical back as the face, this work demonstrates sustainable, customizable garment production with minimal post-processing.

The Hemp Shell

Zero-waste tube-to-wear garment through flatbed knitting (2025)



Inspired by oyster shells, this zero-waste garment translates layered textures into knitted form using hemp yarns. Constructed seamlessly on a flatbed machine, the design embodies biomimicry and circularity. By integrating bio-based fibers and low-labor knitting, the work highlights sustainable approaches to fashion through natural inspiration and localized production.



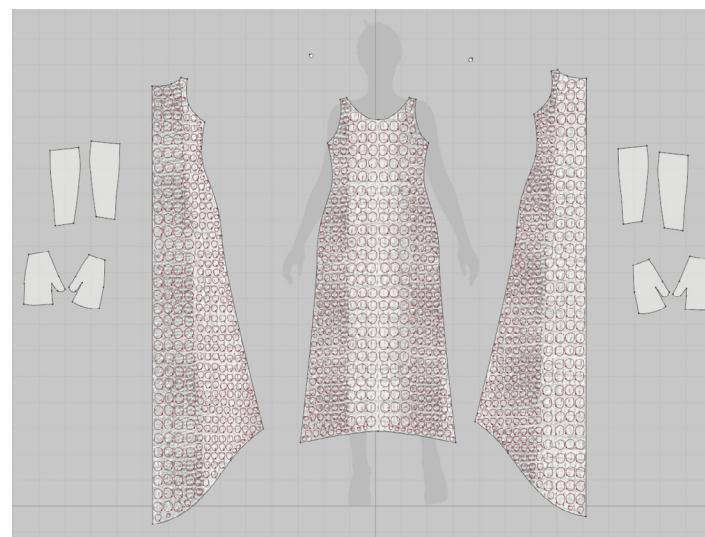
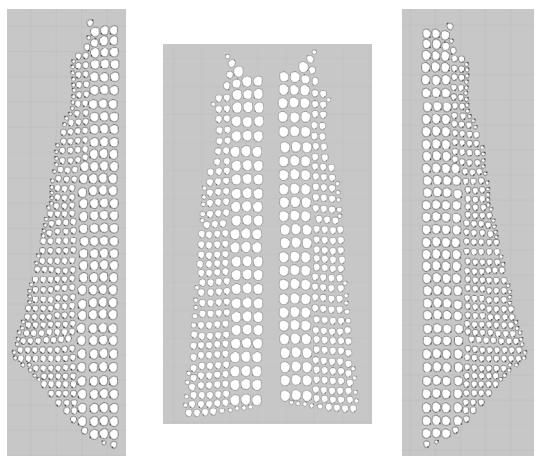
Vibrant Bayou

A 3D simulation drawing inspiration from the cultural marks and traditions of New Orleans (2024)



Sibei Xia, Ph.D.

Vibrant Bayou reflects New Orleans's cultural spirit through Mardi Gras colors, alligator symbolism, and centuries-old oaks. Mirrors replace dyes, reflecting justice, faith, and power in diverse ways. Arranged as alligator scales, they embody resilience, while the oak backdrop signifies continuity, creating an elegant tribute to the city's layered traditions. Simulated in Clo3D program.

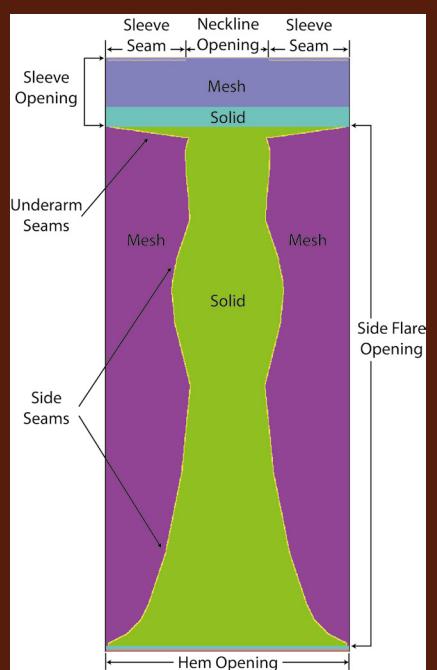


A shaped garment template for 2-bed flat machines achieved by jacquard knitting (2023)



<https://sibeixia.github.io/>

This project develops a whole-garment design solution for 2-bed V-bed knitting machines, which typically require seaming. A tubular template with jacquard techniques enabled the creation of a jellyfish-inspired dress using silk and polyester yarns. Tapered side seams and mesh flares at the sides and neckline express the fluidity of jellyfish, while natural fabric curls were incorporated as symbolic details, representing the resilience and determination of modern women.



Co-Design Scarves

A web-based application that enables users to design and customize knitted scarves online (2023)

A cotton scarf was created as a departmental promotional item using two-color jacquard knitting. The design features the department's majors spelled out across the body, with the university and department names displayed at each end. The piece combines functional wearability with strong visual identity and academic representation.



Sibei Xia, Ph.D.



Customize Your Scarf

Follow the steps and answer all the survey questions before the submission button will be active.

Step 1: Choose Background Color:
Navy

Step 2: Pick three colors for your design:
Selected: #fbf1b1, #780000, #c4a6cc

Step 3: Upload Your Design:
Choose File Screenshot ... 121641.png
Optional: Scale Image:
Re-Center Image Redo

Once your design is ready, click the button bellow to load questions and agreement about your design.
Please review the agreement and answer all questions before clicking the submission button.

Step 4: Expand Terms and Questions

A customizable website was developed to extend the scarf project, allowing customers to personalize a preset design by uploading their own images. The system automatically processes color reduction and resolution correction, generating knitable patterns that transform user input into unique, manufacturable textile products.

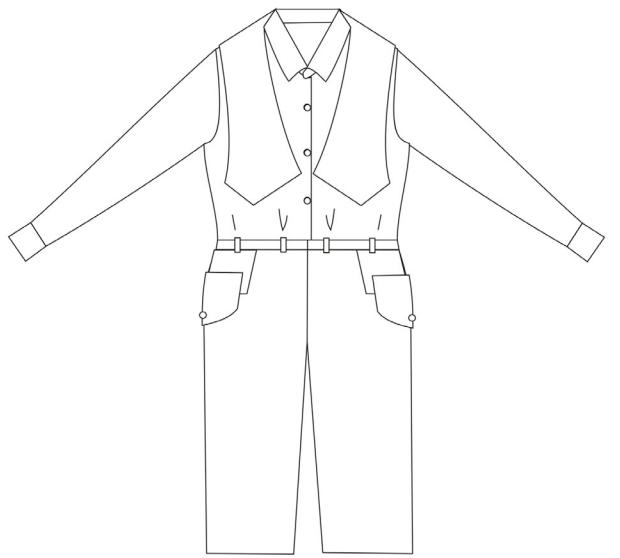
Her Power

Army-inspired silhouettes celebrate women's strength, independence, and fearless confidence (2011)

Sibei Xia, Ph.D.



Inspired by military aesthetics, the collection Her Power highlights women's strength, independence, and confidence. Sharp silhouettes and exaggerated collars serve as bold design elements, symbolizing empowerment and resilience through contemporary fashion expression.



Baby Hat

Knitted thermochromic hat changes color to indicate human fever (2024)

Sibei Xia, Ph.D.



This study introduces a smart-textile solution for monitoring children's body temperature through a thermochromic yarn-based hat. The product addresses parents' concerns about fever by providing a discreet, non-invasive, and wearable alternative to traditional thermometers. Drawing on the adaptability of functional textiles, the hat leverages thermochromic processes to visually signal temperature changes. Designed for everyday use, the concept emphasizes both practicality and emotional reassurance, offering parents a convenient and immediate method to assess their child's health without causing discomfort.

The prototype was tested under controlled temperature conditions to evaluate structural integrity and color response. Variations in knit structure and color combinations were examined for clarity, stability, and reversibility of thermochromic change. Results confirmed consistent performance, demonstrating how structural design and color pairing influence effectiveness in wearable fever monitoring.

(a) Sketch (b) Sample at room temp (c) Sample at fever temp



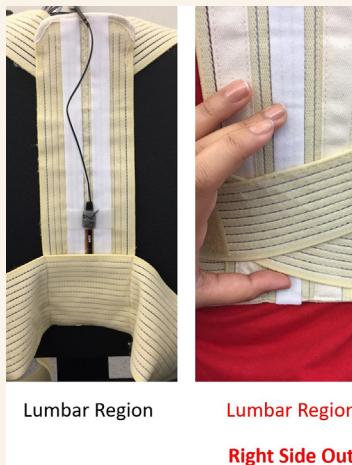
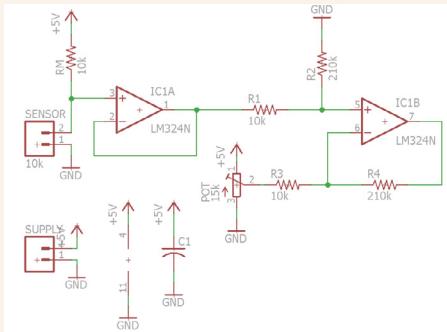
0.6 Stretchiness	Room Temperature 23 °C	Fever Temperature 40 °C
1x1		
White + Thermal	1x2	
1x3		
1x1		
Black + Thermal	1x2	
1x3		
1x1		
Lime + Thermal	1x2	
1x3		
1x1		
Purple + Thermal	1x2	
1x3		
1x1		
Thermal + Thermal	1x2	
1x3	n/a	n/a

Posture Detector

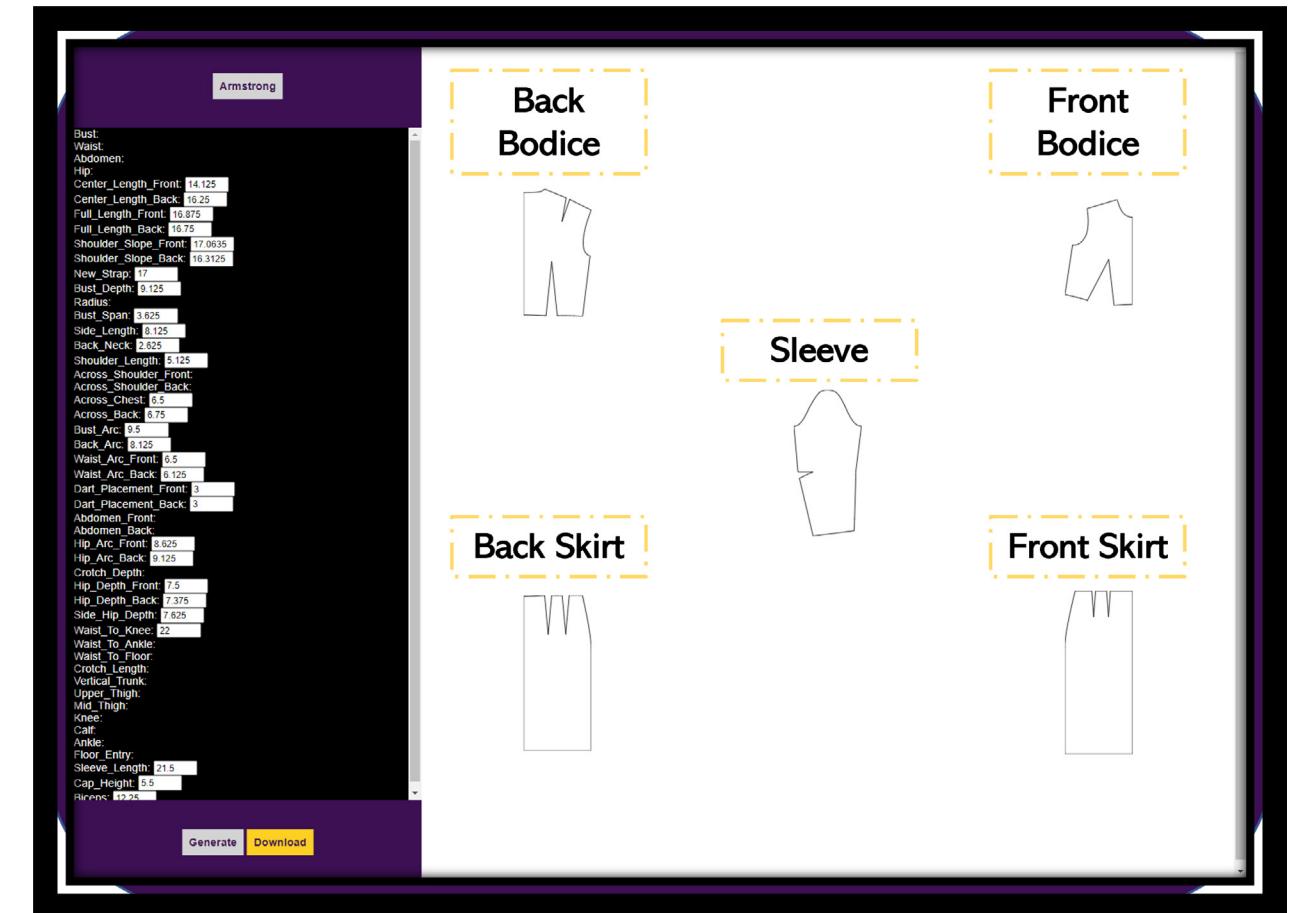
Smart clothing detects poor posture, alerts users, and corrects habits (2018)

A posture detection device was developed and tested with the novel implementation of vertebral bending, a feature not yet applied in commercial posture-related products. Postural states were classified into good and bad categories using a flex sensor, whose signal was amplified by a factor of 21. A calibration procedure was incorporated to establish the reference value for good posture. In addition, a memory module was integrated to record posture activity data, which can subsequently be retrieved and analyzed in MATLAB.

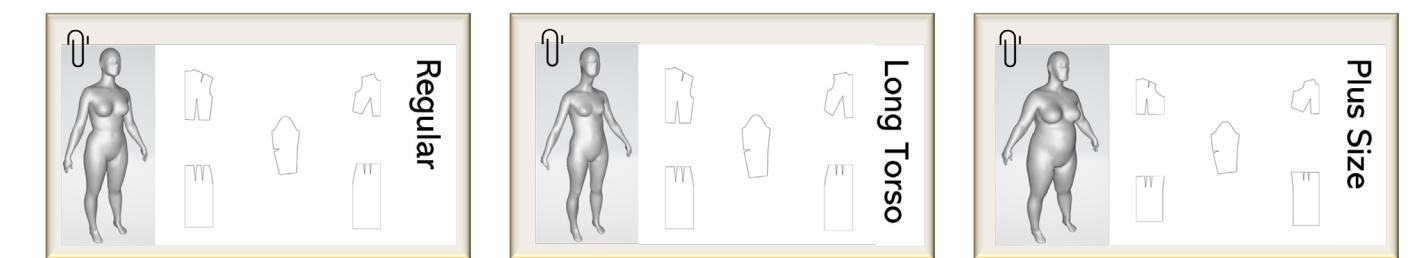
Sibei Xia, Ph.D.



JavaScript app generates individualized patterns using Armstrong patternmaking method inputs (2020)



This program presents a web-based basic block generator and communication pipeline developed using the Armstrong method. By inputting only essential body measurements, users can generate and download customized basic block patterns directly from the application. A pilot study confirmed the feasibility and reliability of the system, highlighting its potential to streamline and modernize digital patternmaking practices.



AI in the Classroom

Explore how GenAI supports jacquard knitting pattern development (2025)

Sibei Xia, Ph.D.



This study explores the application of generative artificial intelligence (GenAI) in fashion design education, specifically for jacquard knitting pattern development. GenAI supported five key stages: inspiration sourcing, theme selection, color exploration, design detail generation, and refinement. Results indicate its strong potential to enhance creativity, efficiency, and design diversity. The findings highlight AI's role as a powerful tool for accelerating ideation while reinforcing the need for critical evaluation and hands-on prototyping.



Examples of how Midjourney can be used across different fashion applications with prompts

(a) Runway prompt

A stunning female model walking down a luxurious runway, wearing a Givenchy Spring 2025 couture outfit. The design is sleek, avant-garde, and modern, with flowing sheer fabrics, structured tailoring, and intricate embellishments. The outfit features soft pastels and bold monochrome contrasts with floral and geometric patterns. The atmosphere is elegant, futuristic, and minimalist, embodying the essence of Givenchy's refined aesthetic. Ultra-detailed, cinematic fashion photography. --ar 3:4

(b) Runway examples



(c) Sketch prompt

A collection of high-fashion flat sketches for Givenchy Spring 2025 womenswear showcasing multiple avant-garde yet elegant designs. Clean, technical line drawings on a white background. The silhouettes blend structured tailoring with flowing sheer fabrics, bold geometric cuts, and intricate detailing. Elements include asymmetrical draping, soft pastels mixed with monochrome contrasts, floral embroidery, and futuristic embellishments. The sketches are precise and minimalist yet highly detailed, resembling professional fashion design sheets for couture production. Ultra-clean, crisp vector-style illustrations --ar 2:1

(d) Sketch examples



(e) Prints prompt

Seamless, repeatable textile print design inspired by Givenchy Spring 2025. Elegant and modern patterns feature a mix of abstract floral motifs, geometric shapes, and delicate embroidery-inspired details. The color palette blends soft pastels with bold monochrome contrasts, incorporating metallic accents and subtle textures. The design is luxurious, sophisticated, and high-fashion, suitable for couture fabrics and runway pieces. Ultra-detailed, high-resolution, vector-style pattern, perfect for digital textile printing, fashion-forward and innovative. --ar 1:1--tile

(f) Prints examples



(g) Advertisement prompt

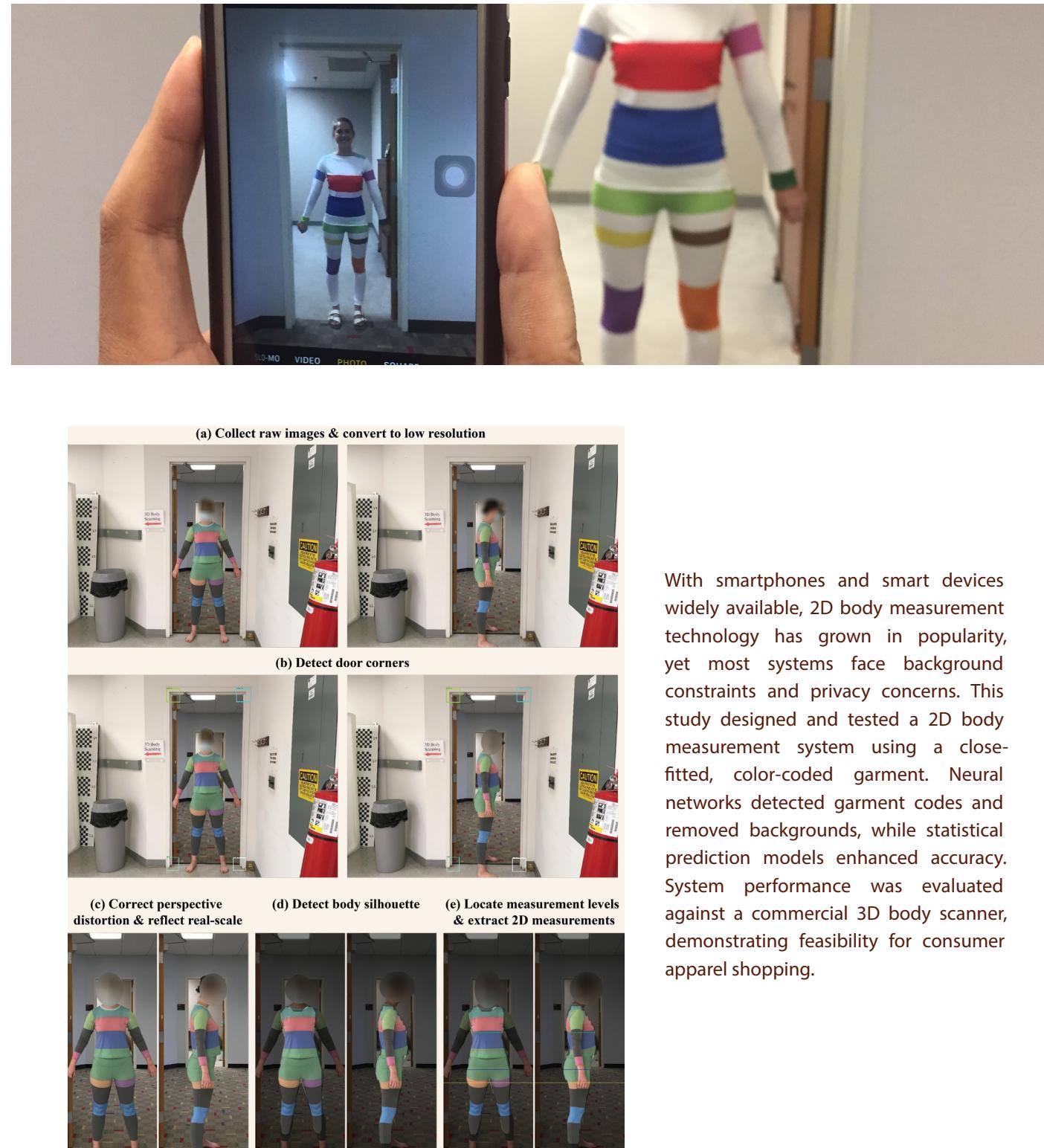
Luxury Givenchy Spring 2025 clothing advertisement featuring a sleek, high-fashion aesthetic. A beautifully styled product displayed against a dramatic, minimalist background with soft lighting and futuristic elegance. The scene exudes sophistication, with elements of sheer fabrics, metallic textures, and subtle floral accents. The composition is cinematic, emphasizing exclusivity and refinement. Ultra-detailed, high-resolution, professional photography style, capturing the essence of Givenchy's modern luxury. --ar 4:5

(h) Advertisement examples



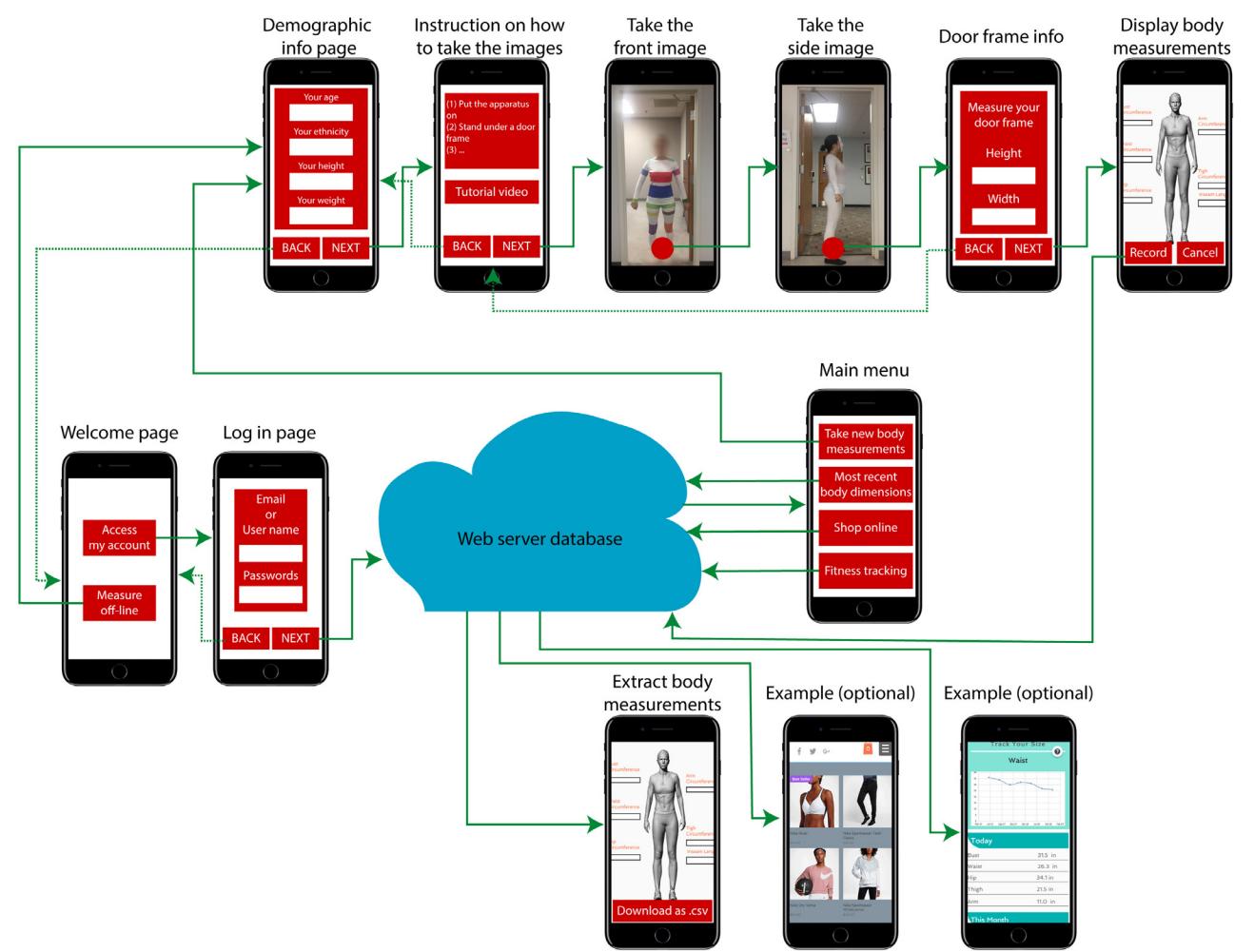
Fit App

Mobile app predicts body dimensions using images for size, fitness (2018)



With smartphones and smart devices widely available, 2D body measurement technology has grown in popularity, yet most systems face background constraints and privacy concerns. This study designed and tested a 2D body measurement system using a close-fitted, color-coded garment. Neural networks detected garment codes and removed backgrounds, while statistical prediction models enhanced accuracy. System performance was evaluated against a commercial 3D body scanner, demonstrating feasibility for consumer apparel shopping.

The 2D body measurement app supports fitness tracking and clothing size selection. By using a color-coded garment and neural network processing, it monitors body shape changes over time, helping users track fitness progress. It also provides accurate body data for brands and retailers to recommend proper sizes, enhance virtual fitting, and reduce return rates in online shopping.



Should you have any questions or
concerns, please feel free to contact me
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Thanks!