



# DESIGN AND DEVELOPMENT OF UNISEX SMART GARMENT FOR MOBILITY PEOPLE

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## ABSTRACT:

Textiles are one of the most commonly used items with a substantial market share; among these products, e-textiles are projected to execute electronic functions, allowing them to gain competitive market benefits. Initially, e-textiles were the result of research efforts, but they are currently being mass-produced in factories. Based on the behavior and performance of samples, it is vital to consider how we may leverage existing industrial processes and develop new ones for scale-up manufacturing. Even though e-textiles face hurdles, some wearable e-textiles with sensors, actuators, and production techniques have already been utilized to embed electronic characteristics into current wearable textiles, allowing them to be used on a regular basis without fear or shame.

Currently, there are a plethora of wearable devices for physiological and activity monitoring on the market, but the most of them only allow for spot measurements. Continuous detection of physiological parameters without regard to time or distance would be extremely valuable in domains such as healthcare, fitness, and other endeavours. Textile solutions for sensor-fitted clothes, in which the sensors are totally incorporated in the fabric, can address these issues. With entire sensor integration in fabric, several production approaches may be possible, allowing for both technological problems posed by physiological factors and basic garment requirements such as perspiration, wash ability, and comfort.

The majority of garment design is based on human anatomy. When it comes to comparing the survival requirements of normal people and people with physical disabilities, it is clear that there are variances. To allow independence in clothing and more self-relevant in day-to-day activities, it is critical to satisfy the needs of physical distortion as well as operationalization of design. Similarly, the design should ensure a quick recovery of health, a positive change in lifestyle, and a clear understanding of personal expectations. The goal is to enable people with disabilities to live a life of self-respect and ability, as well as to allow them to integrate more fully into society. There have been a few clothing designs for persons with impairments in the past, but most of them lack aesthetic attention and focus on the immediate aspect of function. Typically, clothing patterns for people with limb limitations were analyzed using real-life instances. Specific adjustments in the garment were intended to de-emphasize visual indications of a person's impairment and support function and ease to satisfy the requirements of bodily activities, using understanding of human engineering (ergonomics), textile materials, and clothing technology. Garments made for people with impairments should integrate both functional and aesthetic components, elevating them from cumbersome and concealing to convenient, attractive, and functional. This is an attempt to help persons with limb limitations enhance their quality of life.

**Key words – People with limb disabilities, Anatomy, E – textiles, Sensors, Functionalize, Aesthetic, Self – relevant.**

## I. INTRODUCTION

Smart textiles have a critical role in driving innovation and improving health and well-being, enhancing people's quality of life, particularly when targeted at certain users with specific health needs. Designing smart clothes to monitor physiological and physical functions in physically challenged people in order to determine asset that user focused design is examined, balancing users' needs with technology demands associated to the design process. Electronic devices are a part of everyone's life, even if they are only a little portion of it. They contribute to our way of life by providing entertainment, security, and comfort. The needs of disabled persons are not being satisfied due to a lack of appropriate attire, which hinders them from participating in social activities, everyday events, or jobs.

A smart garment is a dress code that incorporates well-fitting, urbanity formal clothes with informal components. Smart garments strike a mix between casual and formal clothing, making them appropriate for professional social gatherings like after-

work get-togethers or social events during business meetings. The goal of design is to create a beautiful object that is functional as well as attractive. Designing entails conceiving about the wearer's wants and incorporating a solution to those needs into the design. The designer focuses on the physical needs for clothes that arise as a result of a disability. The interaction of line, texture, form (shape and space), and colour of the garment, as well as other materials used on the garment, is considered as the aesthetic part of the design, referred to as the elements of design.

Global warming has had a tremendous impact on all sectors of life, from consumer buying habits to business practices. Consumers are becoming more aware of global warming and the issue of sustainability, which may help alleviate the crisis; they are reducing their use of fossil fuels, water, dyes, chemicals, and using solar or wind energy to power their homes, among other things, and are willing to purchase more eco-friendly products in the future.

When designing clothing for disabled persons, functional requirements or necessity is highly important. It is concerned with the ability of the product to execute functions required by the user as part of the design. The garments serve two main purposes: "psychological aspect, or what the garment is," and "execution aspect, or what the garment does." A garment's performance is determined by its physical characteristics." Mobility, fit, and ease of doffing and donning, as well as durability and utility, are all functional considerations of the design.

**2 Problems faced by people with disabilities**

<ul style="list-style-type: none"> <li>• <b>Accessibility</b></li> <li>• <b>Education</b></li> <li>• Access to healthcare</li> <li>• <b>Feeling of being ignored</b></li> <li>• <b>Lack of employment</b></li> </ul>	<ul style="list-style-type: none"> <li>• <b>Feeling of being incompetent</b></li> <li>• <b>Teased and abused</b></li> <li>• <b>Relationships</b></li> </ul>
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**3. Design features to be considered when designing clothes**

<ul style="list-style-type: none"> <li>• Aesthetic</li> <li>• Comfort</li> <li>• Protection</li> <li>• Ease of movement</li> <li>• Easy access</li> </ul>	<ul style="list-style-type: none"> <li>• Type of Fasteners</li> <li>• Quality</li> <li>• Fit</li> <li>• Price</li> <li>• Shopping facilities</li> </ul>
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**4. Designing Process**

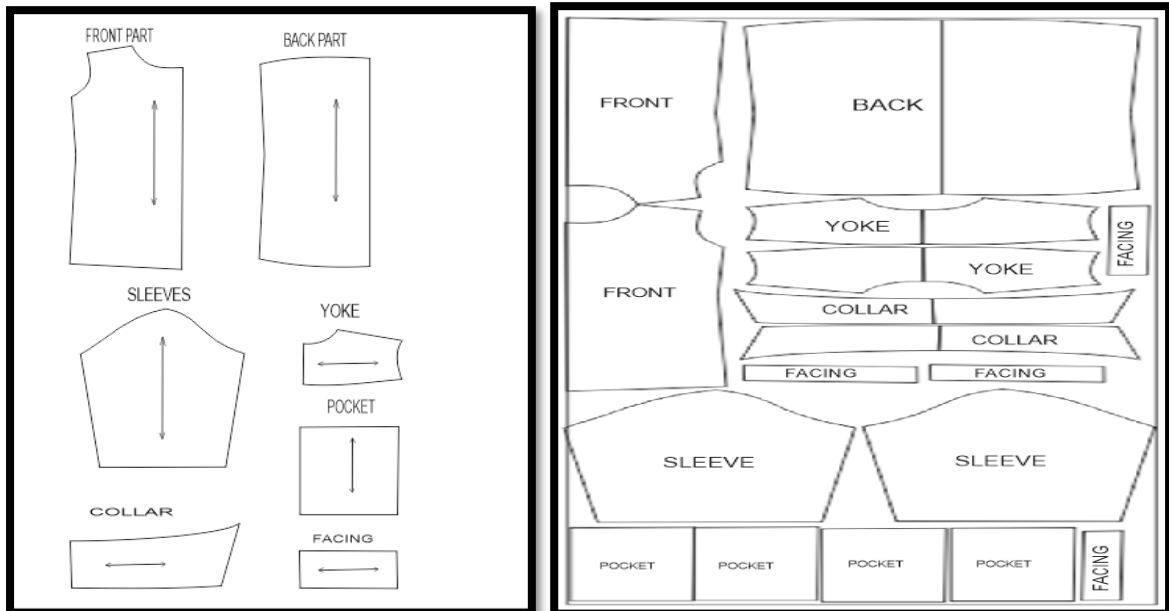
Initially, the survey was conducted through Google form on online platform, where the requirements regarding clothing were collected, the people participated in initial survey preferred functional clothing with special fabric, rather than a normal or adaptive clothing . In this project the sustainable bamboo woven fabric is used with ultrasonic sensors to prepare a unisex smart jacket. The smart jacket developed has ability to understand the user's needs, detailed strategy in a garment satisfy them and guide the cerebral palsy persons by warning signals through vibrator and insight the positive attitude and helpful to monitor the movements

**5. Methodology**

**5.1 Ideation Sketches & Concept Ideation**



**5.2 Drafting & Layout**



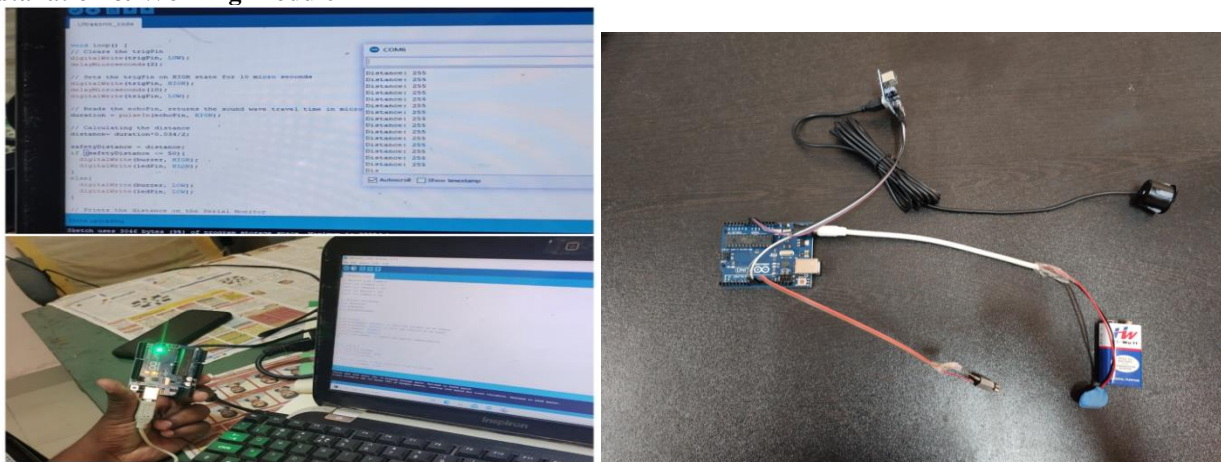
The pattern are drafted according to the measurements based non the layout it is estimated that, 3 meters fabric is required .

**5.3 Stitching and Finishing of the Final Product**



After cutting of the fabric , each component is stitched together by a row of stitch. Trimming of threads, Finishing & Ironing of garment done Draped on dress form.

**5.7 Installation & Working Module**



Installation of sensors using aurdino board by programming online which is available in open source on online. The aurdino board is connected through connector to the computer, By using online form, arduino board is connected to ultrasonic sensors and vibrator. The programming is adjusted to distance of the sensors. the program is installed and run through first time which will continue future. The vibrator is adjusted to sensor connections, when sensors senses any object it gives direction to vibrator so that it starts buzzing . connections: ground – ground,5v-5v, trigar- 9, ecopin- 10,Vibrator: red- 13, grey – ground(gr),All the

connections are arranged properly. The battery with 9v is connect by using on and off switch ,so that the full circuit works neatly. Whenever the work is in progress the battery can be or else keeps it off, save power.

Cost sheet				
DATE:09-04-2022		BRAND : MOBILITY FASHION		STYLE #: 01
DESIGN DESCRIPTION: UNISEX SMART JACKET		DESIGNER NAME: SANGEETHA .G.P		SEASON : FUNCTIONAL
FABRIC DESCRIPTION: BAMBOO WOVEN		CATEGORY: UNISEX		SIZE: M
SL.N	MATERIAL	PRICE/MTR	R MT	AMOUNT
1	Bamboo woven fabric	496	3mt	1657
2	Lining material	50	3mt	150
TOTAL COST OF THE MATERIAL				1807
SL.N	TRIMMINGS	PRICE/QTY	Q TY	AMOUNT
1	Matching colour thread	10	1	10
2.	zips	25	7	175
3.	Electronic items – ultrasonic sensors	450	2	900
4.	Aurdino uno	749	2	1498
5.	Battery 9 v	40	2	80
6.	On & off switch	10	2	20
7.	Battery connector	20	2	40
8.	Vibrator	40	2	80
9.	Wires	1	1	100
TOTAL COST OF THE MATERIAL				2903
SL.N	LABOUR	AMOUNT		
1	stitching	800		
2	Programming	1000		
TOTAL COST OF THE MATERIAL		6510		
TOTAL COST OF THE MATERIAL		6510		
SUGGESTED SELLING PRICE	10%	976	7486	

### 5.10 Photoshoot



The wear study is conducted mobility india centre ,Where the respondnt felt very comfortable and helpful due to the combination material and sensors in a jacket.

### 6. Conclusion

This study gives qualitative data about physically handicapped people regarding.

- The physical effects of the impair condition that related to clothing and dressing.
- The methods of appropriate clothing.
- Dressing deliberations and Clothing requirements.
- Clothing issues that may occur when a assistive device are used.
- Use of smart textiles to help mobility people.
- Application of E - textiles for functional clothing.

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