

# Quality and Durability Checking of Clothes

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**Abstract** - Quality is one of the important aspects of business. Customers always demand and expect value for money. As producers of apparel there must be a constant production of work to produce good quality. This paper studies the approach for quality and durability checking of clothes. This approach uses flex sensor and a load cell to determine the flexibility and weight of the fabric. Each and every cloth will have standard flexibility and weight values also known as standard fabric datasets. Each cloth will have a RFID tag attached to it which consists of the values of flexibility and weight of the cloth. When RFID tag is read by the RFID reader, the serial monitor shows the brand name and the weight and flexibility values of the cloth that is being stored in the tag. Consequently, in the LCD module it displays whether the cloth a branded or a fake cloth. If the particular cloth is fake then it consists of defects in it. The defect in the particular cloth is determined by pattern recognition method. The cloth is allowed to pass through a conveyor belt which consists of ESP32 camera module on top of it. This camera module captures the images of the cloth. These images are given as input to that method.

**Key Words:** Flexibility, weight, standard fabric dataset, branded, fake cloth.

## 1. INTRODUCTION

The textile industry is concerned with the planning of, production and distribution of yarn, cloth or clothing. The staple could also be natural, or synthetic using products of the industry. The textile industry in India traditionally, after agriculture, is that the only industry that has generated huge employment for both skilled and unskilled labor in textiles. India being the second largest producer of textile, there are numerous textile manufacturing companies rapidly blooming. Naturally the shops which sell these materials or clothes increase. There are many textile shop owners who actually don't sell branded clothes but sell fake branded clothes in the name of branded clothes. Due to greediness and also to excel in their industry they cheat the consumers. They buy branded clothes from the dealer and keep that clothes for their own purpose or they sell it to some other dealers and they try to sell fake branded clothes in the name of branded clothes. People as customers when they approach

the shop they tend to think as the clothes they buy are branded and they are unaware of being cheated by these textile owners. As a result, these textile owners gain double profit and become successful business men. Ultimately the customers who buy these fake products are the victim. The motive of this project is to help the customers by identifying the quality of the cloth by themselves and also to know the fading conditions of the cloth and to check the properties of the cloth for different materials they buy. This will bring change in selling fake products in the name of branded products. The similar approach of checking the quality of the clothes is done in industries. It also involves traditional inspection methods that involve human tasks. But now a days it is impossible to find the fake clothes by the traditional inspection method as the fake product is similar to that of the branded product. This project mainly focuses on checking the elongation or flexibility and weight of the cloth. It involves sensors like load cell, flex sensor, RFID tag and reader. The load cell is used to detect the weight of the product. The flex sensor is used to detect the flexibility of the fabrics. Each cloth will have a RFID tag which will detect the flexibility and the weight of the fabrics. The RFID reader reads the tag, and determines whether the cloth is a fake product or a branded one. Then the cloth is allowed to pass through a conveyor belt.

## 2. EXISTING SYSTEM

AFIS- Advanced Fiber Information System is based on the single fiber testing. There are two modules, one for testing the number of neps (small knot of entangled fibers) and the size of neps, while the other one is used for testing the length and the diameter. Both can be done separately or together.

HVI - High volume instrument systems are based on the fiber bundle strength testing, i.e., many fibers are checked at the same time and their average values determined.

INSTRON- Instron is a manufacturer of test equipment designed to evaluate the mechanical properties of materials and components, such as universal testing machines. But the power consumption is more, cost is high and the circuit is complex. Its application areas include flexural strength testing, fatigue testing etc.

### 2.1 Disadvantages

- The existing systems consumed more time for detecting whether the fabric is a fake or branded one.
- These systems also consumed more power.
- The cost of these systems are expensive and the circuits are too complex.

### 3. PROPOSED SYSTEM

This project mainly focuses on checking the flexibility and weight of the cloth. It consists of sensors like flex sensor, load cell with HX711 driver circuit, RFID tag and reader, LCD module are interfaced to the microcontroller. The load cell basically consists of a transducer that converts the pressure/force applied on it into electrical signal which is analog in nature. This analog signal is converted into digital signal by the HX711 IC. In this application, the weight of the cloth is determined by means of this load cell. A flex sensor or bend sensor is a sensor that is used to measure the amount of deflection or bending. Usually, the sensor is placed on the surface of the cloth and resistance of sensor element is varied by bending the cloth. Since the resistance is directly proportional to the amount of bend it is used as a potentiometer and often called flexible potentiometer. In our project, this sensor is used to determine the flexibility or elongation of the cloth. Basically, RFID systems consist of three components: an RFID tag or smart label, an RFID reader, and an antenna. RFID tags contain an integrated circuit and an antenna, which are used to transmit data to the RFID reader (also called an interrogator). The reader then converts the radio waves to a more usable form of data. Information collected from the tags is then transferred through a communications interface to a host computer system, where the data can be stored in a database and analyzed at a later time. In our case, each cloth will have the RFID tag fixed to it and the RFID reader will scan or read the data from the tag and determine whether the cloth is a fake one or branded one. This dataset is basically a collection of values of the branded fabric or cloth. For example: Brands like Biba, Park Avenue etc. For example, let us consider a cotton shirt which should have a standard weight of 120 GSM. But if the weight of the cotton shirt is greater than or lesser than the value then the shirt consists of defects in it. Say that the yarns are being densely spun or the yarns might be loosely spun. Thus, it is finally displayed on the LCD module saying "fake" or "original". By observing the display, the customers will get to know if the cloth is a fake poor quality one or is an original branded one. If suppose it is fake, the particular cloth is given as input to the pattern recognition method. In that method there are a number of samples of cotton, silk, wool and nylon. The images that are being fed to the system are both good samples and defective samples so that the input

samples are being compared with samples that present within it and can display the defect in the cloth in an accurate manner. So, in this way it detects the defect and shows in which particular place the defect is present. In this way customers are aware of what type of cloth they are buying and they don't have to waste their money unnecessarily on a cloth that is not branded or worth the money.

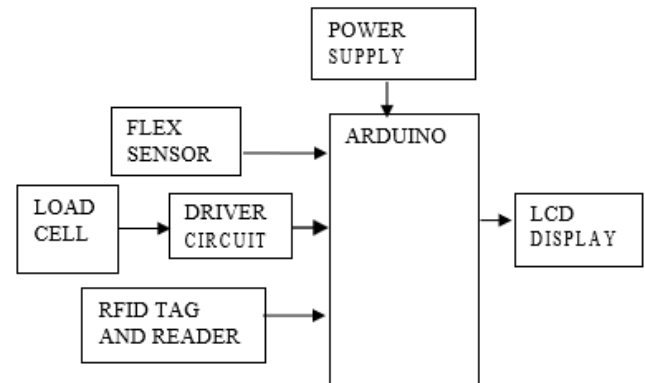


Fig 3.1 : Block diagram of proposed system

### 4. PATTERN RECOGNITION

The image processing concept (pattern recognition method) to display the images of the cloth that has the defect in it and as well as the non-defective images of the cloth. At first image or data acquisition takes place. In this stage images of good and defective fabrics are taken. Here images of cotton, silk and wool are acquired from a source for further processing. The images are captured by a good quality camera and the image should be of 24 bits. Then preprocessing takes place which is basically preparation of the sample/image to introduce it to an algorithm for a specified task. Then image segmentation where partitioning the digital image of the fabric into multiple segments (sets of pixels, also known as image objects) takes place. Then image classification is done by using support vector machine (SVM) which is a supervised learning algorithm. Supervised learning is a type of machine learning algorithm that uses a known dataset also called the training dataset to make predictions.

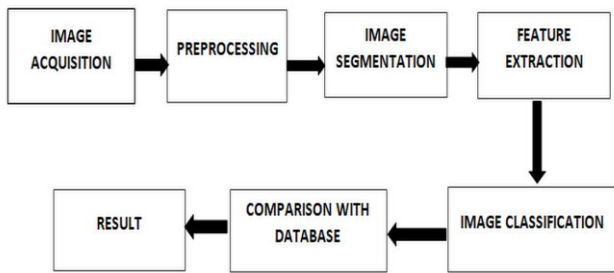


Fig 4.1: Flowchart of pattern recognition method

Mean is given by,  $B = \text{mean2}(A)$ .

The mean of input data is returned as a numeric scalar. If data type of A is single then B is also single otherwise datatype of B is double. Finally, a message box appears which says if it is a good cloth or bad cloth, based on which customers can decide whether to purchase the cloth or not. These images can be viewed by the customer to have a clear idea of the defect and they do not have to waste money unnecessarily.

### 5. RESULTS

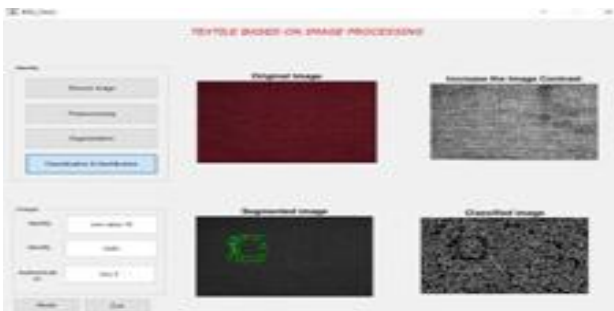


Fig 5.1: GUI showing good quality cloth

Pattern recognition is implemented using MATLAB to determine the defects accurately. There is a possibility for many types of defects to occur in a fabric. Defects such as missing end, missing yarn, multithreading and holes were analysed.

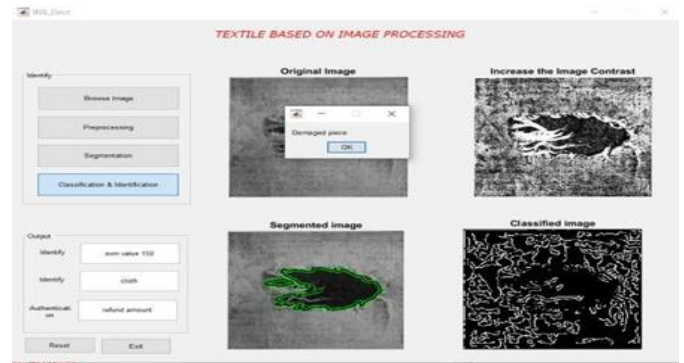


Fig 5.2: GUI showing defect in the cloth

### 5.1 Prototype



### 5.2 Advantages

- Cost efficient
- Low power consumption
- High performance and reliability
- Agile system
- Avoids unnecessary waste of money of the
- As the system displays whether the product is fake or original.

### 6. CONCLUSION

Our prototype helps customers to have a clear insight between branded and fake cloth, thereby preventing the wastage of money if suppose the cloth is damaged or fake. It is also easy to identify faults or defects on fabric images and process by using this method. The MATLAB Implementation is used for defect identification such as holes, missing end, missing yarns and multithreading on fabrics and are processed. The overall efficiency is 90% by using this process compared to other methods of fault identification. Thus, it

can be concluded that this fabric durability checking and defect recognition system is capable of identifying the original as well as the fake cloth and detecting fabric defects with utmost accuracy, efficiency and reliability.

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