DESIGN AND IMPLEMENTATION OF GARMENTS IN FASHION INDUSTRY USING CLO 3D SOFTWARE

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BEING A PROJECT WORK SUBMITTED TO THE DEPARTMENT OF COMPUTER SCIENCE, SCHOOL OF INFORMATION AND COMMUNICATION TECHNOLOGY AUCHI POLYTECHNIC, AUCHI

IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF HIGHER NATIONAL DIPLOMA (HND) IN COMPUTER SCIENCE

NOVEMBER, 2022

CERTIFICATION

We, the undersigned, hereby certify that this project was carried out by **DANIA ONI RUFINA** with Matriculation Number**: ICT/225200060**

We, also certify that this work is adequate in scope and quality in partial fulfillment of the requirements for the award of Higher National Diploma (HND) in computer science.

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DEDICATION

This work is dedicated to God Almighty for his grace, favour and mercies upon my life.

ACKNOWLEDGEMENT

Abstract

Drafting garments is known as a very laborious and time consuming process, which includes taking of client's measurements details and then transferring to a pattern paper which is use in drafting the pattern. This method possess some disadvantages ranging from cost in the purchase of papers, and the inability to easily adjust patterns. With the advance in virtual reality applications, garment industry has strived for new developments. This project focuses on the application of 3D software's (CLO 3D) in designing / drafting patterns with change- able styles, colors and textile patterns, especially using a 3D virtual simulation system, and to examine their potential possibilities in online fashion platforms. With the help of CLO 3D designer can then move around the body form inserting style lines where desired, while making a visual assessment of shape and position. Further tools allow the lines to be edited and the interpolating surfaces between the lines to be added. As the entities created are specified mathematically in 3D space, the required pattern shapes can be derived. To add visual realism to the images, fabric textures can be rendered onto the garment pieces while rotate and zoom facilities allow viewing from any angle and relative distance.

Keywords: *fashion design, computer-aided design, computer, clo*

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CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Computers have influenced every sphere of human life. Life has become easier and comfortable with the use of computer. In the field of garment industry, computers help to design, analyse and manufacture the product within a short span of time. The first step of garment production is designing. The designers do hand sketches, or drape fabric in a dress form. CAD software has begun to make inroads into the world of fashion and textile industry, enable mass customization, develop more designs, and facilitate to make frequent changes in styles and production. Computer Aided designing software not only provides the possibility to speed up the process of putting a new model into production and improve the quality of the products, but also reduces material costs and labour intensity. (Holte, M.B., 2017)

Over the years, computers and fashion have developed gradually, changed with time, taste and trend. But nobody knew that a time will come when both these fields will complement each other so well. Today fashion design has reached new heights by computer aided methods of design. (Yezhova, O., 2018). As a result of which, computer industry has got its new customer. Computer technology is making waves in the fashion design zone. From determining textile weaves to sizing designs; computers are a vital component of the fashion industry.

Computer aided design (CAD) programs reduce the demand for manual sketches. New software programs continue to replace old manual skills. Going by the wayside are "old fashioned" flat pattern construction, pencil sketching and traditional math-based pattern sizing. Those who lag in math and falter at sketching can now breathe a little easier. (Nisselson, J., 2009)

Although most designers initially sketch designs by hand, a growing number also translate these hand sketches to the computer. CAD allows designers to view designs of clothing on virtual models and in various colors and shapes, thus saving time by requiring fewer adjustments of prototypes and samples later.

Fashion designers are always looking for new creative ideas and opportunities; they have a great ability to convert ordinary objects into attractive artwork through their inventions, so this technology plays an important role. Nowadays the use of technology through any kind of process makes the process faster and saves total time by simplifying human efforts. Some software's like apparel magic, 3D body scanning, computer-aided design, and coral draw are popular software's and chiefly used in today's world. Thus, the role of technology is very much crucial in fashion designing.

Fashion has always been at the forefront of innovation from the invention of the sewing machine to the rise of e-commerce. Like tech, fashion is forward-looking and cyclical.

The fashion sector is also one of the largest industries in the world, estimated to be worth more than $3T by the end of the decade, according to CB Insights' Industry Analyst Consensus.

And today, fashion technology is growing at a faster pace than ever.

Robots that sew and cut fabric, AI algorithms that predict style trends, clothes to be worn in virtual reality, an array of innovations show how technology is automating, personalizing, and speeding up the fashion space.

Seizing the opportunity to open more revenue streams and business models, fashion companies are partnering with technology providers, snapping up start-ups, and even building their own tech.

Meanwhile, as the industry faces a long-overdue reckoning with its environmental and social impact, it is re-examining processes across the value chain in an attempt to reinvent itself.

1.2 Statements of Problems

Fashion is an industry that has fallen behind when it comes to technology. Automation and using animations to model different designs of clothes is an opportunity that fashion producers have not yet managed to implement. The fashion industry is relying on human labour for everything from designs, to pattern drafting, to sewing making it one of the most labour and resources

intensive industries, with fashion designers seeming to lack interest in automation and use of technology.

1.3 Aim and Objectives of the Study

The aim of this study is to examine the role of computer in drafting of patterns in order to reduce the involvement of humans in fashion designs.

This study examines the role of computer in fashion industry with the following objectives:

a. To efficiently draft patterns for a design

b. To eradicate all forms of paper and pen method of pattern drafting

c. To easily model designs using animation software's such as CLO3D.

d. To enable easy adjustments for pattern designs.

1.4 Significance of the Study

Fashion designers are always looking for new creative ideas and opportunities, they have a great ability to convert ordinary objects into attractive artwork through their invention, so technology plays an important role. Nowadays the use of technology through any kind of process makes the process faster and saves total time by simplifying the human efforts. Some software's like apparel magic, 3D body scanning, Computer aided designs and corel draw are popular software's

used in today's world. Thus the role of technologies is very much crucial in fashion designs.

1.5 Scope of study

The scope of this work is to examine the use of 3D software's such as CLO3D in improving pattern drafting for designs which will help to eradicate the use of paper and pencil manually used by designers in the fashion industry.

While there are several uses of computer in the fashion industry, this study will focus mainly on how Computer Aided Software's (CAD) will help reduce cost of papers, time management and also improve accuracy and speed in pattern drafting using computer.

1.6 Limitations of the Study

Computer aided design software's is a creative design process that is done using a computer system. Its software's are widely used by professionals with sufficient knowledge in computer. Therefore there is every possibility that most fashion designers will struggle to fully make use of it which might be a drawback in the acceptance of computer system in drafting of patterns and other areas in the fashion industry. Every new employee will have to go through proper training of how to use the software which may result to additional cost for an organization.

The high cost of purchasing new systems might also discourage small business start-up with little capital.

Finally, since computer failure are unavoidable, work can be lost because of the sudden breakdown of computers.

CHAPTER TWO

LITERATURE REVIEW

Computer technology is making waves in the fashion design zone. From determining textile weaves to sizing designs; computers are a vital component of the fashion industry. New software programs continue to replace old manual skills. Going by the wayside are "old fashioned" flat pattern construction, pencil sketching and traditional math-based pattern sizing. Those who lag in math and falter at sketching can now breathe a little easier. (Tamakloe, W., 2011)

Over the years computers and fashion have developed gradually, changed with time, taste and trend. But nobody knew that a time will come when both these fields will complement each other so well. Today fashion design has reached new heights by computer aided methods of design. As a result of which, computer industry has got its new customer. Computer technology is making waves in the fashion design zone. From determining textile weaves to sizing designs; computers are a vital component of the fashion industry. (Schewe, J. 2000). Computer aided design (CAD) programs reduce the demand for manual sketches. New software programs continue to replace old manual skills. Going by the wayside are "old fashioned" flat pattern construction, pencil sketching and traditional math-based pattern sizing. Those who lag in math and falter at sketching can now breathe a little easier.

The role of software and technology is very much crucial in the fashion designing. Not even fashion industries but other textile and manufacturing industries also adopt various technologies for speedy growth in the process and to increase the production. The technology in processing contributes to reduce work in process, production time, and decrease the labor costs. Nowadays all the engineers are working on Artificial Intelligence (AI) and designing the software to increase the production, quality and efficiency of the product, and it helps to maintain standardization. Application of technology in the fashion sector increases the customer's satisfaction with increase in change over time (Mckelvey, K. 1999).

The fashion industry is a global business of 1.3 trillion dollars, which employs more than 300 million people worldwide and represents a significant economic force and a substantial driver of global GDP. This industry operates in a highly competitive market dominated by the presence of global brands. In recent times, despite the deep financial crisis of the last decade, the fashion industry has attained fast growth and has experienced vast transformations. According to the market analysis provided by some of the main international consultancy companies (McKinsey, Deloitte Group, BCG), fashion companies today are operating in a very dynamic competitive environment, dominated by sudden changes and increasing uncertainty (Leach, A. J. 2002) . In a framework dominated by a global increase of life age, thanks to progress in the medical sector and other causes, the fashion industry today has the opportunity to serve both

young and old generations at the same time; this factor translates into the need to diversify both business strategies and marketing approaches in order to satisfy the needs of retired consumers and millennial ones (Imirhe, T., 2004). Uncertainty is driven by geopolitical and economic instability, which have affected the market since the 2008 economic and financial crisis. In 2019 data from the World Bank, the International Monetary Fund (IMF) and the Organisation for Economic Co-operation and Development (OECD) forecast a slower growth of the industry in developed markets and a flat growth curve in developing countries. The areas most affected by this trend are Europe, Middle East, and Latin America. Due to the increase of economic uncertainty and political instability, the level of spending for fashion products is declining and, at the same time, the demand for customized and personalized fashion, at lower prices, is expected to grow in the future years. (Hodgson, R.A. 2007). In addition to political instability, other problematic events have characterized the last few years: terrorist attacks, natural disasters, new epidemics, a combination of factors that are not only devastating for the people they directly affect, but also have major consequences for companies and the local communities in which businesses are rooted.

Another important change in the competitive scenario is the growing digitalization of the economy. The fashion industry is more and more interconnected with the digital world. Digital platforms and digital marketing strategies are becoming prevalent in the fashion market and many new brands

have emerged with the development of e-commerce, which allows companies to engage consumers through virtual reality (Center, M. & Vereker F., 2008). According to McKinsey, a big increase in online sales is expected in the future with respect to total sales; this trend particularly affects the fashion luxury segment, which is expected to represent about 13% of the total fashion market in 2020. In recent years, the fashion industry has also experienced an improvement in relationships with existing clients through marketing and digital promotion, rather than expansion through geographic channels and store network expansion. Most fashion executives see investments in Information and Communications Technology and the digitalization of the value chain as big opportunities.

Technological investment becomes strategic as the fashion market experiences a growing speed of fast fashion trends. Technology improvement in the production process can provide new opportunities for business, like an acceleration of the life, robust reduction in labor costs, an increase in margins, along with the localization of materials/products (for example, digitalization of inventory), and also increase the sustainability of processes. Data provided by the International Labor Organization (ILO) estimate that, within a few decades, more than half of all salaried workers (especially in emerging countries, where labor force in the industry is concentrated), will be displaced by automation techniques and advanced technologies in the fashion industry, as in other manufacturing based sectors too (Burke, S. (2006). Agile businesses are usually more stable and

dynamic, because the mix between employee empowerment, development sprints, and the ability to bring solutions rapidly to customers can help a company become more efficient (Nisselson, J., 1998). Agility requires fashion companies to build flexible supply chains and delivery models able to respond quickly when the environment changes. Disruptions and instability are situations that are not going to stop. Successful fashion companies, in front of uncertainty in the competitive scenario, are acting flexibly to ensure that customer needs are met as a primary objective. To be dynamic is becoming strategic to survive in the long-term and this implies the need for companies to update technologies and to interpret the new trends and to identify how these challenges can be translated into marketing opportunities. As markets and consumer behaviours become more and more sophisticated every year, a successful company must be an "agile" organization, as they cannot delay decisions. In this highly competitive context, the fashion market is becoming more and more concentrated: this phenomenon is reflected with the increasing growth, on the one hand, of mergers and acquisitions activities and, on the other hand, of strategic partnership agreements (Holte, M.B. 2017).

The creation of big conglomerates makes fashion industry brands feel more comfortable and less uncertain about the challenges of the global market. Alongside changes in the competitive environment in which fashion firms operate, consumer behaviour and preferences continue to evolve rapidly; this

requires companies to adapt rapidly to emerging trends by focusing on product innovation and by developing new designs for creating new fashion trends.

2.2 Use of Technology in Fashion Designing

The word technology does not mean that it is connected to the IT world or Google, Microsoft, Intel, etc. Technology is very important even in the fashion industry and textile industry (Gerber technology, 2018).

Nowadays technology is involved in all stages, the main use of technology in any kind of work is to simplify the human effort, and it is time-saving and fast.

For example, in the production houses there would be at least 10 to 20 styles running at the same time and each style would have thousands of pcs, it becomes very difficult for the factory to keep a track on all that is happening hence all the style/stitching details are entered and with the help of a software which will be developed for each organization the factory will be able to keep track of the status of the orders (Burke, S. 2006).

In regards to fashion technology, we often hear many words such as CAD, PDM, POS, ERP, etc.. All these are software developed to keep a track on or to ease the effort and also to save time.

CAD CAM is used to make the markers and calculate the marker efficiency, Corel draw can be used in the design department and so on there is the use of technology in every aspect of fashion design.

Technology does not only mean computers or software it also includes the machines which are used for sewing, the cutting tools, embroidery machines, pressing equipment, packing machines, etc.. Machines are always evolving and changing over the years this happens only because of the innovations in technology.

The fashion industry always needs to keep updating the machines and systems since fashion is also something that keeps on changing. The fashion industry is a very good example of how technology has evolved over the years.

2.3 Application of Software in Fashion Designing

In the fashion processing we use various applications and software. Today software is mainly used to make the patterns, in cutting techniques, also for printing and stitching the garments. So various software are used to make the process compressive and efficient. There are other software like Adobe Photoshop, Vector, Coral draw, and fashion illustration that are used as designing software. These software are used for pre-production sampling or trials. At present, many popular companies are using advanced software to protect their

data and trade secrets. By doing so, they can secure all the information related to their companies for future references.

2.3.1 Apparel Magic:

Apparel Magic is an Enterprise Resource Planning (ERP) and also a Product Lifecycle Management (PLM) used by many apparel companies. Apparel Magic is a software used for total control of apparel operation as an intuitive tool, which is now very easier and faster too. It manages inventory as well as customer relations. Apparel magic can easily take your business to next level efficiently and affordably. Its plans and analyse style raw material cost and production. So, we can get all results in the big picture instantly. It helps to design and plan a track for the design process, including management of the product design, sourcing of material, and management of inventory with sales and supply. This software provides help to the customer to analyse the profitability of orders (accounting) and gives prizing suggestions.

It's the famous apparel software in fashion designing that provides the latest updates with features. Utilize maximum income by the goods of demand of products, a chart produced by this software is used to make the presentation of the process and take an effective utilization.

It provides some other features and advantages like:

i. Integrate online sale channels as a central hub and provide us goods of service too.

ii. Improve product margin.

iii. Monitor the ongoing costs and labor expenses.

iv. Management of raw materials through the workflow.

v. Streamline your inventory and supply chains.

2.3.2 3D Body Scanning:

3D body scanning is software that helps designers and manufacturers to make garments according to their actual body measurement and proportion. Only by referring 3D body model of that consumer, a retailer will create and design the garments which fit perfectly. This software scans and records all the dimensions of the body without any physical contact. After the recording of the dimensions, the software creates a 3D model of that consumer, and then retailers can view in all various angles of that model. So it helps to create a precise garment for fitting and draping. The main advantage of this software is, Manufacturers or designers can drape the clothes virtually instead of trying them physically on the end-users. They can also apply accessories and non-textile materials on that model as per the choice of the consumer. Fashion industries, the animation industry, and other

sectors like gaming, medical, and engineering are already adopted 3D body scanning techniques for a different levels of application.

2.3.2.1 Advantages:

i. It removes the need for guess or predicting data during pattern development.

ii. Provides details of specific consumers to create a greater depth of data to drive a product.

iii. Design accurate outfits for complex bodies.

iv. Provide dimensions of the body by analyzing captured images of mobile phones.

v. Increase productivity and save the time of online and offline retailers.

2.3.3 CAD (Computer-Aided Design):

CAD stands for computer-aided design. A designer can stitch anything with the aid of a computer that's why it is called computer-aided design. The link between CAD and **fashion designer** developed over the decades with the changing time test and face of fashion. So CAD is nothing but the use of computer technology for the process of design development or collection development in Fashion. CAD designing has become more common because of its easy accessibility in

fashion designing and it is an indispensable tool for designers. The use of CAD grew from the idea that new textiles could be created by scanning existing designs and making the modification. Computer-aided designing increases the productivity of the designer as well as improves the quality of design. It also serves as a database of manufacturing and creates designs at a faster rate with extra accuracy.

2.3.3.1 Advantages of CAD:

i. Pen of different types of sizes is available to the artist.

ii. The CAD offers a different range of colors, in millions of shades.

iii. It provides the designer with a variety of images and fabric designs that will take days to draw manually.

iv. The garment designs can be stored in computer memory and then these designs can be used further for other applications.

v. The output of 2D or 3D design can be viewed at any 360 degrees of angle.

vi. With the help of CAD software, designers can visualize and represent their designs as a graphical model in a computer in a fraction of time.

vii. Designers can make quick corrections in their designs because of the software's flexibility and also test out varieties of designs of fabrics.

So, the adaptation of CAD software in fashion sectors brought massive advancements for designers to imagine and draw their new styles.

2.3.4 Coral Draw:

The CorelDraw is a graphics designing software. It is mainly used for creating business and invitations, cards, logos, and other kinds of vector designs. With the help of coral draw, we can create a design from simple lines or shapes into a complex type of design with various special effects. The artwork is created with the help of mathematical equations instead of pixels and gives output in the form of a vectored file.

2.3.4.1 Advantages of Coral Draw:

i. Save time and labor and give output with greater accuracy.

ii. Designers can apply various color combinations in one design.

iii. Quality of design (final design) or image not affected after zoom in or zoom out this main advantage of Corel draw is used to create big banners and holdings.

iv. Provide features like customization and reliability.

v. It allows creating multiple logos and designs in a single page layout.

vi.   CorelDraw QR code generator makes a QR code for your website and it helps seekers.

2.4   Benefit of Software's Applications in Fashion Industry

i.   The room for error in the Digital Designing process is lesser and it saves a lot of time. Let me explain that in detail, consider you are working on a design in a manual process and realize that the colors you have used do not bode well. You would have to re-sketch the whole thing since you cannot erase the colors. Now, consider you were doing the same thing on a software application instead, you can just change the colors to whatever you want with just a few clicks. Software application to the rescue.

ii.   It's a lot easier to customize your designs & sketches when you are working on a digital designing process. You can create multiple variations of a similar design with ease and save so much time compared to that of a manual design process. The room for experimentation in a digital designing process is huge and there is no argument about it at all. You have got a weird idea you want to try out on a design of yours? Sure, go ahead, implement that weird idea. If it works out, great; if it does not, just undo it. It's as simple as that. I sometimes wish life were as simple as undoing things.

iii. The next thing I want to talk about is the choice of colors. I know this is very basic but bear with me. I have a point here. When you are sketching or painting something on paper, how many color options do you have at your disposal? More than 1000 maybe? Factor in the effort you have to go through to mix the primary colors to get the color of your choice. On the other hand, software applications have millions of colors at your disposal. You don't have to even mix different colors, they are just there for you to choose. It just widens the horizon on a different level.

iv. You can adapt the same design you are working on to various materials and patterns and see what works and what's not working. Altering your designs is quick, easier, and more accurate.

v. With 3D modeling, you can actually (Well, not exactly) but at least get an understanding of how your design would look once ready. Based on that you can alter your design, and this removes any room for error as I mentioned earlier.

CHAPTER THREE

SYSTEM STUDY / ANALYSIS

3.1 How Pattern Drafting is manually carried out

Pattern drafting in the existing system is done in a manual way. Fashion designers are saddled with the tasks of taking body measurements, buying of papers to marking of the various points on the paper which is then drawn out on the paper.

The following steps are followed:

Step 1: Body measurements are taken using tape rule and then recorded on a record book.

Step 2: These measurement are then marked on a pattern paper.

Step 3: After which, we connect the various points together on the paper and apply curves to the necessary curve areas like the arm holes, neck line etc.

Step 4: We then proceed to cutting out the drafted shape on the paper.

Step 5: Finally, the pattern on the paper is placed on the fabric to cut out the fabrics to get the exact shape on the paper.

3.2 Analysis of the Existing System

Analysis involved a detailed study of the current system, leading to specification of a new system. Analysis specifies what the system should do. Analysis is

conducted for the purpose of studying a system or its parts in order to identify its objectives. It's a problem solving technique that improves the system.

The existing system of pattern drafting is carried out with paper, measurement tapes, and drafting tools.

Fig 3.1 Measurement Tape

Fig 3.2 French Curves

Fig 3.3 Pattern Paper

3.2.1 Flowchart

```
                    ┌──────────────┐
                    │    Start     │
                    └──────┬───────┘
                           │
                           ▼
   ╱──────────────────────────────────────────────────╲
        Body measurements are taken using tape rule
   ╲──────────────────────────────────────────────────╱
                           │
                           ▼
                  ┌─────────────────┐
                  │ Store in a       │
                  │ record Book.     │
                  └────────┬─────────┘
                           │
                           ▼
                  ┌─────────────────┐
                  │ These measurement│
                  │ are then marked  │
                  │ on a pattern paper│
                  └────────┬─────────┘
                           │
                           ▼
                ┌───────────────────────┐
                │ After which, we connect│
                │ the various points     │
                │ together on the paper  │
                └───────────┬────────────┘
                            │
                            ▼
                      ╱───────────╲
           ┌─────────   Is there   ─────────┐
           │          ╲  curves?  ╱          
           │            ╲───────╱           
           │                │ YES            
        NO │                ▼                
           │      ┌────────────────────────┐ 
           │      │ Apply curves to the     │
           │      │ necessary curve areas   │
           │      │ like the arm holes,     │
           │      │ neck line etc.          │
           │      └───────────┬────────────┘
           │                  │
           │                  ▼
           │      ┌────────────────────────────────┐
           └─────▶│ Cutting out the drafted shape  │
                  │ on the paper.                   │
                  └───────────┬────────────────────┘
                              │
                              ▼
   ╱──────────────────────────────────────────────────╲
      Pattern on the paper is placed on the fabric
      to cut out the fabrics to get the exact shape
   ╲──────────────────────────────────────────────────╱
                           │
                           ▼
                    ┌──────────────┐
                    │     End      │
                    └──────────────┘
```
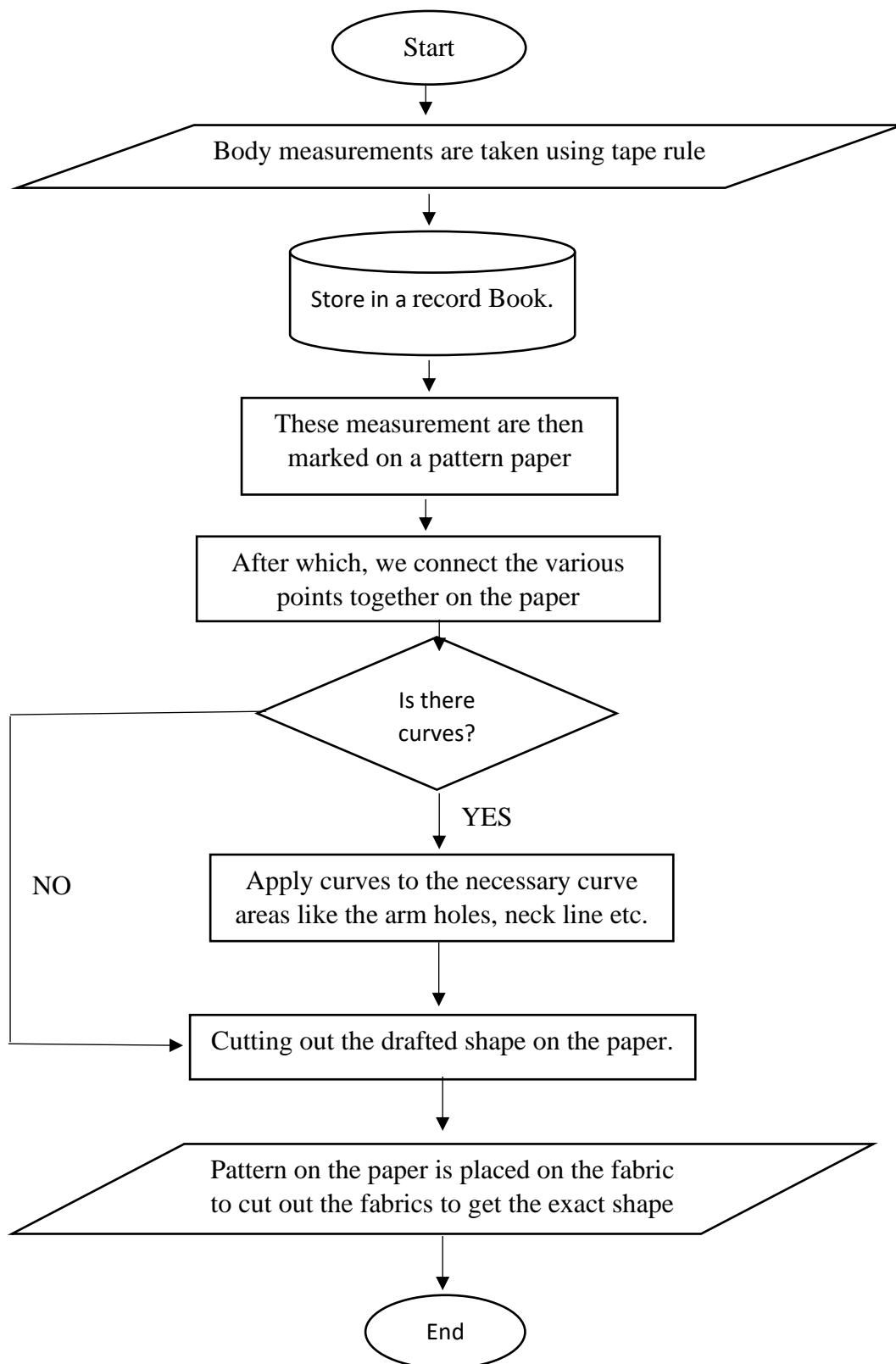
Fig 3.2 Flowchart of the current system

3.3 Weakness of the Existing System

Though the existing system been used is organized in well-defined manual method, lots of drawbacks are still involved. Below are some of the weakness:

a. It is time consuming process as it takes lots of time to draft several patterns.

b. Cost of papers: With the rate of increase in the production of papers, the manual method of using paper places a lot of cost on the organization as compared to using computer

c. Manual method of pattern drafting are usually not 100% accurate

d. Difficulty in adjustment's

e. The paper pattern can be rarely used more than once unless copied on a thick sheet.

f. Unless the techniques and principles of drafting is known it is difficult for the persons to prepare paper patterns.

3.4 Justification of the New System

The processes of manual pattern drafting can result to problem which may in turn affect the production of perfect fit garments in the fashion industry.

Due to the inability to easily adjust patterns in manual pattern drafting, a single error might affect the entire design and lead to starting afresh which might not be cost effective overtime because of the high cost of papers.

Based on these observations, the need for the use of computer software's for pattern drafting become necessary. Computer based system for pattern drafting will enable designers to draft patterns faster, accurately, easy adjustment s and also reduce the cost of papers.

3.5 Analysis of the New System

Because of the problem inherent in the current system; the need for a computerized system becomes imperatives. The New System provides solutions to time consumed in drafting several patterns (same) through the use of CLO Software which can be easily used to input several customers' measurement and generate a pattern.

The customers (shoulder width, chest/burst circumference, waist circumference, top length etc.) are inputted into the measurement chart.

These inputs entered are a major requirement before each parts of the pattern can be successfully generated by the software.

3.6 Benefits of the New System

- 3D virtual prototyping: Which allows designers and pattern makers to make more accurate designs in less time.

- Visualization of garments in 3D which is an innovative tool that brings more creativity and sustainability to the apparel industry.

- Ability to share, optimize and monitor each design and its adjustments with the entire production chain, maintaining a transparent and efficient development in terms of communication and time.

3.7 How Pattern Drafting is done on the New System

The new system provides an interactive and easy to use environment which enables designers to easily draft out pattern by eliminating the usual manual process involved.

In the new system, a designer has to take the client measurement using the measurement tape, after which you select an avatar (image representing the

customer). The designer can explore further by selecting the texture type of material he/she will be using for the client.

After which the measurement gotten will be used to draw lines round the avatar. These lines are thereby converted to shapes which in turns becomes patterns. This patterns will be placed on the 3D windows to have a feel on how it will look on the customers. If the design is okay then you export the design for printing. The printed design can then be used to cut the materials to be sew

CHAPTER FOUR

SYSTEM DESIGN AND IMPLEMENTATION

4.1 System Flowchart

```
                    ┌─────────────┐
                   (    Start      )
                    └──────┬──────┘
                           │
                  ┌────────▼────────┐
                  │ Select a pattern │
                  └────────┬────────┘
                           │
              ┌────────────▼────────────┐
              │ Choose your desired Avatar │
              └────────────┬────────────┘
                           │
         Input the client measurement details while        ◄──────┐
         drawing the pattern lines on the avatar                   │
                           │                                       │
              ┌────────────▼────────────┐                          │
              │ Align the edges and apply curves with curves │     │
              │ tools at where necessary                     │     │
              └────────────┬────────────┘                 NO       │
                           │                                       │
              ┌────────────▼────────────┐                          │
              │ Apply final touches to edges necessary and │       │
              │ preview the pattern on the 3D panel         │      │
              └────────────┬────────────┘                          │
                           │                                       │
                      ◄ Is pattern ►──────────────────────────────┘
                        design okay?
                           │ YES
              Print out the pattern drafted
                           │
              ┌────────────▼────────────┐
              │ Layout the printed pattern on the client │
              │ cloths and cut out accordingly           │
              └────────────┬────────────┘
                           │
                    ┌──────▼──────┐
                   (    End        )
                    └─────────────┘
```
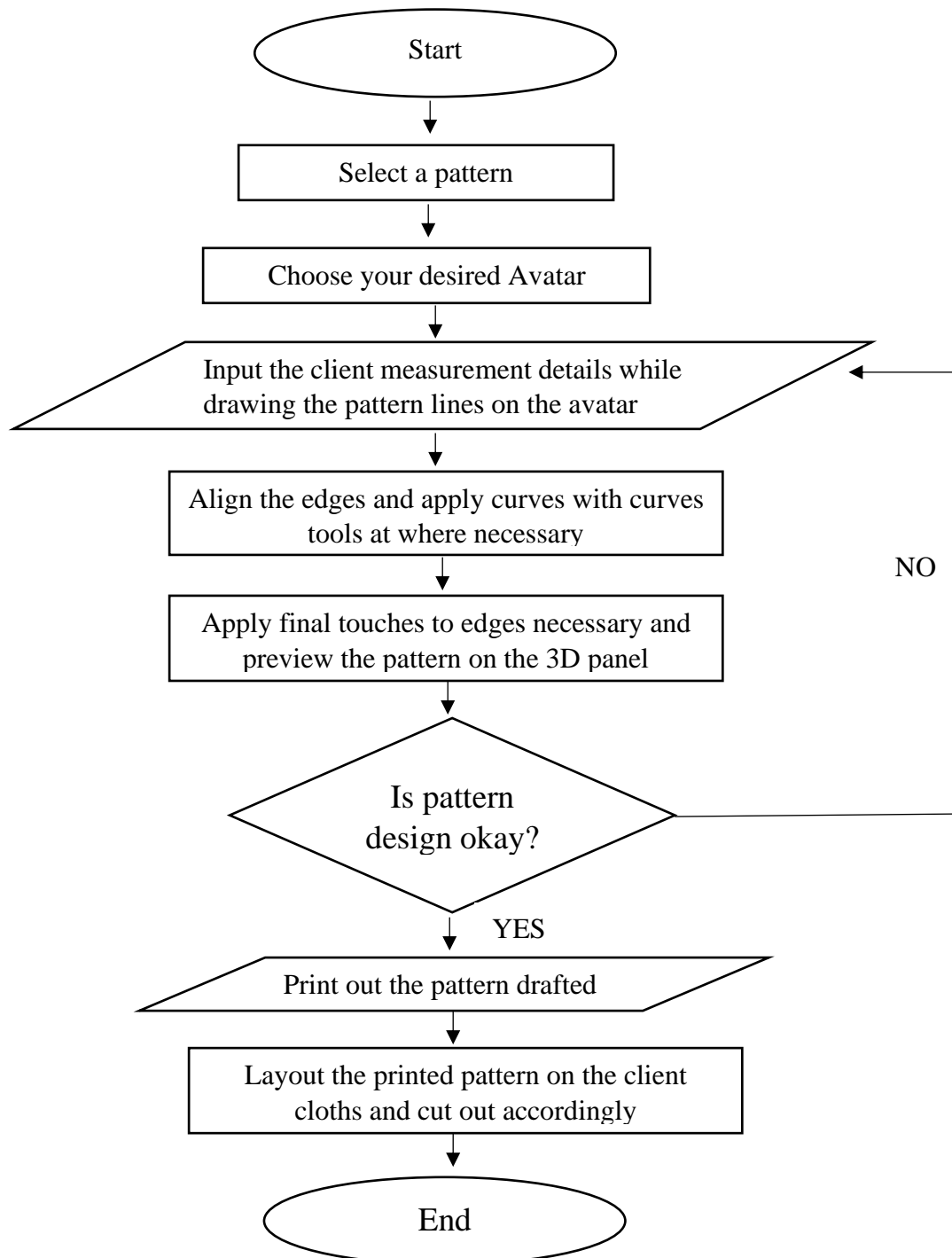
Fig 4.1

4.2 PROGRAM MODULES

The CLO3D software contain the following modules:

4.2.1 Login Page

This provides an interface that restrict and unauthorized user from accessing the application, its objective is to validate and authenticate a user before granting access to him/her based on his/her access level so as to access different aspect of the application, depending on their privileges defined by the application.
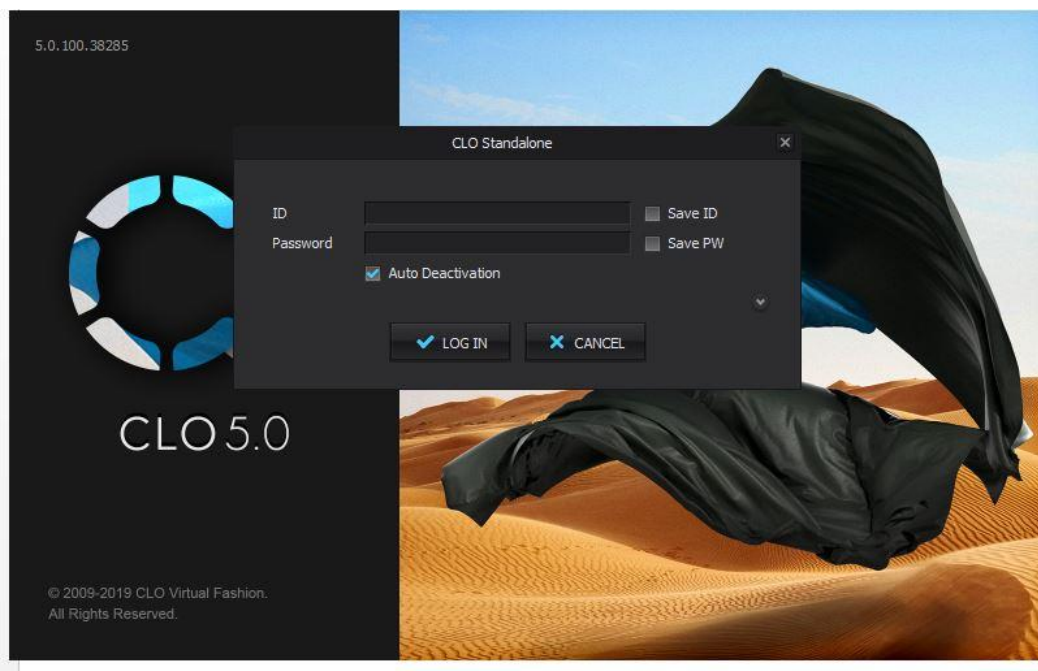

Fig 4.2

4.2.2 Work Tools Bar

This contains all the tools a designer can use i.e.
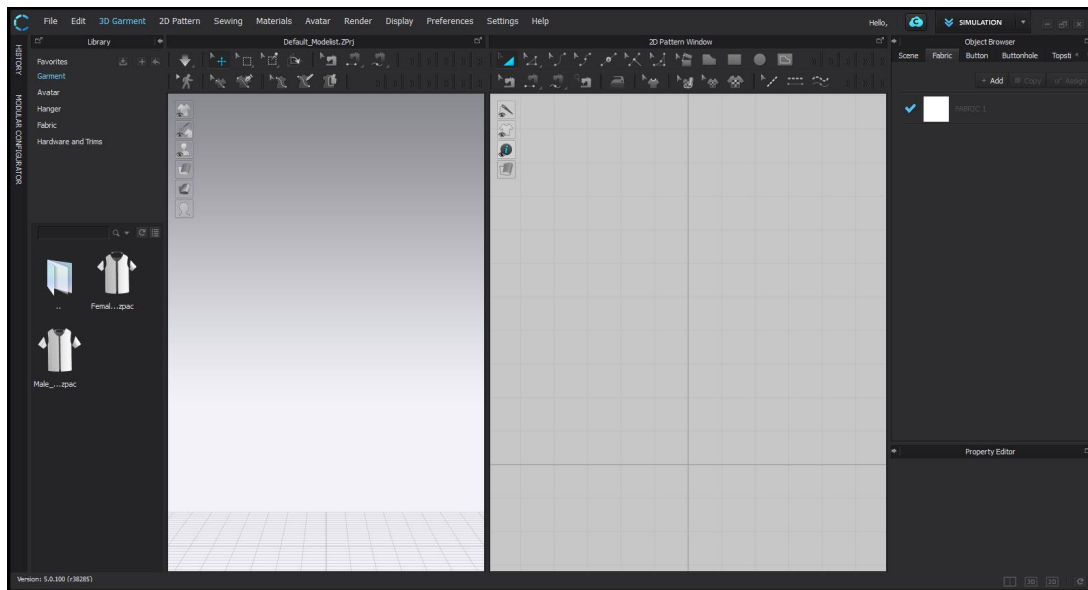
Fig 4.3

4.2.3 3D page

This page provides all the 3D functionalities a designer cam perform such as mounting the pattern drafted on the avatar, animation and exporting to images formats such as jpeg, pdf etc
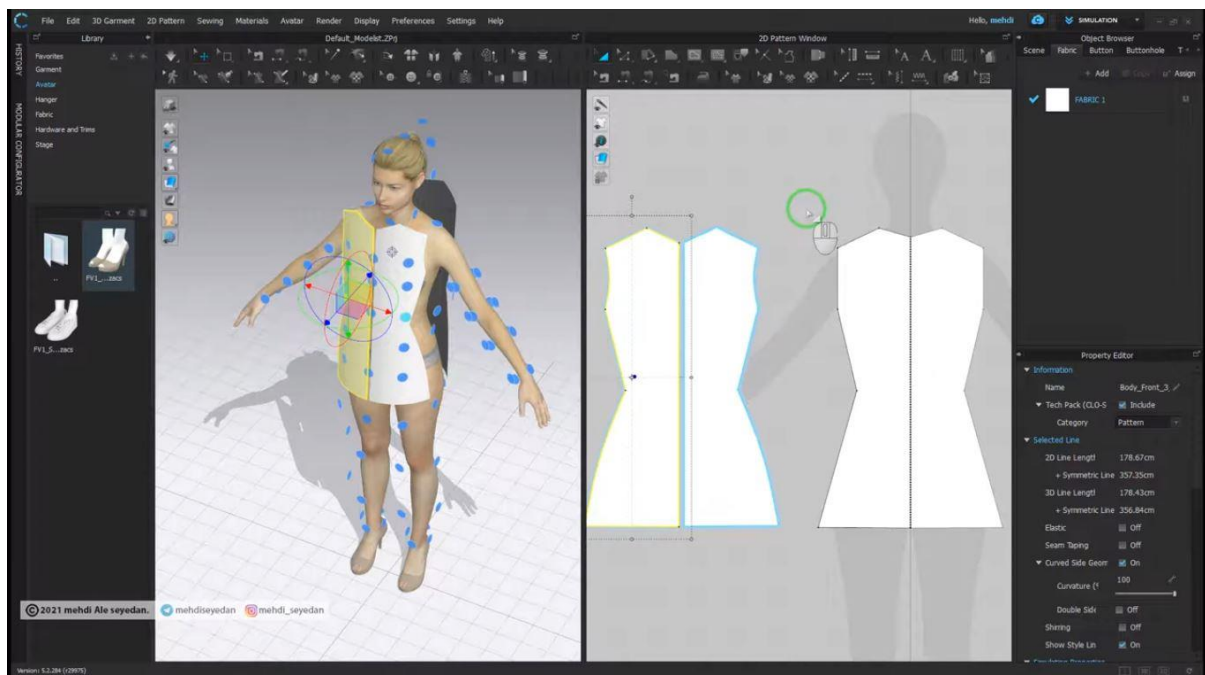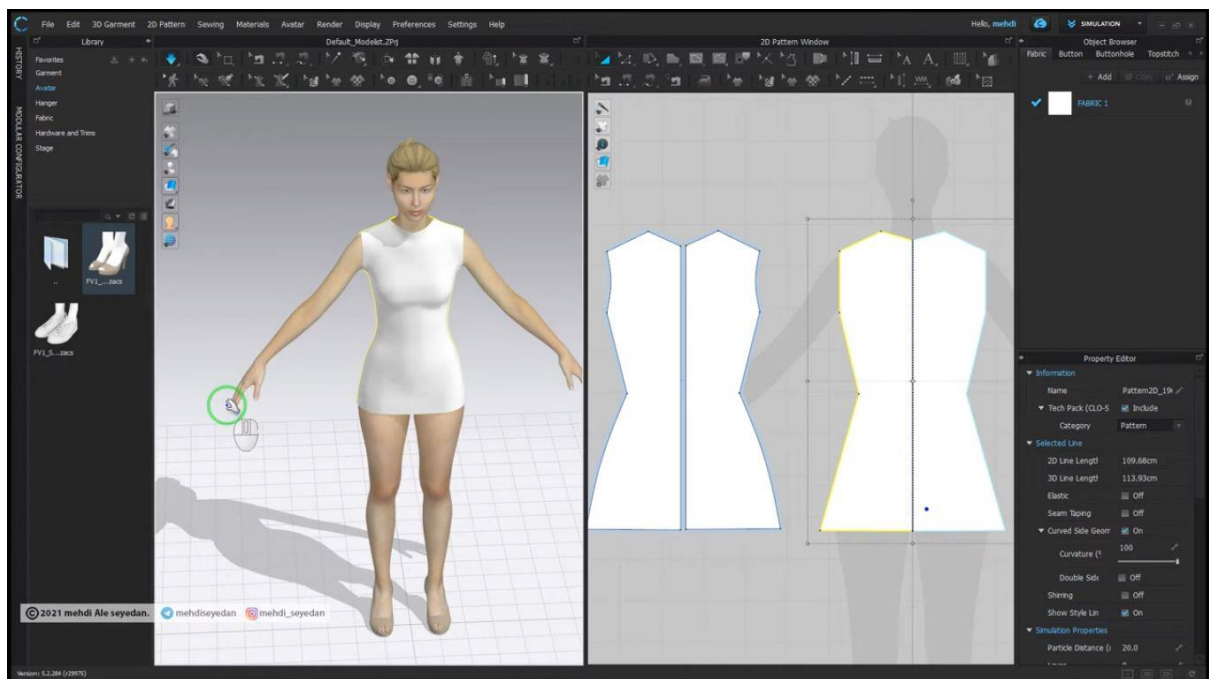

Fig 4.4

Fig 4.5

Fig 4.6

4.3 System Requirements

A computer which should have a minimum of:

- Pentium III Processor or Higher
- SVGA colored monitor
- 4.0GB of RAM
- 250GB hard disk size

4.4 System Documentation

In designing a new system, the documentation stage is the first approach to embark upon. It is very complex and large in creating a new system. This stage commences with design of the new system, purchase of the hardware and software packages. The system is in its completion when it is thoroughly tested and ready for implementation. The system documentation also specifies the changing over methods that will be needed to migrate from the existing system to the new system.

4.4.1 Installation Procedure

- Download and purchase Clo3D Software
- Insert the installation disk in your computer
- Double click on the installation file (Setup.exe) to begin the installation
- After successful installation, kindly open the Application from your application list
- Enter serial number and click on activate.

4.5 SYSTEM EVALUATION

After a thorough testing of the software, the following conclusion was reached:

The system will greatly reduce the manner of time taken to draft patterns for customers wears and also reduce the cost of pattern drafting papers by over 90%.

CHAPTER FIVE

5.0 SUMMARY, CONCLUSION AND RECOMMENDATION

5.1 SUMMARY

This project is focused on the design of pattern drafting using 3D Software (CLO3D). CLO is a market-leading 3D design software that allows apparel designers and brands to easily and accurately construct creative garment designs digitally. CLO 3D Fashion is a fashion designing solution created for textile and apparel industries. The software allows users to design clothes, shoes, and various other types of garments. It provides high-quality sketching functions that facilitate fashion designers to create the desired fabric effect. This fashion designing software provides a vast library of textures for designers to select from and use it in their designs. For example, designers can get a leathery or suede visual effect to design shoes of those materials.

CLO 3D Fashion allows designers not only to create new composition with textured effects, but also enables them to handle intricate details for making cloth cuttings, sewing, tacking, etc. for tailoring as well. The fashion designing software allows users to handle comprehensive segment sewing plans for proper utilization of the material. It allows designers to locate what kind of sewing technique has to be used at which point in apparel designing.

Pattern drafting is usually carried out using paper sheets and other pattern drafting tools, this approach has been in use for a long time. It becomes difficult for the

designer to easily draft patterns for multiple garments as each garments has to been done from scratch. For any growing fashion designer, pattern drafting could be tedious, time consuming and more prone to errors.

5.2 CONCLUSION

To cope with rapid fashion changes and also to reduce the costs, there is pressure from the retail sector to shorten product-development as much as possible and also to minimise the investment in physical prototyping. Virtual prototyping is offered as a solution to this problem. Draping the 2D patterns onto a virtual human model to visualise the 3D appearance of the clothing, coupled with a realistic simulation of the material behaviour, provides the opportunity to check fit and pattern flaws so that the initial 2D pattern pieces might be refined. It is claimed by the software suppliers that such an approach will reduce the dependency on physical prototyping, and will shorten the product-development lead time and the associated costs when communicated over the internet platform.

Flat pattern making is the quickest and most effective process designed to create patterns of design that monitor the size consistency and fit of mass-produced garments. Flat pattern making is unusual among other methods in relying on copies of patterns (working patterns) previously produced for manipulation using slash, or pivotal methods. Flat pattern making is based on three major pattern making principles and techniques: dart manipulation (relocating darts), added fullness (adding more fabric in the design), and contouring (fitting to the hollows

of a model's figure). Designs are usually created without understanding that certain principles are the basis for the creation. Design analysis will play a vital role in ensuring the project begins and remains on track. This can often help to estimate the performance of a product before it even exists as an integral part of design activities. Analyze the designs and determine which principles to apply to the developing pattern to ensure that the replica of the design will emerge from the finished pattern shapes.

5.3 RECOMMENDATION

Considering the benefit of using 3D software such as CLO 3D, following recommendations has been made.

- Proper training and orientation has to be given to designers as a lot of fashion designers do not have the knowledge about computer. Proper training should be given to fashion designers on the need and advantage of the current system and how it will equally assist them.

- The new system would be useful considering the large amount of finance that usually goes for purchasing of papers and the stress involved in drafting each patterns. The labour and stress involved in reproducing same pattern will be reduced.

- Provision of information technology infrastructure to fashion designers by federal government and adequate funds should be provided to create ICT awareness among designers.

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APPENDIX I (PROGRAM SCREENSHOOT)