# AUTOMATED TEXTURE MAPPING TECHNIQUES FOR ONLINE SHOPPING OF GARMENT PRODUCTS

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## Abstract

*In the world lot of shopping methods are available. From the existing shopping methods, online shopping method is generally well known. When an online customers purchase a piece of clothing item through online shopping method, they do not have any idea about the look and feel of that item. For this issue designers have discovered an answer that is Virtual Fit-On Room. There is different sort of Virtual Fit-On Rooms are accessible. Those existing solutions grew by distinctive thoughts by inventive mechanisms. This project is to actualize a Virtual 3D Fit-On Rooms utilizing automated texture mapping procedure. The human model will create as per the user's estimations. The innovative technique of the project is automating texture mapping. The texture mapping procedure has few sub process into that. For the texture mapping author has created algorithms. Prerequisites assembled via Questionnaire. This application produced for wear the dress to the human model that is like the user.*

**Key Words:** Automated texture mapping, Virtual 3D Fit-On Room, Online Shopping, algorithms, human model.

## Introduction

At the point when online users purchase piece of clothing items over the online, they do not have a clue about the look and feel of that item. For that, this research proposes an answer. On the off chance that users may have the facilityto fit on the piece of clothing items and online users can know the look and feel about the item.

Now-a-day innovation has enhanced a great deal hence; individuals shop over the web. Individuals like to shop online in light of the fact that they do not have sufficient time to shop. Individuals have confronted few issues while they buy garment items over the web.At the point when the user purchases clothing item over the web, the user is befuddled because the user does not think about the piece of clothing item's look and feel. For a sample, an individual purchased a shirt on the web. That individual will not fulfilled about the garment item because the purchaser could not fit-on the garment item on the web. This research recommended an answer - 3D Fit-On Room, for the talked about issue above. For this issue, there are a few applications and programming (*see 2.4& 2.5*). However, those solutions are not using the texture mapping technique. This research serves to propose a superior solution than the current solutions by using texture mapping technique.

From this research recommending another innovation to take care of this issue, which is programmed 2D to 3D texture mapping. Regularly a few tools have this method case: - Mesh. In the event that this technique automated, 3D designers can work even more effectively and fit on systems can get effective results. Generally, the 3D engineers use particular tools for texture mapping on 3D models. On the other hand, research has recommended the automating from 2D to 3D texture mapping for a model. Proposed solution will satisfy the user's Requirements.

The project has expect to provide a solution for online users who purchasing piece of clothing item through the web by providing facilityto fit on the particular clothing items over the web.

The researcher looks over the web for Virtual 3D Fit-On Room. Finally, in this research discovered some existing Virtual 3D Fit-On Room. Those Virtual 3D Fit-On Rooms are not giving the expected solution in this research. Some Fit-On Rooms giving 2D solution. Another group of Fit-On Rooms stacks excessively. Diverse issues are in distinctive Virtual 3D Fit-On Room. Agreeing the issues researcher has tired about online shopping and squandering time with this internet shopping. From that minute researcher get a thought for make successful Virtual 3D Fit-On Room in light of the fact that numerous individuals endure with this internet shopping and Virtual 3D Fit-On Room. These issues inspired the researcher to embrace this project extends even more successfully.

**Online shopping**
Online Shopping is one of the important Method for shopping. Online shopping has many advantages than traditional shopping. Many people would like to shop over the web because of their time management and avoid unwanted problems[18].

**Evaluation of problem area**
Online shopping has become rapidly. Users Spent their cash and time to buy the article of clothing items. The fashion designers additionally giving new and inventive outlines to piece of clothing items so individuals like to buy those most recent article of clothing items. In the site, individuals can simply check the pictures yet in the event that they need to purchase the item, users need to go and purchase to the shops. Those garments can have diverse sizes moreover. On the off chance that individuals buy the item, individuals need to hold up in the long line to pay the cash and individuals' time waste. Solution for this issue is virtual 3D Fit-On Room.

This Research concentrates on internet looking for piece of clothing items. Individuals do not like to go and shop along these lines they are occupied. Beneath table looks at internet shopping and conventional looking for more Justification.

**Table 1: Comparison between online shopping and traditional shopping [9]**

| Online Shopping | Traditional Shopping |
|---|---|
| Convenience | Suffering with traffics, holding up in long lines |
| Ready to shop in diverse stores with a click of a mouse | Customers need to go to the store. |
| Relaxing | Customers will get drained |
| Ready to check overall items from one place | Have to fly out to check |

From this research, point of interest online shopping is superior to traditional shopping. User could not feel the look and feel of the garments.Few existing solutions are accessible for this issue. Further, looks what sort of solutions they have.

- Investigating the current solutions, prior engineers have few answers for this issue. The primary solution is making a model and fit on the Garment item on that Model.

- At the point when the user opens the product, user can turn on their cam. At that point, they can see the cam window close to the item list. When user chose the clothing item, that piece of clothing item will attempt to fit-on the cam picture.

- An alternate solution is transferring the user's portrait. At that point, fit on the piece of clothing item on the user's transferred picture and demonstrates the outcomes to the user.

This research discovered different sorts of systems and systems that utilized as a part of the current Virtual Fit-On Rooms however it can't discover texture mapping methodology. Typically, online storeowners might want to build their business.

Texture mapping is 2D object is changing over to 3D object. At the point when consider other existing Fit-On Rooms those rooms are not encountering the user's Requirements. At the point when consider about this texture mapping method it is an enormous system. 3D modeling apparatuses have this procedure however all tools have manual methodology for texture mapping thus in this project computerize the texture mapping strategy and utilize this system as a part of the Virtual Fit-On Room[11].

**Texture mapping**
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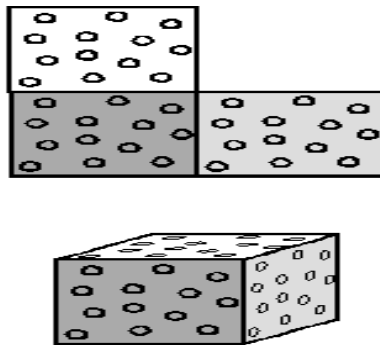


Mapping a 2-D surface onto a 3-D rendition
alters the sizes and shapes of the image elements

**Figure 1. Texture Mappin**

**Evaluation of existing solutions**
3D will give preferable solution over 2D. Designers have utilized diverse sort of systems for this 3D Fit-On Room. Existing systems did not utilized texture mapping strategy. New approach is automated the texture mapping and guide to the model.

239

This is another system for this solution. Presently few methodologies are accessible for this examined issue.

**Table 2: Pros and Cons of Existing system**

| Systems | Process | Pros | Cons |
|---|---|---|---|
| • **Image Based Fit-On Rooms** | In this solution User, need to transfer the user's 2D picture to the system. The system will fit on the chose article of clothing item on user's transferred picture. | Minimal effort | 2D results won't fulfill the users |
| | | Get the outcomes quick | Uploading picture must be particular measurements. Hard to fit on the uploaded picture |
| • **Cam Based Fit-On Rooms** | The system takes include through the webcam and fit on the chose article of clothing item. Particularly kinect cam innovation has utilized as of late. | Get the great look and feel of the piece of clothing product | High cost(Kinect cam and fitting presentation) |
| | | | Low flawlessness |
| • **Model Based Fit-On Rooms** | This Fit-On Room methodology is a most recent solution. Produces the human model for fit the garments on that model. | Get fulfillment of the article of clothing product | High standard hardware |
| | | Quick access | Fast Internet |

Examples:iStyle[16], MyVirtualModel[13], Model My Outfit [17] etc.

**Existing algorithms and pproaches**
**Algorithm for 3D model shape**
There are a few algorithms accessible that is significant to this research. Firstly, this research conveys outs algorithms for changing 3D Model's shapes as per measurements. On the off chance that the user gives their measurements 3D model will change the state of the model. This algorithm can change boundary and geodesic measurements. Non-Linear improvement fit the measurements in two courses for this methodology. This algorithm produces anthropometric measurements in issues. It is upgrades the state of the model thusly, it will give sensible shape [14].
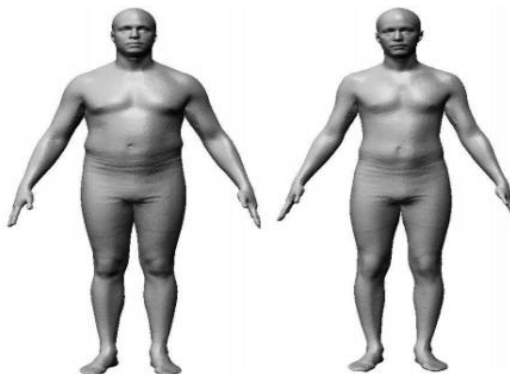
**Figure 2. 3D model changes the shape according to the measurements [14]**

**Branch Cut Method for Phase Unwrapping**
Wrapped amount cannot favor cluster of extension slices without giving important backing to the essential exercises. To achieve the minimization, this strategy fabricates cluster of adjusted limb cuts. This Algorithm finds unvisited deposits and constructs another gathering of extension cuts until the entire picture went by Pros: - Very quick and it needs little space for memory[10].

**Network flow method for unwrapping**
To assemble a system, deposits clarified as hub in the system. Curves used to join the hubs. At last, this technique assesses entirety of unwrapped part.
Pros: - ward cost every unit stream.
Cons: - constrained utilization of strategy, multifaceted nature [10]

**Development methodologies**
Usually Development methodologies use for plan the strategies and reduce the complexity of the project. One of the existing development methodologies may suit for the project, here researcher chosen the incremental model. Following Pros and Cons of incremental Model referenced from [15].

- Quick delivery

- Several changes can be happen in single step.

- Easy to find errors

- Low work load

This methodologies research carried out pros and cons of the methodologies. Users will not take part in some phases or stage of the project. Users can take part with requirement gathering phase after those users do not take part in other phases. Incremental method will be able to do few changes in a single step. Other than, the reference users can come with various requirements at any time and there can be errors any time in that case if use incremental method easy to find bugs or add new requirements or do changes in a single phase. According these reasons this incremental method will be an appropriate for this system.

**Design**
Firstly, System demonstrates a virtual 3D model. As per the user's estimations, the model changes the sizes. After the model is been redone, the model looks like comparative as user.

Besides, select the item pictures from the accessible dresses from that shop. Thirdly, the System mapping those chose piece of clothing items in the 3D model utilizing texture mapping. This programmed texture mapping part has been the testing part in this project Main class has simpleInitApp, wrap, and unwrap, texturing methods. In main class whole texturing process is happens and all objects are called in the main class.

MyHand class is creating a hand. This class has MyHand, CreateHand, read, write methods. Finally, this MyHand object called to the main class. MainMenuLayout class is an xml file. This xml file has the control of the GUI.
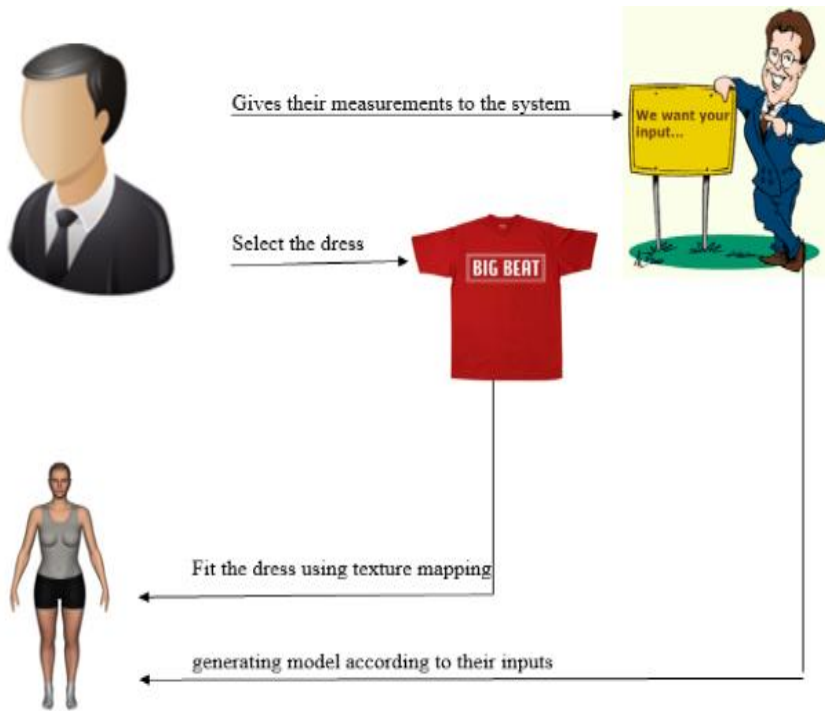


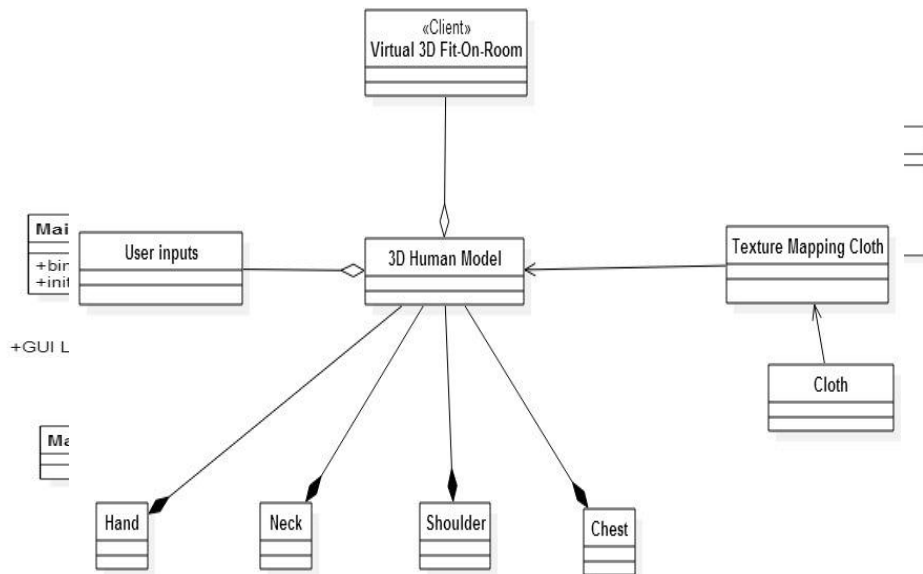**Figure 3. Process Diagram**
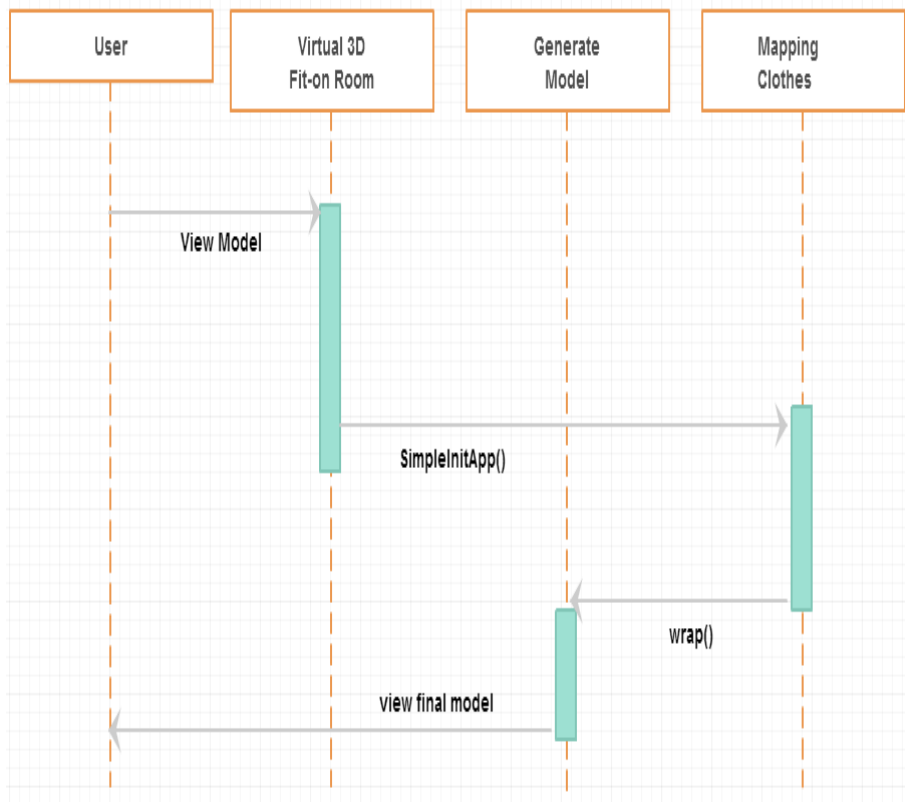**Figure 4. Domain model**

**Figure 5. Class Diagram**



**Figure 6: Sequence Diagram**

### Implementation
### Tools and SDK

Blender is a 3D tool. This blender is suitable for creating human model. JmonkeyEngine SDK has used for this project implementation. Blender format supports to this JmonkeyEngine SDK.

jmonkeyEngine SDK bolsters for java. Existing systems implemented by different languages in this way the researcher implemented this virtual 3D Fit-On Room utilizing java. This project is a web-based application so java will give security facilities to get to web-based applications. Java can run any platforms and quick. This programming language gives productivity results.

Hardware Requirements -Laptop or Pc:
o   Dual Core or Above
o   Ram 4Gb or Above
o   Windows 7 or Above

243

**Algorithms for application**

The developer implemented the core part and innovative part of the project. Let us assume texture mapping for model's hand.

Texture mapping part can divide into 4 sub parts.

- loading model

- unwrap the model

- texture the dress in the model

- wrap the model

**Loading Model**

Firstly loaded the model successfully. Original blend file converted to j3o format [figure: 7].Developer is going to texture map for the hand so it will be a cylinder shape. From this process, assume cylinder will be a hand [figure: 8].

**Unwrap Model**

Object is one of the in-built class of JmonkeyEngine SDK so create an initialize object variable and check with the cylinder object. This unwrap method has called in main method after call the object of MyHand class.

This method has written in MyHand class. This method is creating a square. After call unwrap method this method will run on the main method[figure: 9].

**Texture the dress in the model**

Then texturing the 2D image on the model[figure: 10].

**Wrap the model**

Object is one of the in-built class of JmonkeyEngine SDK so create an initialize object variable and check with the cylinder object. After check the condition this method calls CreateHand method. Wrapping process the square, have to change as a cylinder. A chunk of algorithm is used for wrap the square as a cylinder[figure: 11].
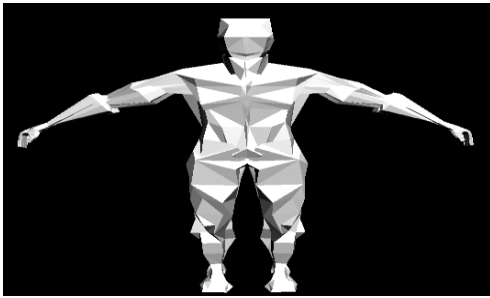
**Figure 7: Human Model**
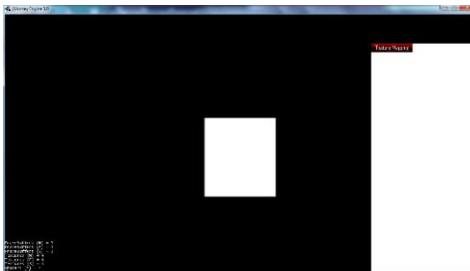


**Figure 8: Hand of the Model**
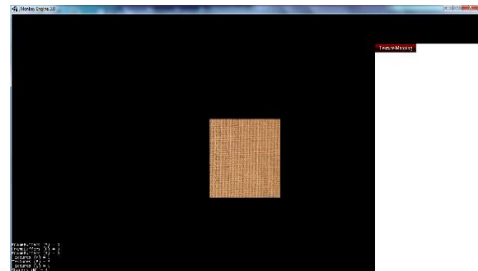


**Figure 9: Unwrapped Model**



**Figure 10: Textured Model**



**Figure 11: Wrapped Model**

## Discussion

In this research firstly conducted literature review, this is base of the project. Literature review clarifies about the existing tools, existing systems, and existing algorithms. This project area is enormous so the research tries to get information from this area. Literature review is giving the unmistakable thought of the project.

The principle reason for this project is online buyers could not get the vibe that chose cloth feel and look before purchasing. This project settled that issue utilizing texture mapping the 2D image on the 3D model and user can rotate that model. The texture mapping technique is regularly utilizes as a part of 3D tools manually. For this project, the research automated the technique.

The center piece of the project was done effectively.Further, the author could not finish the entire project because of the time requirement. The author does not have the time to change the 3D model like the user. Author jumped at the chance to include additional highlight also, which is lighting for texture those sorts of things. In future, it can be developing.

## Conclusion and Future Work

This research discovered different sorts of systems and systems that utilized as a part of the current Virtual Fit-On Rooms however it can't discover texture mapping methodology. Typically, online storeowners might want to build their business. On the off chance that the manager gets the Virtual Fit-On Room, which is, do the user's Requirements well then the holder can expand their business also.

The innovative idea of this project is automating texture mapping for that the research should get the opportunity to think about the texture mapping technique and it can be used to satisfy the online user's requirement.

This project can enhance to footwear, jewels and other apparel things, Generate human model comparative as the user, Create Plug-in or system for automated texture mapping and virtual fitting room.Browse the most loved dress and fit on in the model. Automate texture mapping deeper. Need to control texture mapping

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