

Klug Reflector using AIML & DL for the Fashion Industry

Dr.S.S.Gurav¹, Pratiksha Shelar², Vidya Mengane³ and Neha Mane⁴

¹Prof, Sharad Institute of Technology College Of Engineering /Department of E&TC/ Yadrav/ India
Email: sachingurav@sitcoe.org.in

²⁻⁴Sharad Institute Of Technology College Of Engineering/ Department of E&TC/ Yadrav/ India
Email: {pratikshashelar051, menganevidya, maneneha20101}@gmail.com

Abstract— The "KLUG Reflector" is a groundbreaking fusion of Artificial Intelligence (AIML) and Deep Learning (DL) poised to revolutionize the fashion industry. Developed by Dr. S.S. Gurav and team, this innovative system introduces the concept of "smart clothing" by seamlessly integrating AIML & DL technologies. Operating as a Klug reflector, it prioritizes time efficiency, fabric quality, and hygiene, especially pertinent in the context of the ongoing COVID-19 pandemic. Addressing the challenges of traditional and online clothing trials, the proposed system introduces a Virtual Trial Room, allowing users to experience clothing virtually through real-time interactions with a virtual mirror. Leveraging Machine Learning (ML) and Deep Learning (DL), the system incorporates features like face detection, virtual mouse control, and real-time processing, offering customers an immersive and personalized shopping experience. The paper discusses the architecture, modules, and requirements of the system, showcasing its potential to enhance the market dynamics of the fashion industry. The proposed KLUG Reflector stands as a testament to the marriage of cutting-edge technology and fashion, redefining the future of clothing trials and consumer engagement.

Key Words—Virtual Trial Room, Face Detection, Virtual Mouse, Real time Using AIML & DL.

Index Terms— Introduction, Literature Survey, Methodology, Result, Conclusion, References.

I. INTRODUCTION

Trying cloths by traditional system it take so much time. And also we can not take all cloths by online shopping. As well as to improve the productivity of the offline shopping we found the solution like Klug Reflector using AIML & DL for the fashion Industry i.e virtual trial room. It will boost the market of fashion industry. Identify the face and body gesture is the first step of the system. There are several solution that can use to determine body detection and face estimation. Utilizing straightforward applications like Open CV, Python, and Visual Studio, the issues can be beautifully controlled. It is possible to create a virtual environment and virtual trial room using the user video stream. The user can interact with the virtual mirror and view a virtual version of oneself wearing any outfit they like.

Thanks to the Virtual Trial Room, customers can visualize how apparel will look on them before making a purchase, enjoy the convenience of mall shopping, and compare various patterns and sizes with ease. In the virtual trial area, customers can digitally try on things without actually touching them. This solution enables consumers to choose the optimal size, fit, and style of an item before purchasing it with the help of augmented reality, virtual

reality, Artificial intelligence, Machine learning and Deep learning technologies. According to Forbes Insights, companies can increase personalization possibilities by using virtual trial rooms, which directly affects sales and profits. Customers can visualize many customizing possibilities with AI to build products that reflect their personality and style by accessing a virtual trial tool.

II. LITERATURE SURVEY

[1] Md. Farhan hamid, et.al was describe the idea for physically impaired people who are either completely or partially disabled. A sensor tracks head movements to switch between clothes and eye movements to select clothing for people who are completely blind. The paper tends to prioritize the disabled above regular citizens, which results in a substantial change in functions and, as a result, a decline in population as compared to average citizens.

[2] Ari Kusumaningsih, et.al was research on virtual trial room concept. He recommended technology is used for online trials of Indonesian regional clothes known as Madura Batik. User feedback on the Madura Batik clothing virtual changing room. It provides a virtual reality "trial room" for international customers to vary their shopping experiences and encourage purchases. The fact that there are only garments for local use and nothing else in this case may be its worst drawback.

[3] Srinivasan K., et.al was developed a method. This method makes use of a fixed webcam to take photos of the user. This photograph is processed using MATLAB to compute each pixel and identify the user-selected outfit that best fits the subject. The drawback of this is that it was only ever used as an online shopping platform, with no additional offline applications. Also unavailable are the precise depth readings due to the absence of the Kinect sensor.

III. METHODOLOGY

A. Proposed System

A virtual trial room where a person can try the model they require with the precise measurements and color they desire together with the change in the background and environment they are entering will be one of the ideal solutions provided by the proposed system. They will spend less time traveling and changing because this requires no physical touch and offers a variety of customization possibilities that are often not available in the current system. Consumers can visit any store in the world and try the clothes on to see if they will fit or not, which helps them avoid restricting themselves to a single store or location. Using ML and DL we can filtering and makeup video stream. It look more beautiful.

B. Requirements

The specifications for any system are crucial since they help us determine the system's cost and manufacturing scale. Hardware and software requirements are two categories of requirements. The precise needs for this proposed project are listed below. Hardware requirements offer us an understanding of the interface and logical understanding, whilst software requirements give us an understanding of the code.

- Processor: CORE i5
- Hard disk: 20 GB
- RAM : 8GB / 16GB / 32GB
- Input Devices: Camera, Smart TV
- Operating System: Windows 10 or max
- Programming language: Python, HTML, CSS, JavaScript. Tools and frameworks: Open CV, VS code, media pipe,
- python 3.11, win32com.
- Back-end: flask

C. Architecture

This virtual trail room's architecture is made up of a user, web camera, web page, and output screen. The method begins with the user selecting to search the clothing using a virtual mouse and hand motion recognition while they are standing in front of the camera. Following the user's selection, the cloth camera will begin to record the user while using the media-pipe structure to identify essential features of the user's face and body. A real-time video capture of the cloth image can be created by using an Open CV system to remove the background. The customer experiences dressing or putting on garments virtually using an AIML & DL.

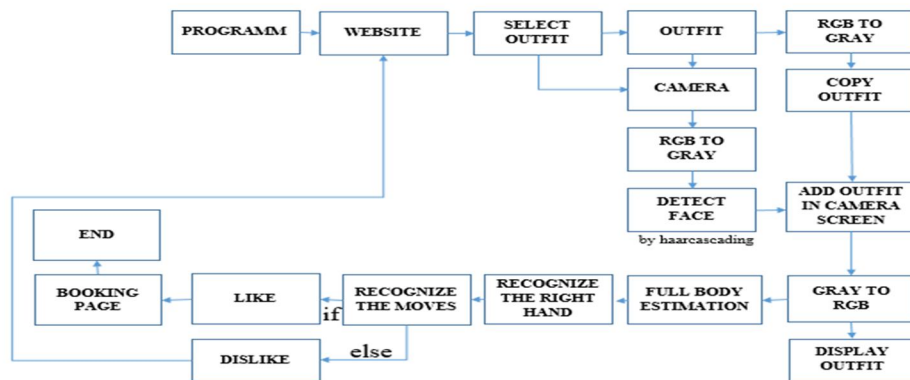


Fig. Block diagram of system

D. Modules Description

In terms of modules, we will be concentrating on the below-listed ones:

- *User*

One will be able to select the sort of clothing, color, and style they want through the user interface, add them to a cart, or mark them as a favorite. Users of artificial intelligence can only do this action without leaving their current location. By using media-pipe and hand motions, it will be possible. It is simple to shop for outfits with this variety.

- *Detection*

The body point detection that masks the video stream for a certain system is made possible by the detection module's use of a Media-pipe structure.

- *Searching*

In this system, we are work with image processing and deep learning to identify the object and to process on it. To handle a klug reflector system we use virtual mouse system. With the help of this system customer can easily handle the system and find cloths on to the website.

To make system powerful we use human hand estimation. By the help of hand gesture system can react to customer. It recognize human activity and show the dresses which they like.

We navigate websites without touching the screen by using a virtual mouse to search for clothes.

- *Masking*

This module assists in disguising the user's clothing using the body joints that the detection module has identified.

- *Filtering*

In this stage ML & DL make the stream more beautiful and it make the stream more perfect.

- *Output*

The output module offers the user's output following the masking of the video feed, which is a real-time masking.

- *Booking*

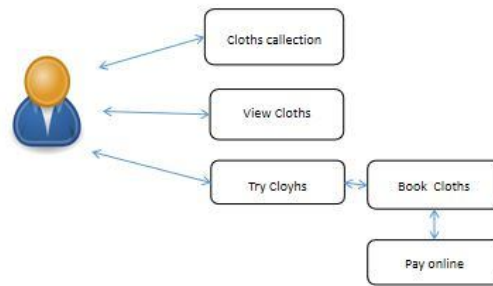
After choosing the clothes costumer can book a dress by standing in front of the screen. And pay cash by online way.

E. Use Case, Sequence, & Class Diagram

The detailed steps we take from image capture to output presentation are depicted in these diagrams.

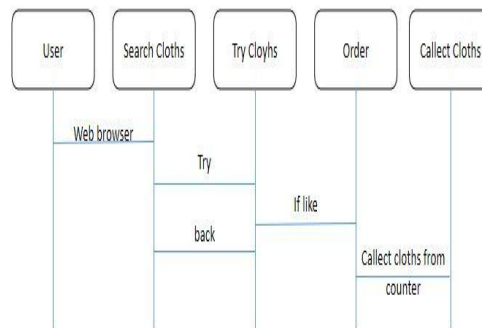
- *Use case Diagram*

The user can browse the garment library in this diagram, view various types of clothing, choose an outfit, and try it on. The first stage in this module is to take pictures of the body joints and disguise the user's clothing before sending them a real-time video that functions as a virtual trial room.



- **Sequence Diagram**

The sequence diagram user is shown in the following figure. Where the user can explore the clothing and, if they like it, try it on before getting the result in the form of virtual dressing. If not, they will look at other clothing options. Additionally, they will book it if they like it.



- **Trial of digital makeup**

Virtual fitting rooms for makeup products, such those for lipsticks, eye shadows, and even contact lenses, depend on models with accurate facial landmark recognition using ML & DL. Depending on the application situation, these models pinpoint multiple points that characterize the geometry of the mouth, nose, eyes, and face.

Face landmark recognition was previously dependent on conventional machine learning techniques like decision tree ensembles. However, a more accurate alternative called deep convolution networks has gradually replaced them or been combined with them over time.

Convolution networks employ training data face images to comprehend makeup, just like other machine learning techniques. Training models for makeup try-on applications need a sufficient amount of visual variation.

- **Activity Diagram**

It demonstrates the workflow from input capture to output generation. The process begins with browsing, viewing, attempting, and initializing the capture. If the distance has been fixed, the joints will be caught, and a snapshot will be produced if not.

IV. RESULT

- **Integral Image**

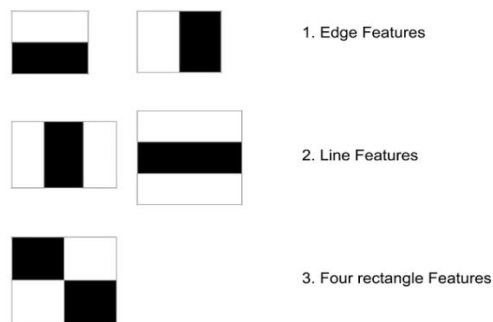
The difference between the sum of the pixels in two rectangular sections represents the values of a two-rectangular feature. The areas are horizontally and vertically contiguous and are the same size, shape, and configuration. In a center rectangle, a three-rectangular feature computes the sum. To compute the difference between diagonal pairs of rectangles, a four rectangular feature is used last. The image is convoluted through a variety of these regions of various sizes to produce a number of filters that will be used as inputs by the Ada Boost training algorithm. The typical technique would take a lengthy computing time to calculate these properties. The authors of the research proposed a novel method, the integral image, to shorten this time.

1	2	1	3	2
2	3	5	6	1
5	2	4	2	6
1	4	5	3	3
3	3	4	4	1

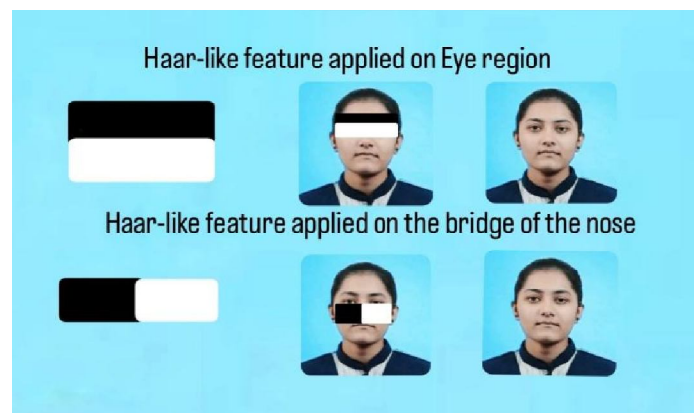
0	0	0	0	0	0
0	1	2	4	10	12
0	3	6	14	20	21
0	9	11	25	37	43
0	13	15	33	44	47
0	15	17	37	48	49

Fig. Integral image

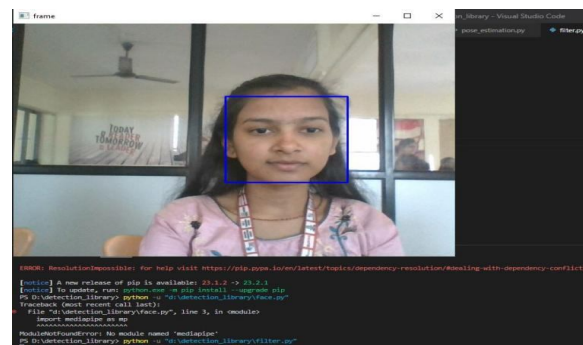
- *Haar like Features*



- *Haar-like feature*



- *User ditecton*



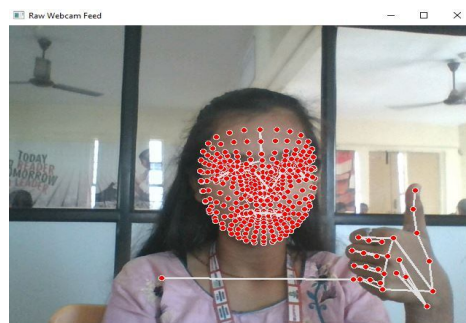
- *Face recognition*

```

OUTPUT    PROBLEMS    TERMINAL    DEBUG CONSOLE
<built-in function id> 565 360
<built-in function id> 515 360
<built-in function id> 576 370
<built-in function id> 587 397
<built-in function id> 499 389
<built-in function id> 518 384
<built-in function id> 531 384
<built-in function id> 548 380
<built-in function id> 559 375
<built-in function id> 567 370
<built-in function id> 588 357
<built-in function id> 503 404
<built-in function id> 507 359
<built-in function id> 609 403
<built-in function id> 573 383
<built-in function id> 473 376
<built-in function id> 573 365
<built-in function id> 571 399

```

- *Facial Landmarks Detection*



- *Output*



V. CONCLUSION

In this case, the virtual changing room application only needs a front image. The 2D graphics of each product appear to be generally adequate and useful for a variety of functions when superimposed on the user. The models are matched to the user using the presented technique, which is also used to test the process in various scenarios. For standard postures, the experiments' performance rates were adequate. In terms of the model that was used for fitting, there are numerous implementation options. In order to match several joints simultaneously, it is conceivable to use a homo graphic transformation on the images rather than the straightforward scale-rotate method, albeit it would involve more processing. Another option would be to produce more realistic video streams by combining numerous images taken from various perspectives. Similar results could be obtained by rendering 3D models in accordance with the current angle and positions. A physics engine might be used to support the model using the second method as well.

APPENDIX B: KLUG REFLECTOR USING AIML & DL FOR THE FASHION INDUSTRY

Authors:

Dr. S.S. Gurav, Prof. of Sharad Institute Of Technology College Of Engineering, Yadav

Pratiksha Shelar, Department of Electronics and Telecommunication Engineering

Vidya Mengane, Department of Electronics and Telecommunication Engineering

Neha Mane, Department of Electronics and Telecommunication Engineering

Contact:

Email: sachingurav@sitcoe.org.in

Email: pratikshashelar051@gmail.com

Email: menganevidya@gmail.com

Email: maneneha20101@gmail.com

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