IJIREEICE ISSN (O) 2321-2004, ISSN (P) 2321-5526

International Journal of Innovative Research in Electrical, Electronics, Instrumentation and Control Engineering

Impact Factor 8.021 ⁜ Peer-reviewed / Refereed journal ⁜ Vol. 11, Issue 10, October 2023

DOI: 10.17148/IJIREEICE.2023.111003

RESEARCH ON VIRTUAL DRESSING ROOM IMPLEMENTATION USING BODY IMAGE CLOTHMAPPING

Miss. Gauri R. Kondane[1], Dr. Nitin Mandaogade[2]

Masters in Technology, Electronics and Telecommunication, G.H. Raisoni University, Amravati, India[1]

Controller of Examination, G.H. Raisoni University, Amravati, India[2]

Abstract: Recent advancements in web technology have given rise to numerous online shopping websites. However, online shopping comes with certain disadvantages. One notable challenge is the difficulty in visualizing how a particular garment would appear when worn, given the diverse variations in body size, shape, hair, and skin color across the human population. Ensuring the fit of clothing is of paramount importance to both customers and retailers. Our approach centers around assessing how a chosen garment complements the user's body and replicating its real-world appearance. This is achieved by identifying critical points on the garment and the user's body dimensions through image processing techniques. In this paper, we present an application designed, implemented, and tested to enhance the virtual dressing room experience

Keywords: Virtual Dressing Room, Body Image Cloth Mapping, Convolutional Neural Network (CNN).

I. INTRODUCTION

In our modern, tech-driven world, where time is at a premium, people still prioritize their appearance. Many invest considerable effort in maintaining and expanding their wardrobes, searching for unique outfits, and looking their best. Traditional in-store shopping can be a time-consuming process, involving trying on multiple garments to find the right fit. Online shopping offers a faster alternative to the physical store experience.

Nonetheless, it presents its own set of challenges. One of these challenges is the difficulty for individuals to imagine how a specific piece of clothing would look on them, given the wide array of body sizes, shapes, hair colors, and skin tones among the human population.

Over the past decade, researchers have explored garment-trying simulations using multi-view systems for cloth tracking and retexturing. Optical flow, such as the method used by Scholz and Magnor, has been employed for calculating 3D scene flow in multi-view systems. Our application aims to simplify the clothing selection process while shopping, making it more convenient for both customers and retailers. We seek to reduce the time spent and broaden clothing choices, addressing a critical need in today's fast-paced technological landscape.

II. LITERATURE REVIEW

1. Krista Kjærside, Kaj Gronbrek, Karen Johanne Kortbek and Henrik Hedegaard, This paper introduces a new augmented reality concept for dressing rooms enabling a customer to combine a tactile experience of the fabrics with easy simulated try-on. The dressing room has a camera and a projection surface instead of a mirror. The customers stick a few visual tags to their normal clothes. Then the ARDressCode application features motion capture and provides an AR video stream on the AR “mirror” with the selected piece of clothes mixed in and fitted to the customer body. Design issues and technical implementation as well as the prospects of further development of the techniques are discussed.

2. Jaychand Upadhyay, Divya Shukla, Nidhi Patel, Sheetal Nangare.” Now-a-days everyone wants to look fashionable. But, it is difficult for ordinary users to make wonderful makeup and hairstyles. Moreover, when you are in nude look and want to share a better look with your friends, the fastest and easiest way is virtual makeup. However, current existing makeup software needs many user inputs to adjust face landmarks, which influence the user experience. And, it cannot remove the flaws on skin as good as the real cosmetic makeup. Hence, we have introduced such a system that allows you to do almost all the makeup work. The system would be platform independent and made up of all the free-source development tools so that if taken commercially later we will keep the cost as low as possible. This will make it accessible in small time running beauty parlours.

DOI: 10.17148/IJIREEICE.2023.111003

3. Shreya Kamani, Neel Vasa, Kriti Srivastava" This paper presents a Virtual Trial Room application using AugmentedReality which allows a user to try on virtual clothes. The user pose and depth is tracked using the Microsoft Kinect sensor and virtual clothes are aligned with the tracked user. The clothing moves and folds realistically and the lighting intensity of the cloth render is adapted to match ambient lighting conditions. The presented application improves on related augmented reality applications by adding full user pose tracking and by using 3D clothing models combined with cloth simulation instead of 2D images.

4. Cecilia Garcia Martin, Erdal Oruklu" This paper presents an image processing design flow for virtual fitting room (VFR) applications, targeting both personal computers and mobile devices. The proposed human-friendly interface is implemented by a three-stage algorithm: Detection and sizing of the user's body, detection of reference points based on face detection and augmented reality markers, and superimposition of the clothing over the user's image. Compared to other existing VFR systems, key difference is the lack of any proprietary hardware components or peripherals. The proposed VFR is software-based and designed to be universally compatible as long as the device has a camera. Furthermore, JAVA implementation on Android-based mobile systems is computationally efficient and it can run in real-time on existing mobile devices.

5. Dr. N.Pughazendi, G.Madankumar, R.Rajkumar, R.Ramsuraj" This paper gives user friendly visual interface which auto-detect the human face and tries to merge the chosen accessories (either jewellery or eye-glasses) on themusing a webcam as an input device and displays it to the screen based on Augmented Reality [AR]. With this, a lot of time is saved to choose the accessories in a virtual display. To achieve this we use the HAAR algorithm which takes the responsibility to detect the face thereby merging the accessory. Here the accessories are merged using the joints and position of the coordinates. Thus by doing so, the accessories are automatically positioned to the detected human face using an affine transformation. In addition, our proposed paper also detects the red pixels on the user"s fingertip to change the accessories based on the gestureautomatically. Thus this makes a user-friendly virtual trial room application instead of a real-time trial room.

6. Md. Farhan Hamid, md. Ashraful alam, This paper throws light particularly on physically impaired people who arepartially or completely challenged. For completely impaired people, the sensor senses the head movements for iterating through the clothes and the eyes movement for selection of apparel[5]But the paper tends to incline more towards the challenged people rather than normal people leading to noticeable change in functions adding to which the population too reduces as compared to normal people.

7. Ari Kusumaningsih; Arik Kurniawati; Cucun Very Angkoso, Eko Mulyanto Yuniarni; Mochammad Hariadi, The system proposed in paper is used for online trial of Madura Batik clothes which is the regional wear of Indonesia. It provides a virtual reality trial room for foreign customers to change consumer shopping experience and increase buying desire. The major drawback here could be that the apparels are limited only to their regional wear and nothing apart from that.

8. Srinivasan K.,Vivek S. This system uses a fixed webcam for capturing the images of the user. This image is processed byMATLAB to compute every pixel of the image and check which apparel suits the best as per user's choice. The drawback for this is that the system was only used foronline shopping platforms and not for any other offline use. Also as there is absence of kinect sensor due to which the actual measurements with respect to the depth is missing.

III. METHODOLOGY

Shopping for clothing is a daily activity, both in physical stores and online. In a physical store, customers usually wait in line to use changing rooms to try on selected clothing items. This can be time-consuming due to the limited number of changing rooms, leading to a less-than-ideal shopping experience. Both in-store and online shopping have inherent limitations, resulting in unsatisfied customers and potential sales losses for retailers.

To address this issue, our "VIRTUAL DRESSING ROOM" system is built on Python software, running on PyCharm for implementation. We employ machine learning techniques for image processing. The Convolutional Neural Network (CNN) used in this project has demonstrated high accuracy.

We used a dataset of 5 T-shirts for image processing. The GUI provides a single-page collection of T-shirts, offering users a real-time video processing experience to select and visualize how different T-shirts appear on them.

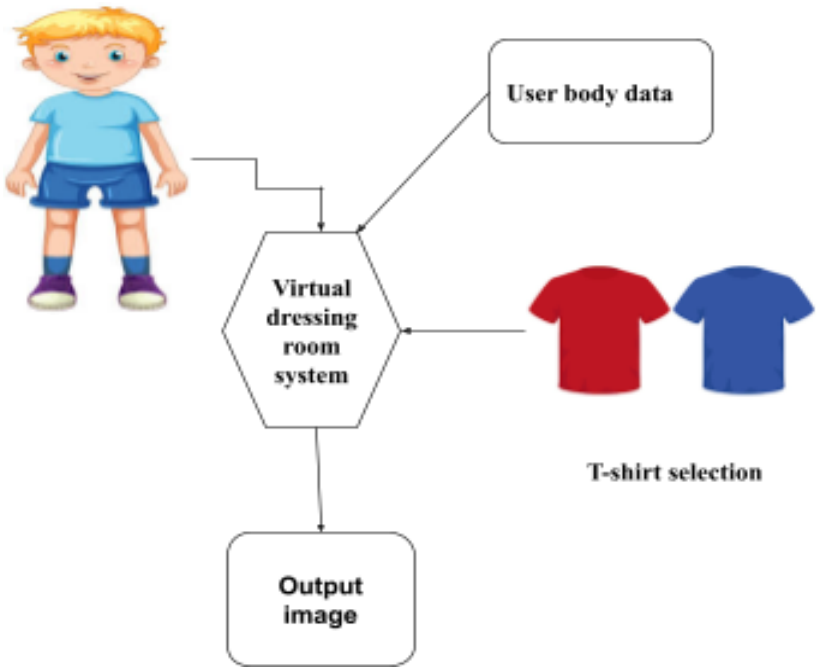
IJIREEICE ISSN (O) 2321-2004, ISSN (P) 2321-5526

International Journal of Innovative Research in Electrical, Electronics, Instrumentation and Control Engineering

Impact Factor 8.021 ⁜ Peer-reviewed / Refereed journal ⁜ Vol. 11, Issue 10, October 2023

DOI: 10.17148/IJIREEICE.2023.111003

IV. FLOWCHART



V. WORKING

The project titled "Virtual Dressing Room Implementation Using Body Image Cloth Mapping" is a Python-based application that runs on PyCharm and utilizes a dataset of 5 t-shirts. It employs a Convolutional Neural Network (CNN) algorithm to map t-shirts onto the body in real-time using live video processing. The application features a single-page GUI where users can selectt-shirts and see how they look on themselves through the laptop's built-in camera.

The virtual dressing room implementation begins by capturing live video input from the laptop's built-in camera. The video frames are processed in real-time. The first step is to detect and track the body or the specific body parts (such as the torso) in the video frames. Once the body or torso is detected and tracked, the next step is to extract the body image. The body image is then processed to segment the region corresponding to the upper body, specifically the torso.

After extracting the torso region, the CNN algorithm is utilized for body image cloth mapping. The CNN model has been trained on a dataset consisting of different t-shirts. The training process involves feeding the CNN model with labeled images of t-shirts and allowing it to learn the mapping between body images and the corresponding t-shirts.

During the inference phase, the trained CNN model takes the segmented torso image as input and predicts the most suitable t-shirt from the dataset. The predicted t-shirt is then superimposed onto the original video frame, giving the appearance of the user wearing the selected t-shirt in real time.

The single-page GUI provides an interface for the user to select the desired t-shirt. The GUI displays the available t-shirts as options, and the user can click on a t-shirt to see how it looks on them in the live video stream.

VI. SYSTEM REQUIREMENTS

Hardware Requirements

- CPU I3 Processor
- RAM 4GB
- OS Window 8
- ROM 250 GB

IJIREEICE ISSN (O) 2321-2004, ISSN (P) 2321-5526

International Journal of Innovative Research in Electrical, Electronics, Instrumentation and Control Engineering

Impact Factor 8.021 ⁜ Peer-reviewed / Refereed journal ⁜ Vol. 11, Issue 10, October 2023

DOI: 10.17148/IJIREEICE.2023.111003

Software Requirements
Python Software version Pycharm software

VII. IMPLEMENTATION

RESULT

VIII. CONCLUSION

In this project, we presented the observations in clothes shopping experiences and figured out the potential problems. The Virtual Fitting Room system is introduced and implemented which is aimed to increase customer satisfaction during clothes shopping. Presents the system design, the preparation process and the iterative implementation process of the Virtual Fitting Room system. In addition, different types of evaluations have been done, and the final result of the system evaluation shows that the system meets general people's needs.

REFERENCES

[1] Krista Kjrside, Kaj Gronbrek, Karen Johanne Kortbek and Henrik Hedegaard, ARDressCode: Augmented Dressing Room with Tag-based Motion Tracking and Real-Time clothes Simulation
[2] Jaychand Upadhyay, Divya Shukla, Nidhi Patel, Sheetal Nangare, Virtual Makeover and Virtual Trial Dressing.
[3] Shreya Kamani, Neel Vasa, Kriti Srivastava, VIRTUAL TRIAL ROOM USING AUGMENTED REALITY.
[4] Dr. N.Pughazendi, G.Madankumar, R.Rajkumar, R.Ramsuraj , Design and Implementation of Interactive Augmented Trial Room .
[5] Cecilia Garcia Martin, Erdal Oruklu, Human-Friendly Interface Design for Virtual Fitting Room Applications on Android Based Mobile Devices.
[6] Md. Farhan Hamid, Md. Ashraful Alam, "Virtual wardrobe for physically impaired using Microsoft Kinect Sensor",2019 IEEE 2nd International Conference on signal and image processing.
[7] Ari Kusumaningsih; Arik Kurniawati; Cucun Very Angkoso, Eko Mulyanto Yuniarno; Mochammad Hariadi, "User experience measurement on virtual dressing room of Madura Batik clothes", 2020 IEEE (978-1-5386-2182-0/17),2020 International Conference on Sustainable Information Engineering and Technology
[8] Srinivasan K.,Vivek S., "Implementation of virtual fitting room using image processing" , 2021 IEEE International Conference on Computer, Communication and Signal Processing (ICCSP202)