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Implementation of Virtual Dressing Room using Newton's Mechanics

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Abstract— The dresses worn by virtual character is done with a real time processing of cloth by a data drive approach, is proposed. It starts with creation of clone of a person prior to real-time simulation, by analyzing height and skin colour tone parameter to give exact look to skeleton. The system will be entirely equipped with sensors like motion sensor, light sensor, camera which is also hardware of our system which control by Graphical User Interface Software. The controllers will be managed by an operating system which will communicate with the user interactive software. The system will provide smart interface to retailer and end user customers. This smart system can increase the level of marketing than the current scenario. This system will realize smart solution for dressing and efficiently solve the issue related to retailers and end user customer. Number of interactive and effective operation supported by our system are as follows :- 1) 3D mannequin is adjusted automatically according to the shopper's body measurement. 2) Virtual trial of variety of cloths after selecting them. 3) Real time simulation of movement of cloths according to mannequin with online resizing/fitting of cloths on it. It is our ultimate goal to develop and integrate different key technologies into interactive virtual clothing store, distributed, where user can select cloths and try on clone that are adjusted to their body measurements. We can overcome the problem of return items and risk in buying process.

Keywords— Clone,3D Mannequin, Online, Motion Sensor, Interactive

I. INTRODUCTION

The task of trying clothes in stores is one of the most time consuming tasks today. Usually long queue and time required are not acceptable, for example when standing in front of full fitting rooms. Additionally time is lost when changing clothes many a times. Reducing this time and helping people to put on a large collection of garment is reduced time was a relevant motivation for this project. Using modern technology - hardware as well as software - the try-on experience can be exponentially improved. Even in web shops people are very sceptic buying clothes because an option for try-on of clothes is not available and also the feel of clothes cannot be judged. Reducing return rate of cloths.[1].

The amount of goods the buyers return may also be reduced due to a more precise representation than 2D images of the cloth they are willing to buy using Virtual Dressing Room that we will be introducing In this project .It offers a solution for the mentioned aspects. The application is based on a mirror, represented by a display that outputs the image of the camera[2]. If a person is standing in front of this virtual mirror, the person will be able to select desired clothes. The selected garment is then virtually superimposed with the image recorded by the camera. In general, this technique can be categorized under augmented reality (AR), where a real-time view of the reality is extended and additionally overlaid with additional information. This paper mainly focuses on the applications in cloth stores and also a home setup is possible as well.

II. LITERATURE SURVEY

In Brooks, A. L., Petersson "Towards an Inclusive Virtual Dressing Room for Wheelchair-Bound Customers"

To address all sizes of customer as well as children the camera had to find the person and that person had to stand at a distance to be able to view the whole body, especially when purchasing trousers or shoes. The VDR is designed as a single user application with collaborative potential to include the sharing of images over smart phone, personal network for advice purchasing.

In Stefan Hauswiesner, Matthias Straka, Gerhard Reitmayr ,"Image-Based Clothes Transfer"

Paper suggests an approach that allows users who are captured by a set of cameras to be virtually dressed with previously recorded garments in 3D. It utilizes image-based rendering techniques and low-level image features to transfer clothes from one user to another. The algorithm designed here is to be executed on a single PC with a single GPU. It utilizes image-based rendering techniques and low-level image features to transfer clothes from one user to another.

In Michel C. Desmarais,"Web Log Session Analyzer: Integrating Parsing and Logic Programming Into a Data Mart Architecture"

We show an approach to the analysis of complex log data based on a parallel stream processing architecture and the use of specialized languages, namely a grammatical parser and a logic programming module, that offers an efficient, flexible, and powerful solution. The drawbacks of this approach are the algorithm is non trivial also the performance is important, so data access and memory usage must be optimized. The advantage is stream processing to aggregate data efficiently before storing the aggregated results into a datamart. This approach shows that it can be highly efficient both in processing and in implementation time and effort.

In RongLi ,KunZou, Xiang Xu, Yueqiao Li and Zan Li ,Research of Interactive 3D Virtual Fitting Room on Web Environment.

Users can view the clothing animation on the various angles, and moreover can change actor's hairstyle, accessories, etc. Human motion and cloth animation, Collision handling are the approaches used in this paper.

III. SYSTEM IMPLEMENTATION

STRATEGIES USED

Previously used strategies include image based rendering techniques and low-level image features to transfer clothes from one user to another[3].Our work will provide a basic outline of the fundamentals. In the following section an overview of the skeleton tracking algorithm introduced with the Microsoft Kinect will be given. In addition, we will outline the frameworks that are available for controlling the Kinect device which will be important later on. Furthermore all kinds of data produced by the frameworks. The remaining parts will be covering Unity and Cinema 4D - that were used for the creation of the Virtual Dressing Room.

MOTION SENSOR

Kinect is a sensor by Microsoft Corp. That mainly aims at depth calculations. The following subsections will take a look at the tracking procedure and will discuss the frameworks that are needed in order to successfully use the Kinect.

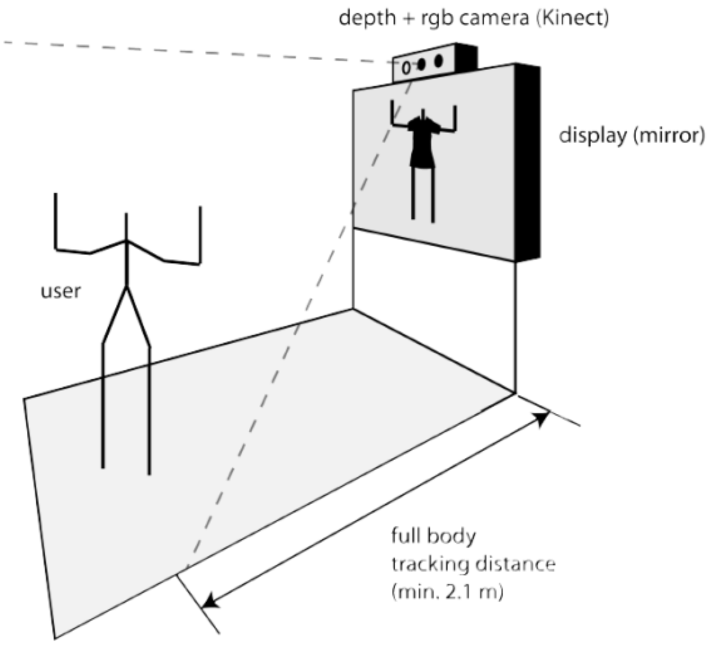

Figure 1 : Basic setup of fitting room

SKELETON TRACKING

A substantial part in the tracking process is the retrieval of the particular body joint positions. This is achieved by an algorithm introduced in Real-Time Human Pose Recognition in Parts from Single Depth Images . The recognition system runs at 5 ms per frame. Also, the system computes each frame independently from every other frame, furthermore implicating information (e.g. transformations) between. The algorithm allows a full rotation of the body and a robust distinction between the left and right side of a body. Figure below gives an overview of the recognition process. By inputting the depth data of the Kinect device, special regions of the body are recognized and based on this the joint positions are defined. The joint positions are needed in order to move a skeleton, for instance, or in case of the Virtual Dressing Room, a piece of garment in respect to the motion of a user. As already mentioned, this algorithm is built upon the depth data. This data is analyzed and a human body is separated in different regions that are representing several body parts. The human body can be captured accurately and robustly even processing different sizes of a person's body correctly. For each pixel the corresponding body part is calculated. Overall the system is trained with data from a comprehensive motion capturing database, which is consisting of humans with different body sizes and measurements. The parts are then assigned using depth comparisons.

In a further step, the joint positions are evaluated based on the body parts using mean shift, also retrieving the 3D positions for all joints. Compared to other methods, the skeleton tracking algorithm introduced for the Kinect shows stable and efficient results in real-time. This is the most important part for the Kinect, figure shows the different steps that are executed on the depth image data in order to retrieve the final 3D joint positions of a human body.

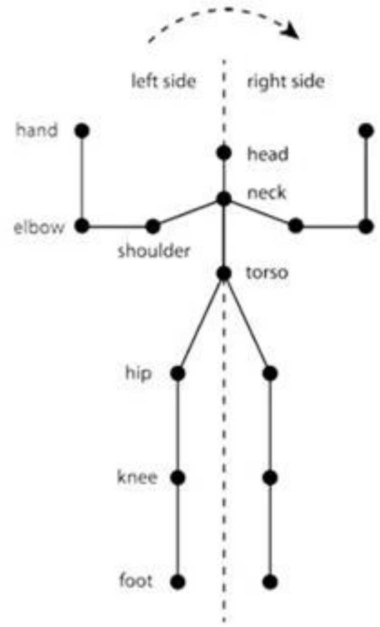

Figure 2. Skeleton Tracking

THE AUTOMATIC DRESSING METHOD

For the deficiencies of existing ways for dressing, we propose a new method which can automatically fit the clothes on the mannequin without suture information, taking into account the actual needs of garment e-commerce. In our method, there is no need to set reference points, only need to

put the clothes at the vicinity of the corresponding parts of mannequin. In addition, it would be best if the clothes shape is similar to the posture of mannequin roughly.

Firstly, place the expanded clothes to the vicinity of the mannequin so that most parts of them are fitted as far as possible. Then, the simulation system will start the automatic dressing process by making use of collision detection module, without any other manual intervention.

Based on the theorem of Newton mechanics, the automatic dressing process will first calculate the force F of each cloth vertex, and then adjust their positions. In the mass-spring model [10], each cloth vertex is under the combined effect of various forces, such as gravity g, supportive force of body S, pulling forces of other adjacent vertexes N1, N2, as shown in.

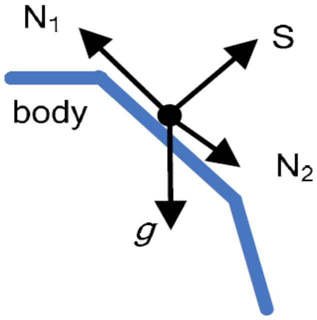

Figure 3.The stress analysis of cloth vertex.

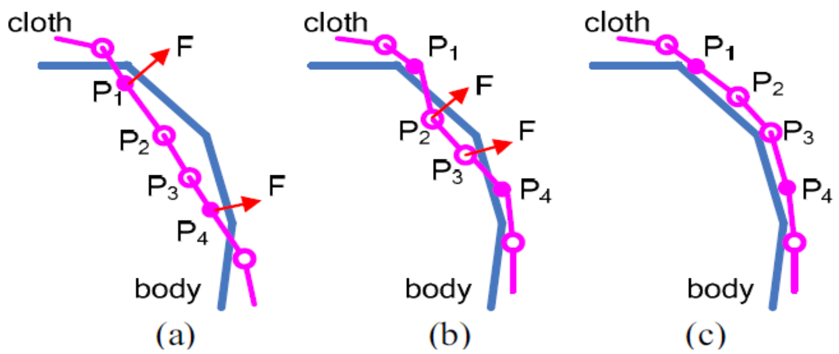

Figure 4.Example of a ONE-COLUMN figure caption.

In the initial state, when we move the clothes to them mannequin so that they are closed to each other, the collision detection module will detect the clothes vertexes P1, and P4in the margins of penetration area occurred between the body and clothes, as shown in Fig. 4(a). In order to reduce and eliminate these penetrations, the collision detection module will exert a big support force F as response. As a result, when the P1 and P4 is adjusted out of the mannequin, the penetrations of vertexes P2 and P3 will also become much shallower and be responded by collision detection module under the action of cloth pulling forces, as shown in Fig. 4(b). Continue this collision detection and response process until the whole penetration area is eliminated, as shown in Fig. 4(c). Finally, when all the penetration areas happened between the clothes and mannequin are eliminated, the dressing process will be finished.

IV. ALGORITHM USED

REGION GROWING ALGORITHM

Start region growing until similarity between the region and neighboring pixels is higher than a threshold.

i. Initialize: region = seed

ii.

(1) Find all neighboring pixels of the region.

(2) Measure the similarity of the pixels and the region.

s1, s2, and sort the pixels according to the similarity.

(3) If smin< threshold

(3.1). Add the pixel with the highest similarity to the region.

(3.2). Calculate the new mean depth of the region.

(3.3). Repeat (1)-(3)

Else

Algorithm terminates.

iii. Return the region.

ADVANTAGES

- Reduce time required in changing clothes the one we are wearing.
- Reduce the return rate of clothes
- Clothes do not get untidy because trying of clothes is not required.
- Reduced physical and psychological strain.

DISADVANTAGES

- Hardware cost
- Not Portable

V. RESULTS

In the previous system, two kinect sensors were used to achieve the accuracy. This was done by taking the credentials from both of the kinect's and combined them. Due to the use of two kinect'ssynchronisation and rendering was required. This adds overhead to the system in terms of time and extra space in fitting room along with the problem of memory requirements. Because of all the above reasons, the cloth on the body is not that accurate and lags with some time-difference.

But, Our system uses only one kinect sensor with the additional approach of newton's mechanics, We have achieved accuracy greater than the previous systems. The cloth perfectly fits on the body at everybody position and their is no time lag in our system as additional tasks of processing are not required.

VI. CONCLUSIONS

By this method to produce a Virtual room that realistically reflects the looks and also the behavior of garment. It should further adapt to specific bodies of different persons depending on their body measurements. This will be one amongst the most challenges since the items of fabric ought to properly fit as several persons respective of individual dimensions. Technically speaking, the fitting room will be based on the Microsoft Kinect, an innovative technology which provides a new way of interaction between humans and the computer. Overall, the presented Virtual Dressing Room seems to be a good solution for a quick, easy and accurate try-on of garment. The Microsoft Kinect offers the optimal technology for a successful implementation. Compared to other technologies like augmented reality markers or real-time motion capturing techniques no expensive configurations and time-consuming build-ups are required. From this point of view it is an optimal addition for a cloth store. Beyond that a simple setup of the system can also be assembled at home since the minimum requirements are a computer with a screen and a Kinect. This can additionally end in an extra feature for an online look. It would allow a virtual try-on of clothes before people are buying it online, taking a closer look at the garment and even conveying the actual behavior of the real cloth.

REFERENCES

[1] Brooks, A. L., Petersson, E. (2014), “Towards an Inclusive Virtual Dressing Room for Wheelchair-Bound Customers”. ,In W. W. Smari, G. C. Fox, M. Nygrd (Eds.), Proceedings of the 2014 International Conference on Collaboration Technologies and Systems (CTS 2014).

[2] Diplom-Ingenieur, Medieninformatik, Philipp Presle, “A Virtual Dressing Room based on Depth Data”. In fakultat fur informatics(2012).

[3] Stefan Hauswiesner, Matthias Straka, Gerhard Reitmayr, "Image-Based Clothes Transfer" in IEEE International Symposium on Mixed and Augmented Reality 2011.

[4] Brooks, A. L., Petersson, E. (2014),\Towards an Inclusive Virtual Dressing Roomfor Wheelchair-Bound Customers.",In W. W. Smari, G. C. Fox, M. Nygrd (Eds.),Proceedings of the 2014 International Conference on Collaboration Technologiesand Systems (CTS 2014).

[5] Jan Smisek, Michal Jancosek and Tomas Pajdla, \3D with Kinect, 2011 IEEE International Conference on Computer Vision Workshops, Barcelona, Spain,November 2011.

[6] Kaoru Nakamura,\Basics in The Kinect for Windows SDK Programming forC++",PloS ONE, Volume 1, pp.34-103,(2012).

[7] ToyobukiTanisiri,\Kinect SDK Programming. in Kinect Sensor image processing program. PloS ONE, Volume 1, pp.42-115,(2011).

[8] KouichiSakai,\A binary image. in Introduction to digital image processing, PloSONE, Volume 1, pp.63-100.

[9] Liu, Y.J., Zhang, D.L., and Yuen, M. M.-F., \A survey on CAD methods in 3Dgarment design", Computers Industry, vol. 61, pp. 576-593, 2010.

[10] H., Qin, S., Sun, G., andWright, D. K., \On Generating Realistic Avatars: Dressin Your Own Style.", Multimedia Tools and Applications, Springer Publisher,2011.

[11] Frederic Cordier and Nadia Magnenat-Thalmann,\A Data-Driven Approachfor Real-Time Clothes Simulation", 2005 published in COMPUTER GRAPHICSforum.

[12] Nadia Magnenat-Thalmann, Pascal Volino, Bart Kevelham, Mustafa Kasap, QuiTran, MarlneArvalo, Ghana Priya and Nedjma Cadi\An Interactive Virtual TryOn".

[13] Yueh-Ling Lin and Mao-Jiun J. Wang \Digital Human Modeling and Clothing Virtual Try-on13 Plan of Project Execution. In Proceedings of the 2014 International Conference on Industrial Engineering and Operations Management Bali,Indonesia, January 7 9, 2014.

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