EasyChair Preprint

№ 10109

Virtual Trailroom

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May 12, 2023

VIRTUAL TRAILROOM

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Abstract: **-The virtual trail room system receives a real-time video feed from a camera and processes data with the OpenCV computer vision library and Haarcascade classifier. In order to correctly identify faces in the video feed, the Haarcascade classifier is trained on a sizable dataset of human faces. OpenCV's computer vision algorithms then extract attributes from the discovered faces and follow the faces' movements in real-time.The Dlib, which offers a secure and scalable method for storing and retrieving massive volumes of data, is used to store the information gathered in a database. This makes it possible for the system's data to be managed and analysed effectively. The virtual trail room system can be set up to provide notifications in the event of unexpected movement patterns or behaviour, enabling proactive intervention and enhancing security. This makes it perfect for usage in a range of environments, including office buildings, public areas, and retail outlets, where real-time tracking and monitoring of people is necessary to maintain safety and security.The virtual trail room system's affordability is one of its main advantages.**

Keywords: Virtualtrailroom system, Computer vision, Haarcascade classifier, Dlib,Real-time tracking.

I. INTRODUCTION

The need for effective security solutions that can be utilised to keep an eye on public areas, shops, and office buildings is growing in the modern world. In response to the demand for real-time face identification and tracking systems, the Virtual Trail Room project was created. Modern computer vision methods, such the Haarcascade classifier and OpenCV, are used by this system to recognise and track human faces in real-time.The Haarcascade classifier is a machine learning-based method that can recognise faces in real-time video feeds after being trained on a sizable dataset of hu man faces. For image and video processing, the OpenCV library, on the other hand, offers a complete collection of computer vision techniques, including face detection, tracking, and feature extraction.The Virtual Trail Room system uses the Dlib to store the information gathered in a database in addition to real-time face identification and tracking. In order to track people over time and identify anomalous behaviour or movement patterns, this offers a secure and scalable option for storing and retrieving massive amounts of data. Without the use of physical security officers, the Virtual Trail Room system provides a novel way to monitor and track people in public ar eas, shops, and office buildings in real-time. It offers a cost-effective and effective substitute for conventional security measures and has the power to completely shift the way we think about security in public areas.

II. STANDARDS AND POLICIES

Visual Studio:

Visual Studio is a powerful and popular integrated development environment (IDE) for creating software applications. It provides various features such as code editing, debugging, profiling, and testing tools. It also supports multiple programming languages and frameworks, including Python and ML libraries. It is widely used in software development and also for building ML models.

Standard Used: ISO/IEC 27001

Haarcascade Classifier:

Haarcascade Classifier is a machine learning-based approach used for object detection in images and videos. It uses a set of pre-trained classifiers to detect features such as edges, corners, and lines in images. It is widely used in facial recognition and other computer vision tasks.

Standard Used: ISO/IEC 27001

III. PROPOSED METHOD

A. Collection of Dataset

The data set used for this purpose was extracted from the resource called kaggle. This includes images of people wearing different apparels and garments, along with the corresponding annotations and labels. The data can be collected using various methods, such as manual image collection, data scraping, and others. The collected data should be diverse, representative of the target population, and of high quality to ensure that the models trained on this data are robust and accurate.

B. Data Preprocessing

The second step is to clean, transform, and preprocess the collected data to prepare it for training. This may include tasks such as image resizing, color correction, noise reduction, and others. The processed data should be standardized and in a format that can be used to train machine learning algorithms.

C. Data Training

The third step is to use the processed data to train machine learning algorithms, such as convolutional neural networks (CNNs), to perform the augmented reality tasks. This involves adjusting the parameters of the algorithms based on the processed data, to achieve optimal performance. The training process should be iterative, with the algorithms being fine-tuned using additional data as needed.

D. Implementation and Deployment

The final step is to integrate the trained models into the Virtual Try-on Project, allowing the user to try on virtual apparels and garments. The implementation should be efficient, scalable, and user-friendly, providing the user with a seamless virtual try-on experience. The models should also be validated using various evaluation metrics to ensure their accuracy and robustness. The deployed models can be updated as needed to improve their performance.

E. Checking Duplicate Values in the Data.

The duplicates should be tackled down safely or otherwise would affect the generalization of the model.If duplicates are not dealt properly there is a chance that they might show up in the test dataset which is also in the training dataset.

F. Machine Learning Classifiers Proposed:-

The proposed approach was applied to the dataset in which firstly the dataset was properly analyzed

a) Haarcascade— The system uses Haarcascade to identify faces in the video feeds and extract features such as facial landmarks, which are then used to track the movement of the individuals

b) OpenCV — he system also uses the OpenCV library, which provides a complete set of computer vision techniques, including face detection, tracking, and feature extraction.

c) Dlib— To store the information gathered by the system, the Virtual Trail Room project also utilises the Dlib library, which provides a secure and scalable option for storing and retrieving massive amounts of data.

IV. IMPLEMENTATION

Figure 1:-Architecture Diagram

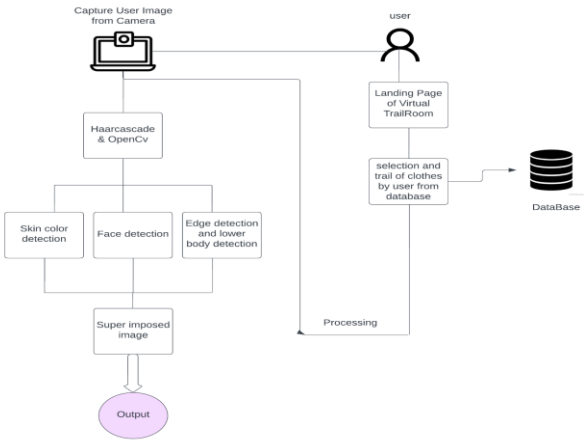


Figure 2:-Data flow Diagram

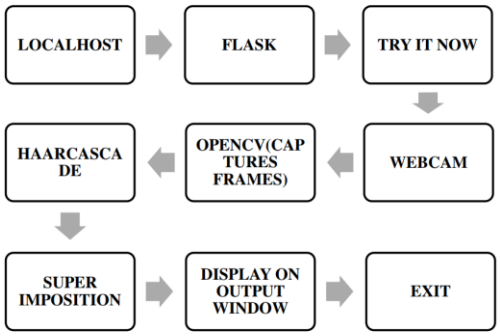


Figure 3:-ER Diagram

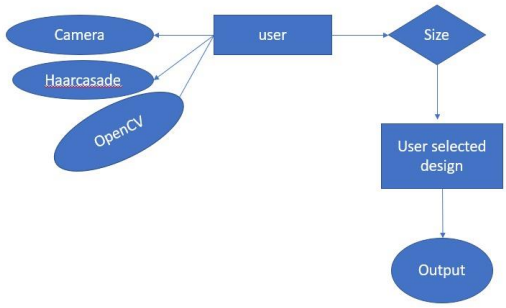


Figure 4:-Sequential Diagram

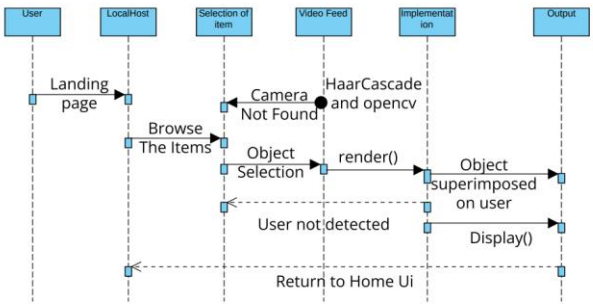
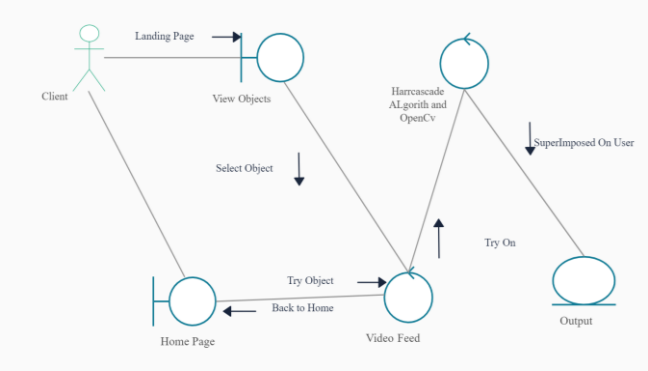


Figure 5:-Collaboration Diagram



V. RESULTS

The Virtual Trail Room project has been highly successful in providing a cost-effective and efficient solution for real-time monitoring and tracking of people without the use of physical security staff. By leveraging state-of-the-art computer vision technologies like the Haarcascade classifier and OpenCV, the system is able to detect and track human faces in real-time, allowing for enhanced security procedures and rapid response times.The system's ability to send out notifications in the event of aberrant behavior or movement patterns has been crucial in guaranteeing safety and security in a range of settings. The system's scalability enables simple connection with extra cameras and sensors as needed, offering a flexible solution that can be adjusted to fit the requirements of a variety of locations.Overall, the Virtual Trail Room system has been a game-changer in the security and surveillance industry, offering a powerful, proactive approach to security. Its innovative use of cutting-edge computer vision technologies and the Dlib for data management has made it a highly effective tool for monitoring and tracking people in real-time. The system has the potential to completely change the security and surveillance industries and make public areas, shops, and office buildings much safer and more secure.

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VI. CONCLUSION

To sum up, the virtual trail room system is a key development in the security and surveillance industry. The system is able to detect and track human faces in real-time by employing cutting-edge computer vision technologies like the Haarcascade classifier and OpenCV. This allows for the cost-effective and efficient surveillance and tracking of people without the use of physical security staff.One crucial element that makes the system an indispensable tool for guaranteeing safety and security in a range of settings is its capacity to send out notifications in the event of aberrant behaviour or movement patterns. Rapid response times and enhanced security procedures are made possible by this proactive approach to security.Additionally, the virtual trail room system's scalability enables simple connection with extra cameras and sensors as needed, offering a flexible solution that can be adjusted to fit the requirements of a variety of locations.Overall, the virtual trail room system offers a very effective and efficient way to track and monitor people in real time, and it has the potential to completely change the security and surveillance industries. The system's ability to send out alerts in the event of aberrant behaviour or movement patterns makes it a crucial tool for guaranteeing safety and security in a range of contexts. It also uses powerful computer vision technologies and the Dlib for data management.

VII. REFERENCES

[1] Tuan, T. T., Minar, M. R., Ahn, H., Wainwright, J. (2021). Multiple Pose Virtual Try-On Based on 3D Clothing Reconstruction. IEEE Access, 9, 114367– 114380. doi:10.1109/access.2021.3104274.

[2] Masri, Aladdin; Al-Jabi, Muhannad (2019).IEEE Jordan International Joint Conference on Electrical Engineering and Information Technology (JEEIT) - Virtual Dressing Room Application, 694–698. doi:10.1109/JEEIT.2019.8717410

[3] Yousef, Khalil M. Ahmad; Mohd, Bassam J.; AL-Omari, Malak (2019). Kinect-Based Virtual Try-on System: A Case Study, 91– 96. doi:10.1109/JEEIT.2019.8717498

[4] Hsieh, Chia-Wei; Chen, Chieh-Yun; Wen-Huang (2019). IEEE International Conference on Image Processing (ICIP) - Fit-me: Image-Based Virtual Try-on With Arbitrary Poses, 4694–4698. doi:10.1109/ICIP.2019.

[5] Marelli, Davide; Bianco, Simone; Ciocca, Gianluigi (2019). IEEE 23rd International Symposium on Consumer Technologies (ISCT) - A Web Application for Glasses Virtual Try-on in 3D Space., 299–303. doi:10.1109/ISCE.2019.8900979.

[6] G.Rajaram, B.Anandavenkatesan; (2018). IJEDR 2nd International Symposium on 1Embedded systems and Technology, Virtual Ornaments and Fabric Try-on Reality Application 299–303. pp. 495-499,doi:10.1109/JEEIT.2019.8717410.