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**TOPIC – Facial Landmark Detection using DLIB and OpenCV.**

**Reviews -**

Hyeon-Woo Kim [1], discusses the importance of the EMTCNN model, its prior drawbacks, and the suggested improvements. The potential effects of these improvements in facial landmark detection technologies have also been noted here. In order to extract 68 facial landmark points in real-time for use in facial recognition and other applications, a new technique is presented in this study. There research can be applied to various applications that require real-time object recognition, such as face recognition in payment services and pedestrian detection in autonomous driving.

Ahmad Zarkasi [2], this paper discusses a new technique based on auto-extracted facial marks for face recognition. Here they have worked with landmarks related to the outer corner of the nose. Here a triplet of areas and their associated geometric invariance are formed. Then the data obtained will be trained using the Support Vector Machine algorithm for face recognition. Then it implanted in a mobile robot with raspberry. From the testing they have observed that success rate of facial recognition using this is 95% with an error of 5%. Here servo motors and dc motors move according to face positions.

Chun-Ling Lin [3], in this paper a real-time automatic attendance system (AAS) based on Internet of Things (IoT) technology and facial recognition has been presented. Here cloud server is used where face detection and recognition libraries are implemented and a Raspberry Pi camera is used to transfer facial images to cloud server, which thus can handle all the processes involved with the automatic recording of student attendance. The facial features encountered are processed using data serialization before they are saved in the SQLite database; such serialized data can easily be written and then read back from the database. The results of this study show that the proposed AAS can recognize multiple faces and so record attendance automatically.

Rohit Gupta [4], in this research paper the design of the eye-controlled wheelchair has been presented. Users of wheelchairs can travel through their environment more simply and independently by controlling the wheelchair's direction and movement using their eyes. Using face landmarks recognition technology, the camera that is attached to the user's head records photos of their eyes and follows their motions. Places in the dark light interfere with the operation of the wheelchair. This system works perfectly with ambient light and indoors.

Jun Wan [5], the proposed Reference Heatmap Transformer (RHT) approach for facial landmark recognition is described in this paper in a factual and impartial manner. The RHT approach uses reference heatmap data to increase detection accuracy while addressing the shortcomings of conventional landmark detection methods in handling complex settings. It is demonstrated that the RHT-designed soft transformation and hard transformation modules can work together to create more effective facial shape limitations. The method's efficiancy has been proven in a number of trials, and it might find use in a number of different disciplines. The RHT approach is able to learn more discriminative feature representations and efficient facial shape restrictions by adding reference heatmap data, which improves its ability to handle difficult situations. A self-attention mechanism is also used in the technique.

Ashrant Aryal [6], discusses the limitations of current HVAC systems in buildings and how advancements in Internet of Things and Machine Learning can help to improve the accuracy of thermal imaging for modeling and predicting thermal comfort. The paper evaluates the proposed approach and demonstrates an improvement in the accuracy of temperature measurements extracted from thermal images compared to previous studies. The paper suggests that more accurate temperature measurements from thermal images can improve the accuracy of thermal imaging for modeling and predicting thermal comfort.

Mr. Rikshit Makwana [7], discusses a hassle-free method for managing the office space using biometric security systems. It uses a sophisticated face recognition system to identify employees, identify visitors, and schedule appointments for them. A mail-based token-based authentication technique is employed in the case of Unknown face recognition. The Python Algorithm Facial Landmark Detector using DLIB is the basis for the face recognition algorithm. The face recognition software will provide an accuracy ranging from 50% to 70%. Here they are presenting the most successful existing algorithms or methods for facial recognition technology to encourage researchers to embark on this topic.

Janith Kodithuwakku [8], it is not an easy task for organizers to observe the engagement level of a video meeting audience. This research paper discusses a system that uses machine learning models based on convolutional neural networks (CNN) and support vector machines (SVM) to classify participants' emotional states and attention levels in order to improve the quality of video conversations in settings like virtual meetings and online classrooms. On the basis of participant face features throughout the video conversation, this suggested system offers an artificial intelligence (AI)-powered analytics system with optimized machine learning models to track the audience and create relevant insights. The use of the neural accelerator chip to improve emotion and attention detection tasks is one of the key goals of this research.

A.L.Rohith [9], since many educational institutions have chosen online platforms to continue their education, this paper discusses how students behave during online classes. There has been a gap between student and instructor engagement in the online classroom, despite the fact that the majority of faculties are conversant with online means for education. A report based on the student's behaviour is analyzed and presented using the tool in this circumstance to determine how the student has been listening to the entire class. The creation of a self-sufficient agent that can provide information to both teachers and students is the project's main goal.

Qiao Han [10], discusses about making thee metaverse characters more realistic by adding lips animations learnt from videos in the wild. For that they have conducted ablation study for Pre/Post-Net and pre-trained encoder weights to demonstrate the effectiveness of transfer learning between audio and visual speech data. To further increase the training corpus and consequently the learning capacity of the model, they experimented with self-supervised methods like masked autoencoders.

**Reference -**

[1]. Hyeon-Woo Kim, Hyung-Joon Kim, Seungmin Rho and d Eenjun Hwang “Augmented EMTCNN: A Fast and Accurate Facial Landmark Detection Network”

[2]. Ahmad Zarkasi, Fachrudin Abdau, Agung Juli Anda, Siti Nurmaini, Deris Stiawan, Bhakti Yudho Suprapto, Huda Ubaya and Rizki Kurniati “Implementation of Facial Landmarks Detection Method for Face Follower Mobile Robot”

[3]. Chun-Ling Lin and Yi-Huai Huan “The Application of Adaptive Tolerance and Serialized Facial Feature Extraction to Automatic Attendance System”

[4]. Rohit Gupta, Rajesh Kori, Swapnali Hambir, Ajit Upadhayay, Shridhar Sahu “Eye Controlled Wheelchair using Raspberry PI”

[5]. Jun Wan, Jun Liu, Jie Zhou, Zhihui Lai, Linlin Shen, Hang Sun, Ping Xiong and Wenwen Min “Precise Facial Landmark Detection by Reference Heatmap Transformer”

[6]. Ashrant Aryal and Burcin Becerik-Gerber “Skin Temperature Extraction Using Facial Landmark Detection and Thermal Imaging for Comfort Assessment”

[7]. Mr. Rikshit Makwana, Mr. Romil Nandwana, Mr. Jayshil Jain, Mr. Tejas Laxmeshwar, Mr. Shirish Sabnis “VISITX: Face Recognition Visitor Management System”

[8]. Janith Kodithuwakku, Dilki Dandeniya Arachchi and Jay Rajasekera “An Emotion and Attention Recognition System to Classify the Level of Engagement to a Video Conversation by Participants in Real Time Using Machine Learning Models and Utilizing a Neural Accelerator Chip”

[9]. A.L.Rohith, Reddy, K.Anish Gandhi, S.Thakrimul Jaffer and M.K.Srilekha “Student Live Behaviour Monitoring During Virtual Class using Artificial Intelligence”

[10]. Qiao Han, Jun Zhao and Kwok-Yan Lam “Facial Landmark Predictions with Applications to Metaverse”