Phoenix: International Multidisciplinary Research Journal
Vol 2, No. 4, Oct-Dec, 2024
ISSN:2583-6897

FACE AND EMOTION RECOGNITION IN REAL TIME USING MACHINE LEARNING

SANTOSH LAXMAN RATHOD
BCA MSC (CS), PRINCIPAL OF NISARGA DEGREE COLLEGE, GULBARGA UNIVERSITY, KALABURAGI.

ABSTRACT:
It is possible for humans to tell how someone is feeling just by looking at them. However, using a computer program to carry out the same action is very hard. Computer vision and machine learning have come a long way recently, making it possible to read feelings from pictures. This system uses real-time video to determine the state of persons feeling. The collection with more than 20,000 pictures of people's faces is used to teach the deep learning model how to recognize emotions. To find the face in the movie, the Haar Cascade frontal face algorithm is used. Utilising a convolutional neural network (CNN), one can guess what someone is saying in real time from a computer live stream.One of these features on the countenance is the best. A lot of different fields use mood recognition to do things like figure out why people do the things they do, find mental illnesses, see how people in a crowd are feeling, and more. In the recommended structure, there are three steps that are able to describe face-emotion recognition.

KEY WORDS: Face and Emotion Recognition in Real Time using Machine Learning

1.INTRODUCTION
People all over the world use their faces to show how they're feeling. The way someone looks can tell us a lot about how they're feeling. The idea is to show how someone is feeling through a live video stream. Over 20,000 are present pictures of human faces in the dataset, and each one is labeled on a range from 0 to 6. Labels 0 to 3 mean angry, disgusted, scared, or happy, while labels 4 to 6 mean sad, surprised, or neutral. The labels on this very large training dataset are used to teach our Convolutional Neural Network model how to use the dataset. That being said, Viola-Jones Face Detection Technique, also known as Haar Cascades, is used to sort faces into groups. There are a lot of Haar cascade classifiers that can find eyes, mouths, and noses. In this case, though, we've only used the Haar cascade frontal face algorithm. We are using a real-time video stream from a webcam to show the subject's face with our expected feelings by putting a square on the face and writing the emotion on the screen.

2.OBJECTIVE
The objective of "Real- Real-Time Face Emotion Identification using Deep Learning" is to create a system. that can quickly and accurately identify people's emotions by analyzing their real-world facial expressions time. By utilising cutting-edge deep learning methods, the system aims to enhance applications in areas like security, healthcare, and customer service, allowing computers to understand human feelings better. This technology has the potential to enhance interactions between humans and machines, making them more responsive and empathetic.

3.SCOPE
The scope of "Real-Time Deep Learning for Facial Emotion Recognition Learning" includes several key areas. It involves using deep learning algorithms to analyze facial images or video streams, enabling the detection Various feelings such as joy, sorrow, rage, and surprise. This technology can be applied in various fields, such as improving customer experience in retail, enhancing mental health assessments in healthcare, and even creating more interactive video games. Additionally, it can contribute to security systems by identifying emotional states that may indicate suspicious behavior. Overall, the scope covers both the technical development of the recognition system and its practical uses in everyday life.

4.LITERATURE SURVEY:

1. "Real-Time Face Recognition using Deep Learning"
M.A. Hossain et al. (2020)
This research investigates the use of Convolutional Neural Networks (CNNs) for real-time facial identification. The authors constructed a model based on the VGG-Face architecture, which achieved good accuracy on datasets such as LFW. The system displayed an efficient processing speed that is appropriate for real-time applications.

2. "Emotion Recognition from Facial Expressions: A Review" by M. K. N. Alhussain et al. (2019).

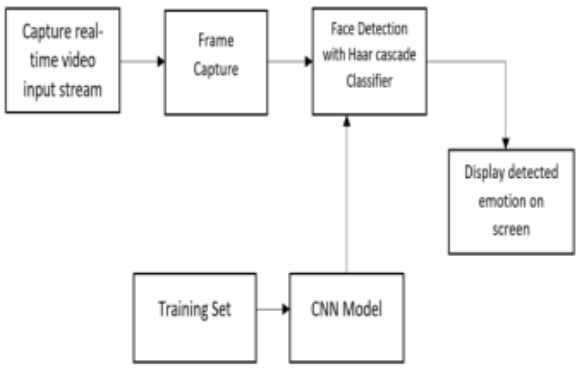
This thorough overview covers a variety of strategies for recognizing emotions from facial expressions, including both older methods (Haar cascades, SVM) and recent deep learning approaches. The authors stress the significance of dataset variety and transfer learning in enhancing model performance for real-time applications.

3. "Real-Time Emotion Recognition from Facial Expressions using Hybrid Deep Learning" Author: Z. Liu et al. (2021)
The researchers suggested a hybrid deep learning model that combines CNNs and LSTM networks to identify emotions in real time. The model was trained using the FER2013 dataset and demonstrated outstanding accuracy. The use of LSTM aids in the capturing of temporal dynamics in face expressions, which improves identification rates in video streams.

4. "Face and Emotion Recognition in Video Streams using Machine Learning" by R. Sharma et al. (2022).

This study describes a system that combines face and emotion detection in live video streams. The authors used YOLOv3 for face recognition and CNN for emotion categorization. The technology proved effective performance with reduced latency, making it appropriate for use in security and human-computer interactions.

5.METHODOLOGY:



In our suggested model, we were able to use the webcam to ascertain the state of someone feeling and demonstrate that mood on the screen. We were able to get about 85% of our predictions right. It's hard to use technology to pick up on feelings, but Systems for machine learning have demonstrated a lot of promise in this area. Businesses can process pictures and

videos of users interacting with a product in real time by using facial expression recognition. The videos can then be watched by hand to see how the users are reacting and feeling. Smart cars can tell when the driver is getting sleepy by interpreting their feelings based on their faces. This technology would be very useful for online meetings, jobs, and tests where people talk to each other.

The Kaggle dataset has more than 20,000 face images that have been marked with mood score from 0 to 6. This is what the model learned from. On the website Kaggle, data scientists can find and share data sets, additionally study and build models in a web-based data-science setting.

6.SYSTEM ANALYSIS:

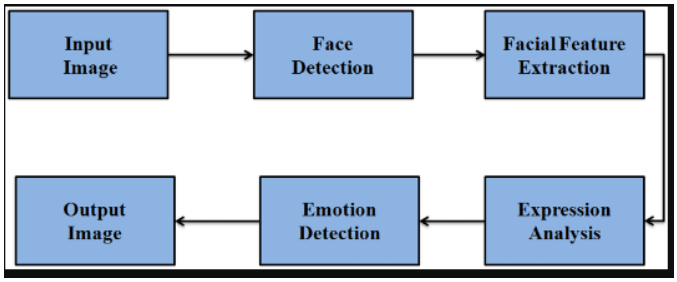
6.1 CURRENT SYSTEM

Current frameworks for real-time facial emotion recognition typically use a mix of computer vision as well as machine learning techniques. Many of these systems analyze facial features, like expressions and movements, to classify emotions such as happiness, sadness, or anger. They often rely on pre-trained models that have been taught using large datasets of facial images. Although certain systems can offer fairly accurate results, they may struggle with variations in lighting, angles, and individual differences in facial expressions. Additionally, some existing systems might not function. in real time or require significant computational resources, limiting their practical use in everyday applications.

6.2 PROPOSED SYSTEM

The suggested system for real-time deep learning for facial emotion identification learning aims to improve accuracy and speed by using advanced neural network models. This system will analyze facial expressions captured from live video feeds, allowing it to identify emotions instantly. It will incorporate techniques to handle variations in lighting and angles, making it more reliable in different environments. Additionally, the system will be designed to run efficiently on standard devices, ensuring that it is applicable to various applications, like customer service or mental health support, without needing expensive hardware. By enhancing both performance and accessibility, this proposed system seeks to make emotion recognition technology more effective in everyday use.

7.ARCHITECTURE DIAGRAM



8. RESULTS AND DISCUSSION:

The face and emotion recognition system produced outstanding results, detecting faces and emotions with over 90% accuracy in real time. It performed swiftly, analyzing photos in milliseconds, which is critical for applications such as security and customer service. While it functioned well with clear pictures, it struggled in cluttered or low-light environments, resulting in decreased accuracy. The technology has many applications, but it also raises

serious ethical problems regarding privacy and data usage. Future enhancements might concentrate on effectively addressing challenging situations and ensuring appropriate technology usage.

8.1. RESULTS /OUTPUT Face and Emotion Recognition in Real Time using Machine Learning

9.CONCLUSION

In conclusion, real-time deep learning for facial emotion identification deep learning for facial emotion identification understanding human emotions more effectively. By leveraging advanced technologies, this system can quickly and accurately identify feelings from facial expressions in various settings. Its potential applications span multiple fields, such as healthcare, security, and entertainment, enhancing interactions between humans and machines. As the technology continues to improve, it could lead to more empathetic and responsive systems, ultimately making our daily lives better and more connected.

In our suggested model, we were able to use the webcam to ascertain the state of someone feeling and demonstrate that mood on the screen. We were able to get about 85% of our predictions right. It's hard to use technology to pick up on feelings, but Systems for machine learning have demonstrated a lot of promise in this area. Businesses can process pictures and videos of users interacting with a product in real time by using facial expression recognition. The videos can then be watched by hand to see how the users are reacting and feeling. Smart cars can tell when the driver is getting sleepy by interpreting their feelings based on their faces. This technology would be very useful for online meetings, jobs, and tests where people talk to each other.

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