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Emotion Tracker: Real-time Facial Emotion Detection with Open CV and Deep Face

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Abstract-*The "Emotion Tracker" Project is a real Time Facial Emotion Detection platform using open CV (Computer Vision) and Deep Face (AI-based Emotion Classification). This platform will take a live webcam video feed and analyze it to detect the face of the subject(s) and classify their emotional state (Happy, Sad, Angry, Fearful, Surprised, Disgusted, or Neutral). The classification will occur in real time and once completed, the classification can then be logged to the database for future analysis. Approximately 90% accurate, reasonably priced, easy to use and capable of operating in "Offline Mode", this platform can be beneficial for a variety of industries (Healthcare, Education, Customer Service, and Security) in numerous ways.*

Keywords: Facial Emotion Recognition, Real-Time Detection, Deep Learning, Open CV, Deep Face, Computer Vision, HCI.

1. INTRODUCTION

Traffic congestion is an expanding challenge in cities, often resulting in extensive delays and poor vehicle movement. Fixed-time traffic signals, the default for controlling car flow, cannot respond to fluctuating conditions making the traffic signal ineffective at peak hours or unexpected surges. Emerging technologies, specifically in computer vision and machine learning, make it possible to remotely and in real-time analyse traffic flow without on-site inspection using video based detection, tracking, and density estimation. The intelligent signal control system proposed here employs intelligent signal control techniques using computer vision and machine learning to develop simulation models that can assess car flow and dynamically apply signal timing using a max-pressure algorithm. The ultimate goal is to reduce wait times, reduce congestion and increase the efficiency of traffic management.

2. PROBLEM STATEMENT

Detecting facial expressions in real time is difficult because of the many factors involved (e.g. the way someone is feeling, the type of lighting they are in, their angle of view, and whether they are hiding their face). Most traditional techniques are not very accurate or robust, while the vast majority of modern deep learning algorithms are either computationally intensive, reliant on cloud storage, or designed to work with still images only. Therefore, a low-cost and rapid option for online detection of facial expressions is needed that can generate accurate and time-sensitive results from a video feed, as well as allow for an easy and intuitive viewing experience. To address this issue, the Emotion Tracker Project utilizes both Open CV and Deep Face.

3. OBJECTIVES

Emotion Tracker aims to build an Emotion detection system that captures facial expressions in real-time using Open CV and Deep Face. It will capture human face images from live-streaming video data, accurately detect and classify 6 Different Emotions (using facial recognition technology) on real-time and capture emotion information for later analysis. The Emotion Tracker will also be designed to be extensible and modular to allow for future adaptations (including integration into other applications).

4. RESEARCH METHODOLOGY

The project uses a systematic process that consists of requirement analysis, system design, implementation, testing, and deployment. The webcam captures the video stream live; Open CV detects faces in the video, and Deep Face is used for emotion classification. The system will be tested in various conditions to confirm that it operates in real-time with high levels of accuracy and dependability.

5. REVIEW OF LITERATURE

At first, early systems for identifying facial expressions used hand-constructed characteristics and conventional algorithms. However, these systems did not offer very reliable performance in a real-world environment. With the introduction of deep learning and Convolutional Neural Networks (CNNs) into the space, the effectiveness of identifying emotions increased significantly. Pre-trained models like VGG-Face and tools such as Deep Face allow for much quicker and more precise construction of emotion detection systems. Nevertheless, despite the availability of various developed solutions today, many are still expensive to run, require usage of the cloud, and therefore cannot be used for real-time applications. That is

why there is a demand for developing an emotion recognition system that is lightweight, accurately identifies emotions in real-time, and has the capability to operate offline. The intended goal of this proposed project is to provide such a solution..

6.SYSTEM DESIGN

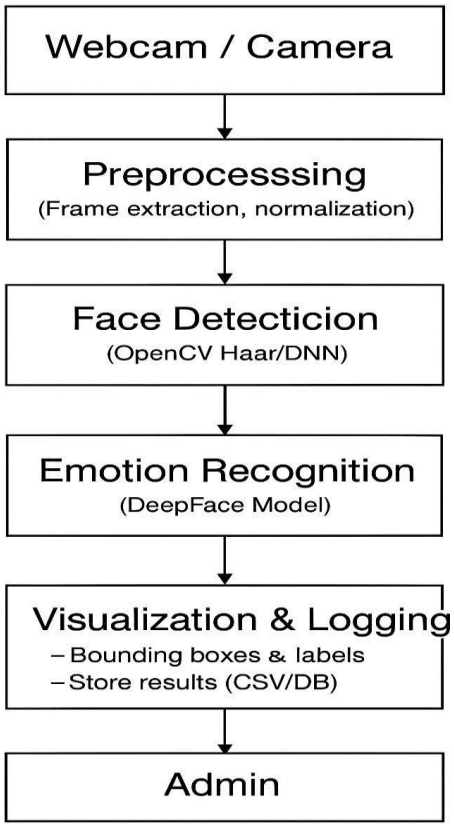

Figure 1: Architecture Diagram (Block Diagram)

7. SCREENSHOT

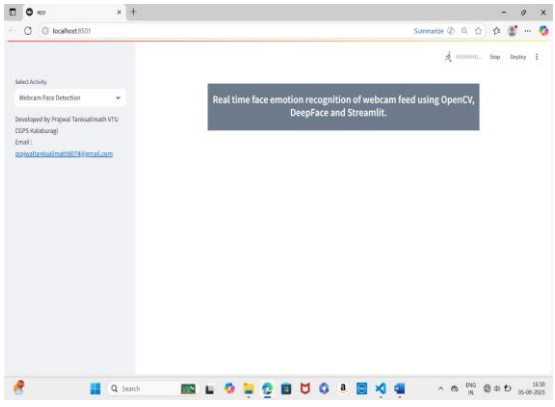

Figure2: Home Page

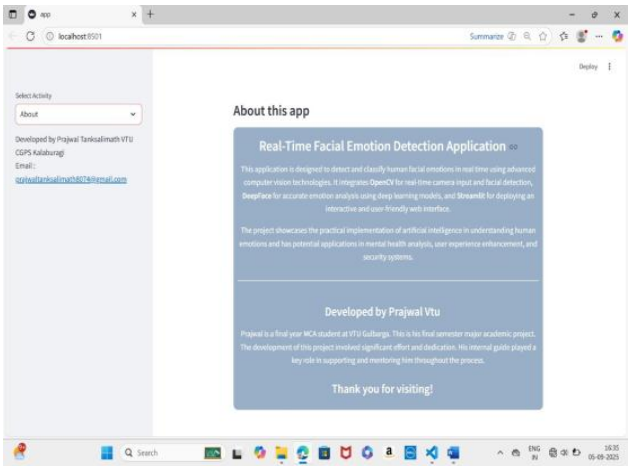

Figure 3: About this app

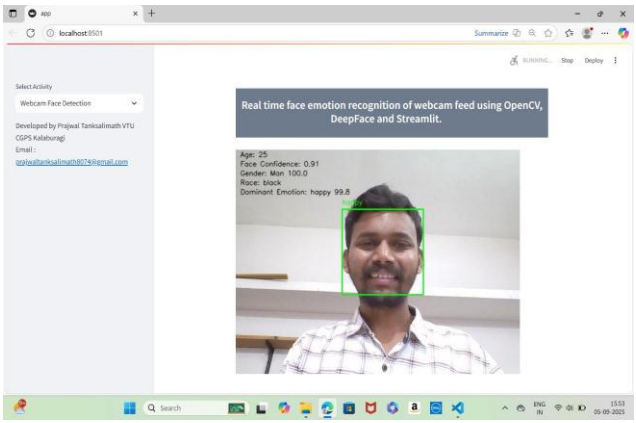

Figure 4: Emotion (Happy)

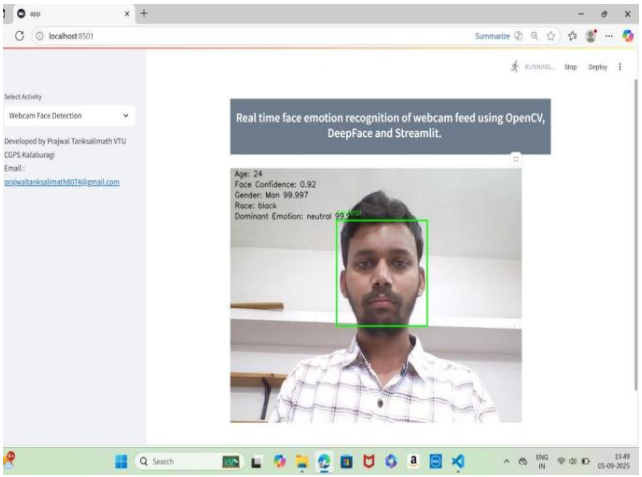

Figure 5: Emotion (neutral)

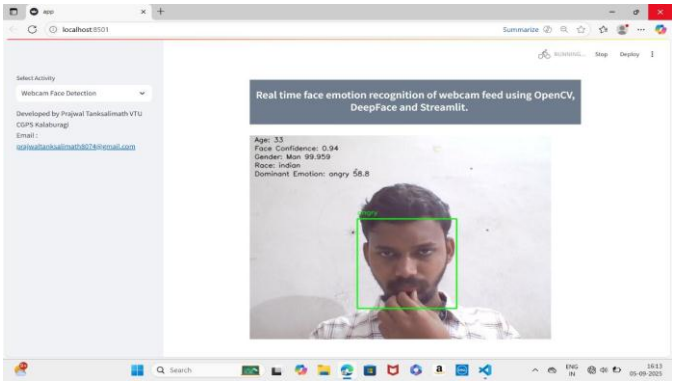

Figure 6: Emotion (Surprise)

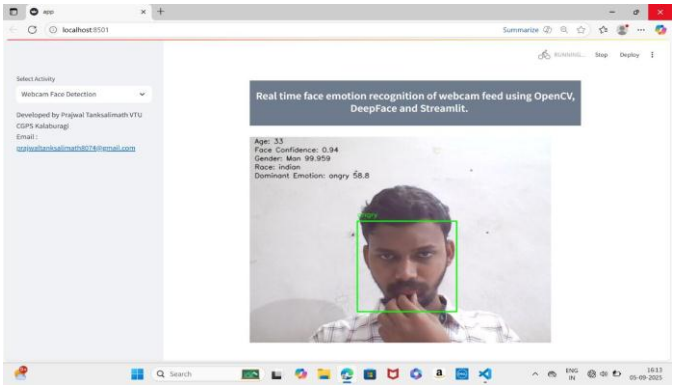

Figure 5: Emotion (Angry)

8. Conclusion & Future Scope

The Emotion Tracker project utilizes a facial emotion detection (recognition) system in real-time, utilizing Open CV and Deep Face methods, both of which have achieved high accuracy as well as real-time performance on normal hardware. This was demonstrated as proof that, by using a combination of both computer vision and deep learning, emotion-aware applications can be created and utilized effectively within the fields of health care, education, security and human-computer interaction.

Future improvements anticipated to be implemented are GPU acceleration, support for multiple cameras, advanced emotional recognition, user profiling, deployment on mobile and web-based devices, cloud-based data analysis, and the implementation of other AI modules for increased scalability and increased impact on the physical world through real-time emotion-based applications.

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