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Age and Emotion Detection for Movie Theatre Report

1 Introduction

The Age and Emotion Detection task focuses on developing a machine learning model capable of detecting the age of individuals entering a horror movie theatre. The model determines whether a person is allowed entry based on their age and predicts their emotion if they fall within the permitted age range. Additionally, all data, including age, emotion, and entry time, are stored in an Excel or CSV file for record-keeping.

2 Background

Age and emotion detection models utilize deep learning techniques to analyze facial features and extract relevant attributes. These models enhance security measures by enforcing age restrictions and provide insights into audience reactions based on emotion analysis.

In this task, a custom-trained deep learning model was used to process real-time video input, detect age, classify emotions, and store relevant data in a structured format.

3 Learning Objectives

- ❖ Develop a machine learning model for real-time age detection.
- ❖ Implement an age-based restriction system with visual alerts.
- ❖ Integrate emotion detection for individuals aged between 13 and 60.
- ❖ Store detected data in an Excel or CSV file for analysis and auditing.

4 Activities and Tasks

- ❖ **Model Development:** Train a custom deep learning model for age and emotion detection.
- ❖ **Data Preprocessing:** Prepare images by resizing, normalizing, and augmenting the dataset.
- ❖ **Age Detection:** Identify individuals' ages and classify them into predefined categories.
- ❖ **Emotion Detection:** Implement emotion classification for individuals in the permitted age range.
- ❖ **Entry Restriction System:** Display a "Not Allowed" message and mark individuals with a red rectangle if their age is below 13 or above 60.
- ❖ **Data Storage:** Save age, emotion, and entry time in an Excel or CSV file.

5 Skills and Competencies

- ❖ Proficiency in Python and OpenCV.

- ❖ Knowledge of deep learning frameworks such as TensorFlow and Keras.
- ❖ Understanding of image preprocessing and feature extraction techniques.
- ❖ Experience with data storage and handling using Pandas.

6 Feedback and Evidence

- ❖ Successfully implemented a real-time age and emotion detection system.
- ❖ Ensured the proper marking of individuals based on age-based restrictions.
- ❖ Verified accurate storage of detection results in an Excel/CSV file.
- ❖ Observed how the model differentiates age groups and predicts emotions effectively.

7 Challenges and Solutions

- ❖ **Challenge:** Handling variations in facial expressions and lighting conditions.
 - **Solution:** Applied data augmentation and adaptive preprocessing techniques to enhance model robustness.
- ❖ **Challenge:** Efficiently classifying both age and emotions in real time.
 - **Solution:** Optimized the model by using a lightweight CNN and OpenCV-based real-time processing.
- ❖ **Challenge:** Storing and organizing detected data efficiently.
 - **Solution:** Implemented structured logging using Pandas to save data in a well-formatted CSV file.

8 Outcomes and Impact

- ❖ Improved real-time age and emotion detection accuracy.
- ❖ Enhanced audience security through automatic restriction enforcement.
- ❖ Provided valuable data insights by storing detection records.
- ❖ The methodology can be adapted for other real-time surveillance and security applications.

9 Conclusion

The Age and Emotion Detection task successfully demonstrated the application of deep learning in real-time security enforcement and audience analytics. The model ensures compliance with age restrictions in a horror movie theatre while also analyzing audience emotions. The stored data provides valuable insights for further analysis, improving overall decision-making and system effectiveness.