EMOTION DETECTION FROM FACIAL EXPRESSION AI AGENT

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Abstract :

The Emotion Detection AI Agent is an intelligent system designed to identify human emotions from facial expressions automatically. The system takes a facial image or video stream as input, extracts facial features, and classifies the performance of the model into categories like Happy, Sad, Angry, or Neutral. This project demonstrates how AI can understand human psychological states efficiently.

Introduction :

Artificial Intelligence plays a vital role in automating the understanding of human behavior. In various industries, analyzing human emotions manually is time-consuming and prone to bias. This AI Agent automates the process by analyzing facial landmarks and providing intelligent feedback on the user's emotional state.

Problem Statement :

In existing systems, human observers must manually evaluate emotional responses, which is inefficient and prone to errors when handling large groups. Hence, there is a need for an automated AI-based system to analyze facial expressions and generate emotional reports.

Objective of the Project :

- To collect facial images as input.
- To detect and isolate faces from the background.
- To classify emotional states based on facial features.
- To provide intelligent suggestions based on detected moods.
- To reduce manual effort in sentiment analysis.

- To function as an autonomous AI Agent.

Scope of the Project :

- Applicable for security and mental health monitoring.
- Uses standard deep learning libraries.
- Rule-based and model-based analysis.
- Educational and research purpose only.
- Can be enhanced in the future with more complex ML models.

System Architecture :

The system consists of four main modules:

- Input Module: Analyze the input image.
- Processing Module: Processes the image.
- Decision-Making Module: Deep learning model classifies the emotion.
- Output Module: Displays the emotion label and bounding box.

Algorithm :

1.Start

2.Read image or webcam frame

3. Detect face coordinates

4. Extract facial features using a neural network

5. Compare features with learned thresholds

6. Classify the emotion

7. Display result and emotion label

8. Stop

Implementation :

The project is implemented using Python programming language in Google Colab. The AI Agent uses deep learning logic to analyze facial expressions and make decisions automatically.

Technologies Used:

- Python
- Google Colab
- DeepFace / OpenCV

Code link :

- Image File: https://colab.research.google.com/drive/12u53D4vebCrol4MfSjQm5D42edUK0Mza?usp=sharing

- Webcam: https://colab.research.google.com/drive/1f6Sm5rWpBUAeQwcMzurwbOreQ7j_MiuC?usp=sharing

Result :

The system successfully analyzes facial marks and displays the emotion level along with appropriate labels. The output is clear and useful for behavioral evaluation.

Sample Output:

Detected Face: User Face
Dominant Emotion: Happy
Confidence: 95%

Conclusion :

The Emotion Detection AI Agent effectively demonstrates the use of artificial intelligence in behavioral analysis. The system operates autonomously and reduces manual workload. This project proves that AI Agents can be efficiently used in human-computer interaction applications.

Future Enhancement :

- Add multi-face detection for group analysis.

- Integrate advanced machine learning models for higher accuracy.

- Store emotion history in a database.
- Develop a web or mobile application for real-time tracking.