



# Social emotion Detector

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# Abstract

1. Human emotion detection from image is one of the most powerful and challenging research task in social communication.
2. Deep learning (DL) based emotion detection gives performance better than traditional methods with image processing.
3. This project presents the design of an artificial intelligence (AI) system capable of emotion detection through facial expressions.
4. It discusses about the procedure of emotion detection, which includes basically three main steps: face detection, features extraction, and emotion classification.
5. This project proposed a convolutional neural networks (CNN) based deep learning architecture for emotion detection from images.

# Problem Statement

1. Human emotions and intentions are expressed through facial expressions and deriving an efficient and effective feature is the fundamental component of facial expression system.
2. Face recognition is important for the interpretation of facial expressions in applications such as intelligent, man-machine interface and communication, intelligent visual surveillance, teleconference and real-time animation from live motion images.
3. The facial expressions are useful for efficient interaction Most research and system in facial expression recognition are limited to six basic expressions (joy, sad, anger, disgust, fear, surprise).
4. It is found that it is insufficient to describe all facial expressions and these expressions are 3 categorized based on facial actions.
5. Detecting face and recognizing the facial expression is a very complicated task when it is a vital to pay attention to primary components like: face configuration, orientation, location where the face is set.

# Aim and Objective

The primary goal of this project is to design, implement and evaluate social emotion detector system using various statistical learning techniques.

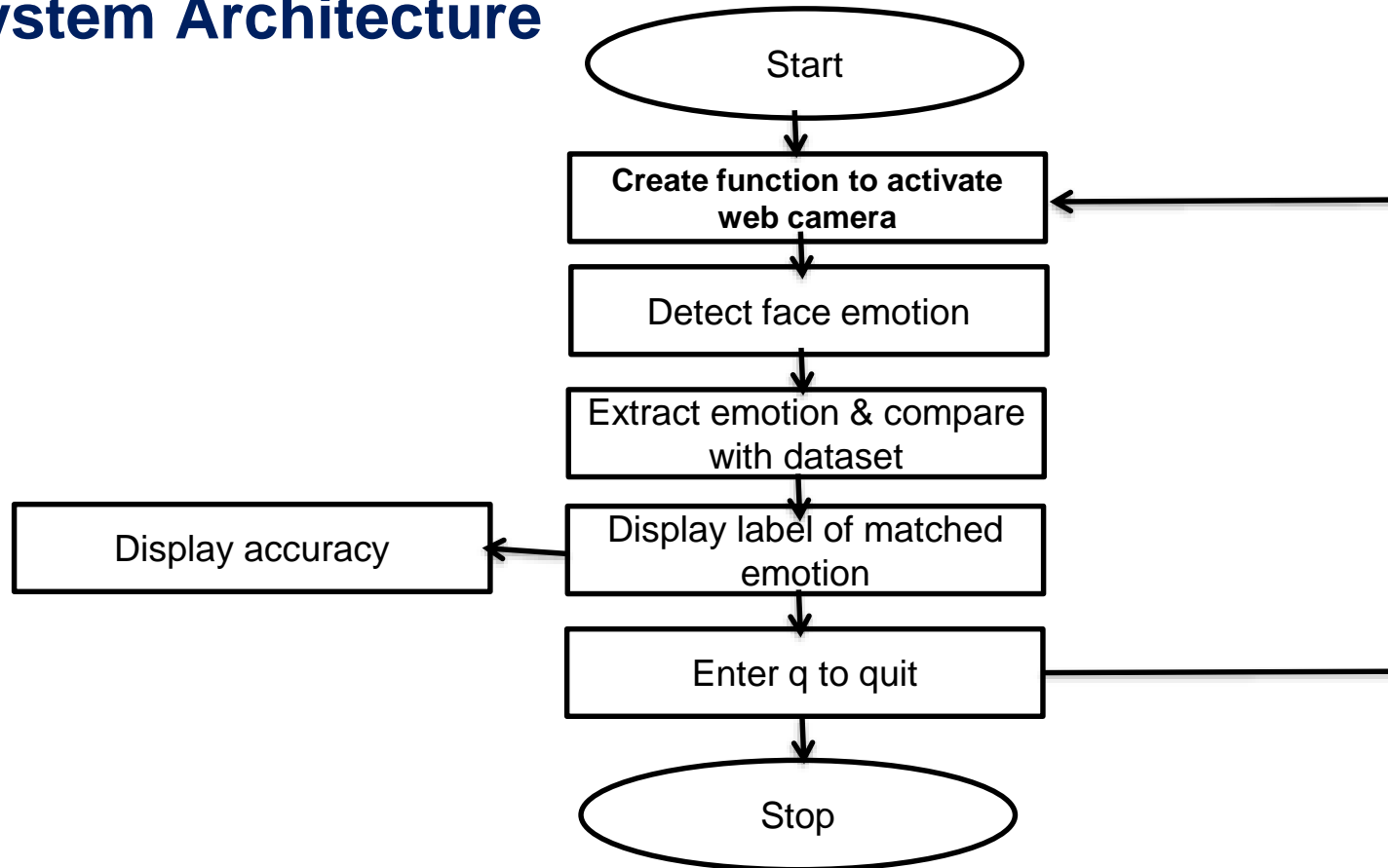
This goal will be realized through the following objectives:

1. A facial expression recognition system usually consists of multiple components, each of which is responsible for one task.
1. Implement and test various techniques for each module and find the best combination by comparing their accuracy, speed, and robustness.

## Proposed Solution

1. In this work, a simple solution for facial expression recognition that uses a combination of algorithms for face detection, feature extraction and classification is discussed.
2. The proposed method uses CNN models.
3. When the model predicts incorrectly, the correct label is often the second most likely emotion. The facial expression recognition system presented in this research work contributes a resilient face recognition model based on the mapping of behavioural characteristics with the physiological biometric characteristics.
4. The physiological characteristics of the human face with relevance to various expressions such as happiness, sadness, fear, anger, surprise and disgust are associated with geometrical structures which restored as base matching template for the recognition system.
5. The behavioural aspect of this system relates the attitude behind different expressions as property base.

# System Architecture



# System Deployment Approach

## Define Requirements

1. Identify use cases (e.g., customer service).
2. Establish performance metrics like accuracy and latency.

## Data Preparation

1. Collect and augment a large, labeled dataset.
2. Pre process images by normalizing and aligning faces.

## Model Development and Training

1. Choose an appropriate model architecture (e.g., CNN).
2. Train and validate the model, then evaluate its performance.

## Deployment Strategy

1. Decide between edge and cloud deployment based on needs.
2. Use Docker for containerization and develop RESTful APIs.



## Algorithm & Deployment

1. **NumPy**: Python library for numerical computing, providing support for large, multi-dimensional arrays and matrices, along with a collection of mathematical functions.
2. **Seaborn**: Statistical data visualization library based on Matplotlib, offering a high-level interface for creating informative and attractive statistical graphics.
3. **TensorFlow**: Open-source machine learning framework developed by Google, widely used for building and training deep neural networks, including applications like image recognition, natural language processing, and more.
4. **Matplotlib**: Comprehensive plotting library for creating static, interactive, and animated visualizations in Python, widely used for data visualization tasks.
5. **OS**: Python library providing a portable way of interacting with the operating system, enabling tasks such as file and directory manipulation, process management, and environment variables handling.
6. **OpenCV**: Open-source computer vision library, providing tools and algorithms for real-time image and video processing, including tasks like object detection, face recognition, and motion tracking.

# Conclusion

1. The facial emotion recognition system offers valuable insights into human behavior.
2. It enhances biometric security by mapping facial expressions to emotions.
3. This technology has applications in healthcare, education, customer service, and workplace dynamics.
4. The proposed asymmetric cryptosystem provides secure authentication without passwords or smart cards.
5. Overall, facial emotion recognition has the potential to improve societal well-being and security significantly.

# Future Scope

Future advancements in facial emotion recognition can lead to more empathetic and responsive systems, improving overall societal well-being and efficiency

1. **Healthcare and Education:** Improve mental health monitoring and personalized learning through emotion detection.
2. **Security and Entertainment:** Aid in criminal detection, create more engaging entertainment experiences, and enhance human-computer interaction.
3. **Customer Service and Workplace:** Enhance customer experiences, address employee well-being, and improve team dynamics.
4. **Marketing and Public Safety:** Optimize targeted advertising, ensure public safety through crowd management, and assist in crisis response.

## Reference link

- <https://www.kaggle.com/code/jonathanoheix/face-expression-recognition-with-deep-learning/input>

**Video link**

[https://drive.google.com/file/d/1bVRWhYgbovsyHiASXYVCXD6by5UzgyWX/view?usp=drive\\_link](https://drive.google.com/file/d/1bVRWhYgbovsyHiASXYVCXD6by5UzgyWX/view?usp=drive_link)

**Thank you!**