**Auto Capture Selfie by Detecting Smile**

Synopsis report submitted in partial fulfilment of the requirement for the award of the Degree of **Bachelor of Technology**

by

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**2025**

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**Introduction**

Today’s self-capturing world offers the ability to unwind, smile and take selfies all at the same time! A twinkle in the eye coupled with a warm genuine smile is perhaps the best way to describe an individual in their state of joy. But more often than not, smiling for an image can lead to fake or forced looking expressions. The project "Auto Capture Selfie by Detecting Smile" seeks to take that challenge head-on, using real-time image processing techniques to intuitively automate the selfie capturing process at the user smile detection stage. It aims to, not only detector but also lock in an image autonomously, eradicating the need for tactile interaction. With this approach, taking selfies becomes an experience that is far easier and more entertaining. By merging concepts from machine learning, computer vision, and mobile or webcam equipment, the project constructs an automated selfie system which requires no manual intervention at any level.

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**Title**

Design and Development of a Smile Detection Selfie Capture System using python and OpenCV in Real Time.

**1.Abstract**

With the advent of smartphone devices and social networking sites, selfies have become a daily routine. Pressing the capture button manually, though, can result in bumpy shots or forced postures on attempting to capture the ideal smile. This project suggests the use of a smart system that takes a selfie automatically upon detecting a smile. With the use of real-time facial expression detection using machine learning and computer vision, the system provides improved user experience with the absence of manual intervention and more expressive and natural photos.

**2. Introduction**

Selfie usage has grown with the proliferation of front-facing cameras and social media platforms such as Instagram and Snapchat. Yet, utilization of the ideal smile by hand can be a problem. The goal of this project is to automate selfie-taking through the introduction of real-time smile detection into the process to enable hands-free, smile-driven photo taking.

**3. Problem Statement**

Selfie capture has traditionally been through manual intervention, which can:

Interrupt natural expression.

Create blur from shaky hands.

Be inconvenient on hands-free scenarios (e.g., phone mounted or selfie stick).

**4. Objectives**

To detect faces using webcam.

To identify a smiling facial expression.

To capture a photo automatically when a smile is detected.

**5. Literature Review**

OpenCV's Haar Cascades and DNN (deep neural network) modules for face detection.

Deep learning techniques using CNNs (convolutional neural network) for facial expression recognition.

Research on FER (Facial Expression Recognition) datasets such as FER-2013.

Currently available apps that use gestures or voice to capture selfies.

**6. Methodology**

System Architecture

Input → Camera Feed

Processing → Face Detection → Smile Detection → Timer/Confirmation

Output → Auto-Captured Image Saved to Disk

Technology Stack

Python

OpenCV

TensorFlow/Keras (for model training if necessary)

Pre-trained models (Haarcascade , Dlib or CNNs)

GUI: Tkinter (python library) or OpenCV window

Smile Detection Algorithm

Pre-trained classifiers such as Haarcascade for rapid detection.

Optional: Fine-tuned CNN for improved accuracy.

Smile detected if mouth corners are raised and lips are turned up.

Auto Capture Mechanism

After detecting a smile and maintaining the same for 1-2 seconds:

Take the picture.

Save to A.I project folder.

**7. System Design**

Use Case Diagram

Actor: User

Use Cases: Open App → Detect Face → Detect Smile → Auto Capture → Save Image

Flowchart

Start → Open Camera → Detect Face → Detect Smile → If Smile: Start Timer → Capture Image → Save → Display → End

**8. Implementation**

Environment Setup

Python 3.x

Libraries: OpenCV, NumPy, Dlib/TensorFlow (optional), Tkinter

Code Structure Overview

main.py: Run the application

face detector detect the face, smile detector detect the smile and capture the image.

Face Detection

Use Haar cascade: (“haarcascade\_frontalface\_default.xml”) file for face detection.

Optimize parameters to get highest frame rate.

Smile Detection

Detect smile using Haar cascade: (“haarcascade\_smile.xml”)

Temporarily add a CNN-based smile detector.

Camera Integration

Utilize OpenCV's cv2.VideoCapture(0) to access the webcam.

Live feed displayed on GUI.

Auto-Capture Trigger

Smile consistently for 1-2 seconds.

Optional: display countdown.

Save the captured image in local disk D.

**9. Results and Output**

Automatically takes selfies on smiling.

Timestamp used as filename when saving captured image.

Good success rate even in bright light conditions.

Interactive UI for instantaneous feedback.

**10. Advantages and Limitations**

*Advantages-*

* No manual interaction required.
* Improved timing to capture natural smiles.
* Beneficial in accessibility-driven designs.

*Limitations-*

* Can miss smile in low illumination or occluded faces.
* False positives when there are open mouths or partial smiles.
* Can be slow on slow hardware in real time.

**11. Future Scope**

Integration with smartphone applications (iOS/Android).

Add voice commands.

Add group selfies and multiple smile detection.

Improve detection using 3D facial module.

**12. Conclusion**

This project brings to light an innovative approach to the selfie-capture process with automatic smile detection. It leverages computer vision and low-level interaction for effortless high-quality selfies.

**13. References**

OpenCV Documentation: https://docs.opencv.org

Facial Expression Recognition Datasets (FER2013, CK+, etc.)

Deep Learning for Face and Smile Detection papers.

Python GUI and camera integration tutorials