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FaceSort: An Automated Image Organizer Using Facial Recognition

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Abstract: ***This work introduces a practical system designed to perform facial recognition in real time, paired with automated email delivery for streamlined communication. The system is built using Python, making use of libraries such as OpenCV and face-recognition to capture and analyze facial features from a live webcam feed. Once a face is identified, the captured image is sent to a cloud- based service for classification. After processing, the system automatically emails the classified image to a specified recipient using secure email protocols. By automating these tasks, the system minimizes manual effort, improves reliability, and ensures that important information is delivered quickly and efficiently.***
Keywords: Face recognition, Real-time processing, automatic email notification, image classifica- tion, cloud computing, surveillance systems

I. INTRODUCTION

In an increasingly connected digital world, facial recognition technology is playing a growing part in streamlining identity verification, access control, and personalized interactions. From security and educa- tion to healthcare, events, and client service, its operations are expanding fleetly. Yet, numerous results fall suddenly when it comes to integrating real-time discovery with smart backend processing and automated communication. This project aims to bridge that gap by erecting a complete facial recognition system that brings together real-time original discovery, cloud-based image bracket, and automatic email delivery.

Developed using PyCharm, an extensively used Python development terrain, the system relies on robust libraries like OpenCV and face- recognition for accurate face discovery whether from a live webcam feed or uploaded images. This real-time discovery forms the system's core, preparing visual data for further anal- ysis. To complete the colonization process, the system includes a email announcement module powered by Python's split and secure protocols. Once an image is successfully classified, it is attached to a personalized email and transferred directly to the correct recepient removing the need for any manual handling.

By seamlessly combining face discovery, smart bracket, and automated delivery, this system offers a practical, effective result for intelligent image processing and communication. Each element works to- gether to insure the entire process from recognition to delivery is smooth, accurate, and user-friendly.

II. LITERATURE SURVEY

The literature reviewed spans a diverse set of methodologies and technologies applied in the field of Face Recognition.

1) Create a custom facial recognition system with Amazon Rekognition, as explained in the 2017 AWS blog post titled "Develop Your Own Face Identification Service with Amazon Rekognition." explains how to produce a serverless facial recognition system using AWS tools. It uses Rekognition for face analy- sis, Lambda for robotization, S3 for image storehouse, and DynamoDB for metadata. When an image is uploaded, facial features are uprooted with the IndexFaces API and stored, while metadata is saved. The SearchFacesByImage API is also used to match new images grounded on similarity. The post also covers use cases like access control and offers deployment way using AWS CloudFormation.

2) Review of an Efficient Facial Identification Framework Employing hybrid Methodology The paper by Bhattad, Bijwe, and Bhagat presents a combined approach to facial recognition, using Local Binary Pattern(LBP) for landing crucial facial features and Principal Component Analysis(PCA) to reduce data size and speed up processing. This system was tested on a different image set and showed bettered performance over traditional PCA-only systems. What sets this work piecemeal is its attempt to mimic how the human brain processes faces, aiming to make recognition systems that work well indeed in changeable real-world settings like security and identification systems.

3) Image Spam Bracket using Deep Learning Ajay Pal Singh(2018) delved the elaboration of spam detection in his master's design, highlighting the transition from textbook- grounded pollutants to image- grounded ways. As spammers began hiding

content in images, traditional styles came less effective, prompt- ing the use of visual analysis through machine literacy. Despite advancements, early image- grounded approaches plodded because of the intricacy of spam images. The study emphasizes the pledge of deep literacy — especially CNNs for self-directed learning of features from images. Singh explores models like VGG19 and custom CNNs, which led for the advancement of further suitable training dataset for the study.

4) Facial Recognition Approach Using LBPH Algorithm The authors describe a practical face recognition setup that uses the LBPH algorithm, known for handling lowlight conditions well. The system detects faces using Haar Cascades and then breaks the image into sections, turning patterns of pixel intensity into his- tograms. Built with Python and OpenCV, it's quick to train and showed reliable results on a small, custom dataset. While the system works well for detecting faces exhibiting different expressions or lighting, it tends to struggle when faces move too fast or get partially blocked. Even with that, it's a simple and useful solution for things like attendance tracking or security checks.

5) LBPH-based Enhanced On-the-Spot Face Identification inside this study, the authors explore an im- proved instantaneous facial identification framework leveraging the LBPH (Local Binary Pattern His- togram) technique. They begin by reviewing a variety of face recognition methods—from older geo- metric matching and PCA to more advanced tools like neural networks, SIFT, SURF, and Gabor filters. Among these, LBPH stands out for being fast and reliable. The system works by converting face images to grayscale, analyzing texture patterns in smaller regions using LBP, and then generating histograms that are pieced together to create a full feature profile of the face. Recognition is done by comparing these his- tograms using similarity measures like the Chi-square test. The setup includes image capture, training, and recognition stages, built using Python and OpenCV. Experiments showed strong results, with the system performing well even in less-than-ideal conditions. While it's already effective for real-time use on basic hardware, the authors suggest that combining it with deep learning and better cameras could make it even more powerful in the future.

6) Face Recognition Automation—and sending emails and WhatsApp messages via face detection. The Medium article by Babuakash (2021) showcases a practical approach to automating tasks such as sending emails and WhatsApp messages applying face detection technology in Python. By leveraging the OpenCV library for facial detection and the face-recognition module for identification, the system can recognize in- dividuals in real time through a webcam feed. When a known face is detected, it automatically performs predefined actions like sending an email via the smtplib library or a WhatsApp message using pywhatkit. The setup involves training the system with stored images of individuals and comparing live input during execution. This method, enhanced with basic error handling and customizable user settings, indicates the potential of face recognition to extend beyond security applications into smart automation scenarios such as attendance tracking or personalized alerts.

7) An Overview on Amazon Rekognition Technology Raghavendra Kumar(2021) provides an overview of Amazon Rekognition, pressing its deep literacy-grounded image and video analysis capabilities for tasks such as facial recognition, sentiment discovery, PPE compliance, and content temperance. The service in- tegrates well with other AWS tools, offering real-time processing and scalability across sectors like health- care, retail, and finance. Case studies demonstrate its effectiveness, including high-accuracy mask discov- ery, paperback sentiment analysis, and bettered facial verification in loan processing, showcasing its value in enhancing safety, client experience, and functional effectiveness.

8) Face Identification Method – LBPH Algorithm This design presents a live face recognition system using the LBPH algorithm, designed to work reliably under different lighting and facial angles. Erected with Python and OpenCV, it includes modules for face discovery, feature extraction, and recognition. By analzing pixel patterns and comparing them to stored data, the system directly identifies faces using a webcam. It performs well in real-time scripts like surveillance and attendance shadowing, though future advancements could address challenges like occlusion and rapid motion.

9) Object Discovery Using Haar Cascade–based ML Algorithm Gowsikraja et al.(2022) discuss the utiliza- tion of the Haar Cascade algorithm for real-time object discovery using Python and OpenCV. The system relies on training with positive and negative images to identify objects by surveying for specific features like edges and contrasts. Applied to vehicle discovery, the study highlights its effectiveness in business monitor- ing. While compared to YOLO, Haar Cascade is slower but more reliable in certain scripts, especially with lower datasets. The paper concludes that Haar Cascade is a featherlight, effective result for object discovery in simple or resource constrained surroundings.

10) Face Recognition using LBPH Algorithm, Python and OpenCV Manpreet Kaur and Dr. Naveen Dhillon(2022) present a facial analysis system built with the Original Binary Pattern Histogram (LBPH) algorithm with Python and OpenCV. The approach involves face discovery through Haar falls, model train- ing with facial images, and real-time recognition. Designed for trustability under varied lighting and acts, it suits surveillance and security use. The system shows better accuracy with further

facial features, while remaining effective on low-power bias. The research ends by recommending enhancing performance in further challenging environments.

11) A Review Paper On Face Recognition Using LBPH technique Basitty Anjali(2023) reviews the use of facial recognition, specifically the LBPH algorithm with Haar cascade classifiers, to automate attendance systems. The system captures real-time facial images, processes them through improvement and feature ex- traction, and matches them with stored data to update attendance records in Excel automatically. The paper compares LBPH with other ways like eigen faces and deep literacy, noting high proficiency rates. It also details LBPH's workflow and highlights future advancements similar as pall integration, better accuracy, and privacy safeguards for broader perpetration.

12) A real time face recognition system with email and whatsApp integration for enhanced security. This study introduces a on-the-fly face analysis system combining Haar Cascade and LBPH algorithms for precise discovery and identification. The system uniquely integrates email and WhatsApp announcements via SMTP and API, waking directors immediately upon detecting unauthorized individuals. It achieves high precision, especially with augmented datasets addressing variations like lighting and facial expressions. The literature review compares various methods including CNNs and Viola-Jones, noting that Haar Cascade and LBPH offer effective performance for featherlight, real-time use. Integration with messaging platforms enhances security responsiveness, though challenges remain in complex or dammed scripts. Un- born work aims to ameliorate accuracy using multimodal inputs and advanced deep literacy.

13) Face mask discovery model grounded on deep CNN technique using AWS Tandon et al.(2023) present a face mask discovery systems which utilize deep convolutional neural networks and AWS pall services to combat COVID- 19. The model, trained on combined datasets with the MTCNN armature for dependable face discovery, includes preprocessing methods like resizing and normalization. It achieved a high preci- sion of 99.35 and low loss, outperforming birth CNNs. Enforced with Python and stationed on AWS, the system supports real-time mask monitoring in public spaces. Compared to affiliated models like VGG-16 and MobileNetV2, this approach emphasizes reduced overfitting and strong conception, with plans to incorporate models like YOLOv5 for future advancements in smart surveillance operations.

14) Software Blueprint for Face Recognition Setup Using Amazon Rekognition This paper outlines a cloud-based face detect and recognize setup implemented through Amazon Rekognition and further AWS components including S3, Lambda, DynamoDB, and API Gateway. Designed for real-time security and ac- cess control, the system is scalable, cost-effective, and fast—achieving 93.5processing around 100 images per second with an average response time of 320 ms. The framework demonstrates strong performance using a dataset of 700 images. Compared to traditional algorithms like HAAR, PCA, and CNN, Amazon Recognition offers better integration and scalability. Though challenges like dataset bias remain, promising results indicate the system's suitability for sectors such as healthcare, education, transport, and law enforce- ment.

15) Facial Recognition Algorithms: A Systematic Literature Review El Fadel (2025) provides a com- prehensive review of facial recognition algorithms, examining Conventional machine learning methods like SVM and KNN, and modern deep learning methods, particularly CNNs. The paper evaluates key datasets such as LFW and VGGFace2, and assesses algorithm Measured effectiveness using indicators like accu- racy and F1-score. It highlights ongoing challenges including data bias, limited generalizability, and ethical concerns, stressing the need for improved evaluation standards and transparent development. Synthesizing over 100 studies, the review identifies trends in hybrid models and 3D recognition, critiques limitations like high computational demands, and suggests future directions such as domain-specific training and federated learning. Emphasizing ethical considerations, the paper calls for more inclusive, explainable facial recog- nition systems that balance accuracy with social responsibility.

A. Summary of Literature Survey

This project presents a comprehensive facial recognition system designed to streamline identity verifi- cation and automate communication. As facial recognition becomes increasingly common across sectors like security, healthcare, education, and customer service, this system addresses a critical need for real-time detection combined with intelligent backend processing. Built using PyCharm and leveraging powerful li- braries such as OpenCV and face-recognition, the system accurately identifies faces from both live webcam feeds and static images. It further integrates cloud-based image classification and an automated email noti- fication feature, enabling instant delivery of personalized messages with attached images to the appropriate recipients. By unifying detection, classification, and communication in one workflow, the system offers a smart, efficient, and user-friendly solution for real-time facial recognition and automated response.

B. Table of Summary

Author	Title	Key Insights
AWS Blog	Build Your Own Face Recognition Service Using Amazon Rekogni- tion	Build a scalable face recognition system using AWS ; Covered face indexing ; Image manage- ment via APIs.
L. S. Bhattad, K. B. Bijwe, and V. B. Bhagat	Review of an Efficient Face Recognition System Using Hybrid Methodology	Facial expression and illumination changes ; Hybrid approach (LBP + PCA).
Ajay Pal Singh	Image Spam Classification using Deep Learning	Deep learning (CNNs like VGG19) outper- forms traditional methods by automatically learning complex image features.
Abhishek Pratap Singh, SunilKumar S Manvi, Pratik Nim- bal, Gopal Krishna Shyam	Face Recognition System Based on LBPH Algorithm	LBPH algorithm enables real-time face recog- nition, performing well under poor lighting con- ditions.
F.Deeba, A.Ahmed, H.Memon, F.A. Dharejo, and A.Ghaffar	LBPH-based Enhanced Real-Time Face Recognition	Real time recognition using LBPH ; Edge en- coding and Histogram representation.
Babuakash	Face Recognition Automation and Sending Emails and WhatsApp Messages via Face Detection	Build pipeline (email,whatsapp,AWS) ; Cofi- dence threshold(80% accuracy) ;Demonstrated Orchestration across local ML.
Raghavendra Kumar	An Overview on Amazon Rekogni- tion Technology	AWS Rekognition using deep learning ; Inte- gration with Amazon S3,Lambda and SES ; Achieved 97% accuracy in detecting PPE vio- lations.
Balabharathi, Yu- vasri	Face Recognition System – LBPH Algorithm	The system is efficient for security applications but needs improvements for occlusion and rapid frame changes.
P. Gowsikraja, T. Thevakumaresh, M. Raveena, J. Santhiya, and A. R. R. Vaishali	Object Detection Using Haar Cas- cade Machine Learning Algorithm	Real time capability; system can detect and track vehicles with bounding boxes.
M. Kaur and N. Dhillon	Face Recognition using LBPH Al- gorithm, Python and OpenCV	LBPH based face recognition ; Open CV offers high accuracy .
Basitty Anjali	A Review Paper On Face Recogni- tion Using LBPH Technique	Cloud integration, and privacy handling for wider use.
P. Futane, P. Shelke, A. Khedkar, T. Joshi, S. Chaudhari, and C. Shewale	A Real-Time Face Recognition System with Email and WhatsApp Integration for Enhanced Security.	Haar Cascade and LBPH algorithm for face recognition ; Alerts via Email and whatsapp.
R. Tandon, A. Sayed, and M. A. Hashmi	Face Mask Detection Model Based on Deep CNN Technique Using AWS	Achieved 99.35% accuracy using MTCNN; Im- age processing and data augmentation; De- ployed on AWS.
J. B. Urbanus and Y. M. Malgwi	Software Framework for Face Recognition System Using Ama- zon Rekognition	Deep learning (CNN,VGG16); IoT and edge devices(Raspberry Pi); Hybrid models (com- bining face+ movement detection).
Nazar EL Fadel	Facial Recognition Algorithms: A Systematic Literature Review	Generalizability, computational cost, and ethi- cal concerns, transparency.

III. CONCLUSION

In an era where digital efficiency and intelligent automation are increasingly essential, this facial recog- nition system offers a practical and forward-thinking solution. By integrating real-time face detection, cloud-based image classification, and automated email communication, the system eliminates the need for manual intervention while ensuring speed and accuracy. Developed with reliable Python tools and libraries, it demonstrates how emerging technologies can work together to enhance identity verification and stream- line communication across various industries. Ultimately, this project not only simplifies facial recognition processes but also sets a strong foundation for future enhancements in smart, automated systems.

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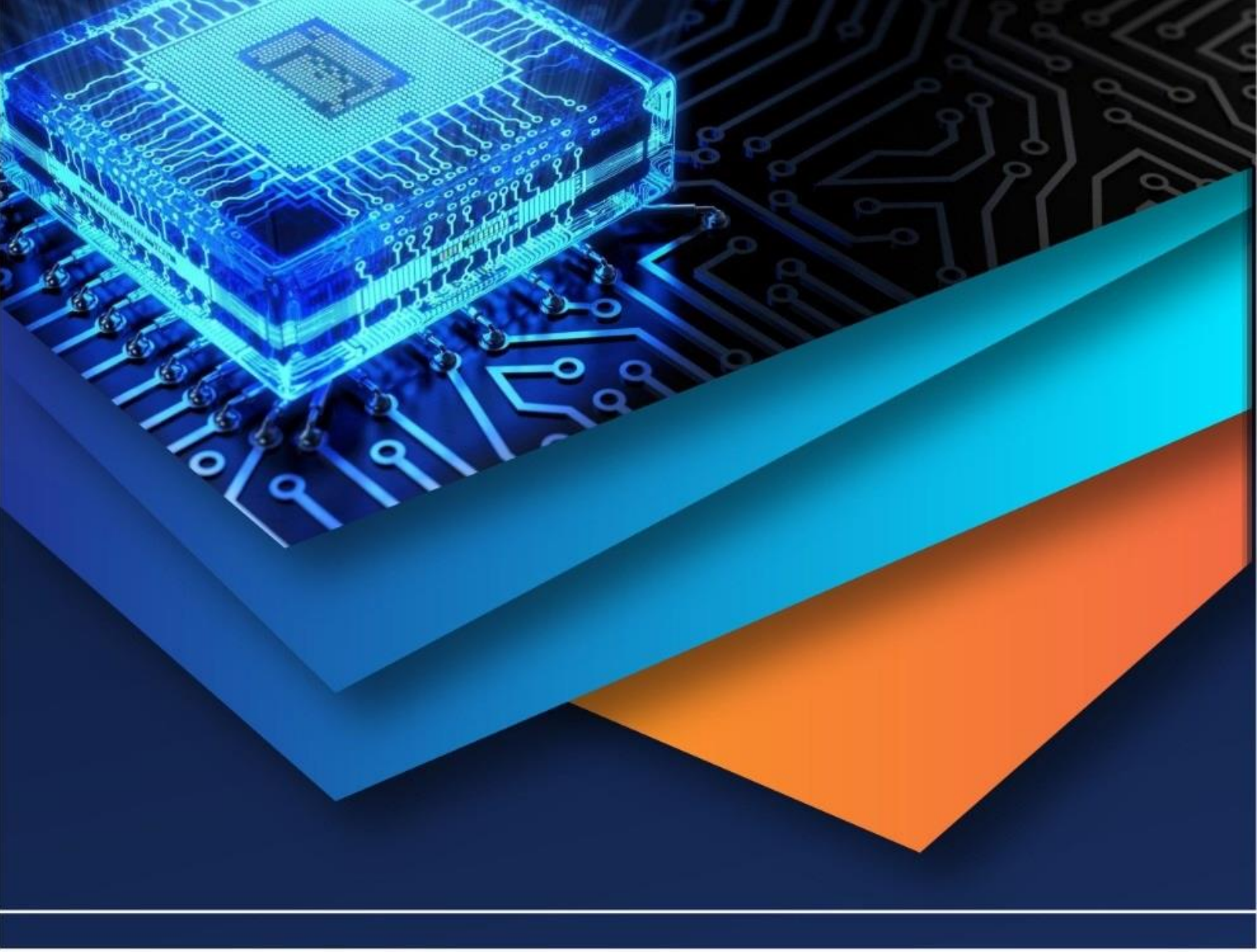

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