Visvesvaraya Technological University, Belagavi – 590018

MINI-PROJECT REPORT
ON

B-LOCK: A Blockchain based e-vault application

Submitted in partial fulfillment for the award of degree of

BACHELOR OF ENGINEERING
in
COMPUTER SCIENCE & ENGINEERING

Submitted by

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DEPT. OF COMPUTER SCIENCE AND ENGINEERING
ST JOSEPH ENGINEERING COLLEGE
An Autonomous Institution

(Affiliated to VTU Belagavi, Recognized by AICTE, Accredited by NBA)

Vamanjoor, Mangaluru - 575028, Karnataka

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CERTIFICATE

Certified that the Mini-project work entitled **"B-LOCK: A Blockchain based e-vault application"** carried out by

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the bonafide students of VI semester Computer Science & Engineering in partial fulfillment for the award of Bachelor of Engineering in Computer Science and Engineering of the Visvesvaraya Technological University, Belagavi during the year 2023-2024. It is certified that all suggestions indicated during internal assessment have been incorporated in the report. The project report has been approved as it satisfies the academic requirements in respect of project work prescribed for the said degree.

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Abstract

The advent of blockchain technology has revolutionized the way data is stored and managed, offering unparalleled security, transparency, and immutability. This report presents the development of a blockchain-based eVault, a decentralized application designed to securely store, retrieve, download, and delete files and documents. The eVault leverages blockchain's distributed ledger technology to ensure the integrity and confidentiality of users' data.

The primary objective of this project is to provide a robust and user-friendly platform for secure document management, addressing the increasing demand for data privacy and protection. The eVault application allows users to upload files directly onto the blockchain, where each document is encrypted and assigned a unique identifier for easy retrieval. Users can access their documents at any time, with the assurance that the data remains untampered due to the immutable nature of blockchain records.

Key features include secure file upload, efficient retrieval using unique identifiers, and comprehensive access control mechanisms that ensure data is accessible only to authorized users. Performance metrics indicate that the system achieves optimal transaction speeds and data retrieval times, even under high loads.

Throughout the development process, challenges such as scalability and integration with existing systems were addressed, resulting in a versatile solution that meets industry demands.

This blockchain-based eVault demonstrates significant potential across various industries, offering a secure and efficient solution for managing sensitive documents. By addressing current limitations in data storage and retrieval, this project paves the way for innovative advancements in digital security and privacy.

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Chapter 1

Introduction

1.1 Background

In today's digital age, the management and security of data have become paramount across numerous industries. With the rapid increase in data generation, there is a growing need for efficient and secure systems to store, retrieve, and manage sensitive information. Traditional storage solutions often struggle with issues of security breaches, data tampering, and unauthorized access.

Blockchain technology has emerged as a revolutionary solution to these challenges, offering a decentralized and immutable ledger that enhances data integrity, transparency, and security. By leveraging blockchain, we can ensure that data is stored in a manner that is resistant to tampering and unauthorized access, making it an ideal solution for managing sensitive documents and files.

This report introduces the development of a blockchain-based eVault, a decentralized application designed to provide a secure platform for storing, retrieving, downloading, and deleting files and documents. The eVault utilizes blockchain's unique capabilities to ensure that user data is encrypted, protected, and accessible only to authorized users, addressing the critical need for data privacy and security in various sectors.

The primary goal of this project is to create a user-friendly platform that leverages blockchain technology to offer a robust solution for document management. This platform allows users to securely upload files to the blockchain, ensuring that each document is encrypted and assigned a unique identifier for easy and secure retrieval. The immutable nature of blockchain ensures that once data is stored, it cannot be altered or deleted without proper authorization, providing a high level of trust and reliability.

1.2 Problem statement

In today's digital age, securing sensitive data is a major challenge due to the limitations of traditional storage systems, which often struggle with data breaches, unauthorized access,

and tampering. There is an urgent need for a reliable solution that ensures data integrity, privacy, and security. The blockchain-based eVault addresses these issues by providing a decentralized platform for secure file storage, retrieval, download, and deletion, leveraging blockchain technology to guarantee data protection and user control.

1.3   Scope

The blockchain-based eVault project aims to develop a secure and efficient platform for managing sensitive documents across various industries. This project focuses on creating a user-friendly application that allows users to store, access, and manage files with complete confidence in their security.

The eVault will feature encrypted file storage, ensuring that all documents are tamper-proof and accessible only to authorized users. It will implement unique identifiers and access control mechanisms for efficient data retrieval and user management, providing a reliable alternative to conventional storage systems.

The application is particularly suited for sectors where data privacy is critical, such as finance, healthcare, and legal services. By offering a robust solution for secure document management, the eVault project addresses the growing demand for data security and privacy, paving the way for innovative advancements in digital information management.

Chapter 2

Software Requirements Specification

2.1 Introduction

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2.2 Functional requirements

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2.3 Non-Functional requirements

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2.4 User Interface requirements

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2.4.1 subsection heading

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2.4.2   subsection heading

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2.5   Software Requirements

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paragraph contents...

2.6   Hardware Requirements

paragraph contents...

Chapter 3

System Design

paragraph contents...

3.1 Architecture Design

Figure 3.1: System Architecture Diagram

This Figure 5.1 illustrates a high-level overview of the audio visual speech separation system. It is important to note that the specific techniques, algorithms, and models used in each component can vary depending on the implementation approach and the requirements of the system.

3.2 Decomposition Description

./pic/sjeclogo.png
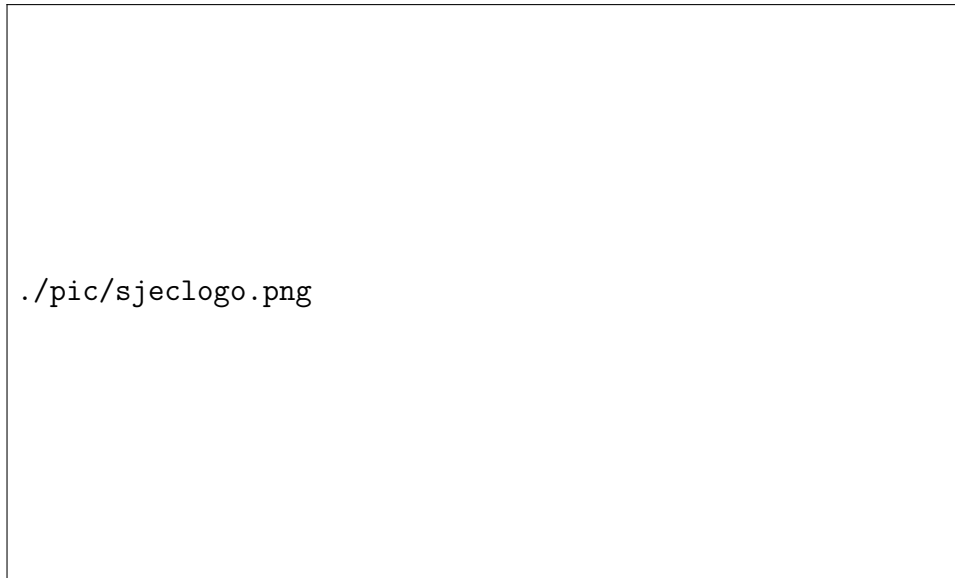
Figure 3.2: Flow chart

Figure 5.2 represent the flow chart of the proposed system. In audio visual speech separation, the goal is to decompose an audio signal containing multiple overlapping speakers into individual speech signals corresponding to each speaker. The decomposition process involves separating the desired speech signals from the background noise and other interfering sounds.

3.3   Data Flow Design

The audio input undergoes pre-processing, while the visual input is processed to extract relevant cues. The pre-processed audio and processed visual data are then integrated. From the integrated representation, features are extracted. These features are utilized in the speech separation stage, where individual speech signals are separated from the mixture. Post-processing techniques are applied to enhance the quality of the separated speech signals. Finally, the individual speech signals are outputted as the result of the system. The data flow design ensures a sequential flow of operations, starting from capturing and processing the inputs, integrating the audio-visual information, extracting features, performing speech separation, applying post-processing, and generating the output. This design allows for effective processing and separation of audio visual data to obtain distinct speech signals from overlapping speakers.
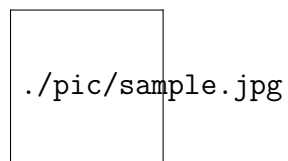
Figure 3.3: Dataflow design

Chapter 4

Implementation

the chapter contains paragraph contents.(Pseudocode, Algorithm etc), for ex: Check the following data

4.1 Audio Extraction

Audio extraction is the process of isolating and extracting the audio content from a multimedia source, such as a video file. It involves separating the audio track from the accompanying video or other elements to obtain a standalone audio file representing the sound present in the source material.

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./pic/sjeclogo.png
```

Figure 4.1: code snippet for audio extraction

4.2 Speech Separation

SpeechBrain is an open-source framework

4.2.1 Sepformer

SepFormer is an algorithm for speech separation that utilizes self-attention mechanisms. It employs a transformer-based architecture to capture long-range dependencies and model the relationships between time-frequency points in the audio mixture, enabling the separation of multiple speech sources from the mixture.
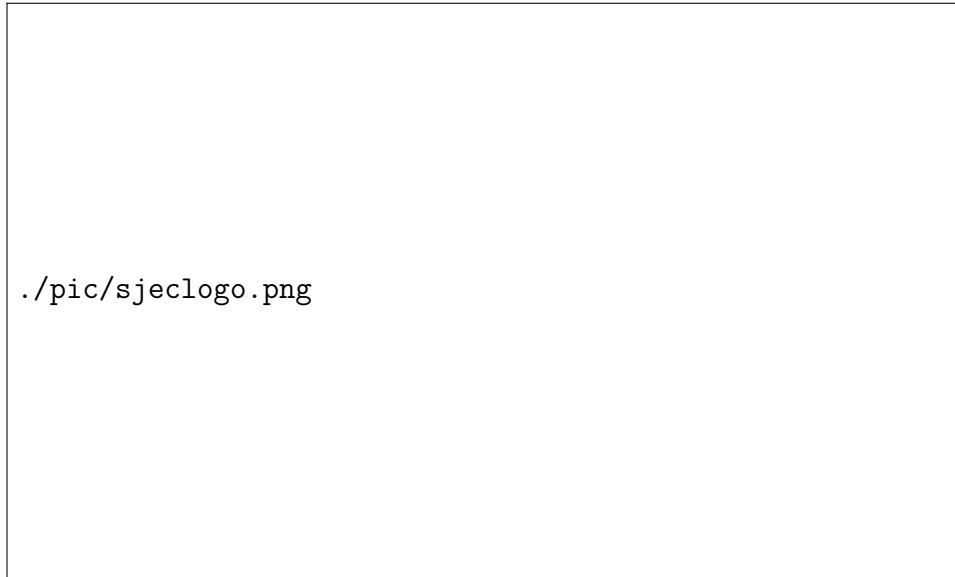
```
./pic/sjeclogo.png
```

Figure 4.2: code snippet for speech separation
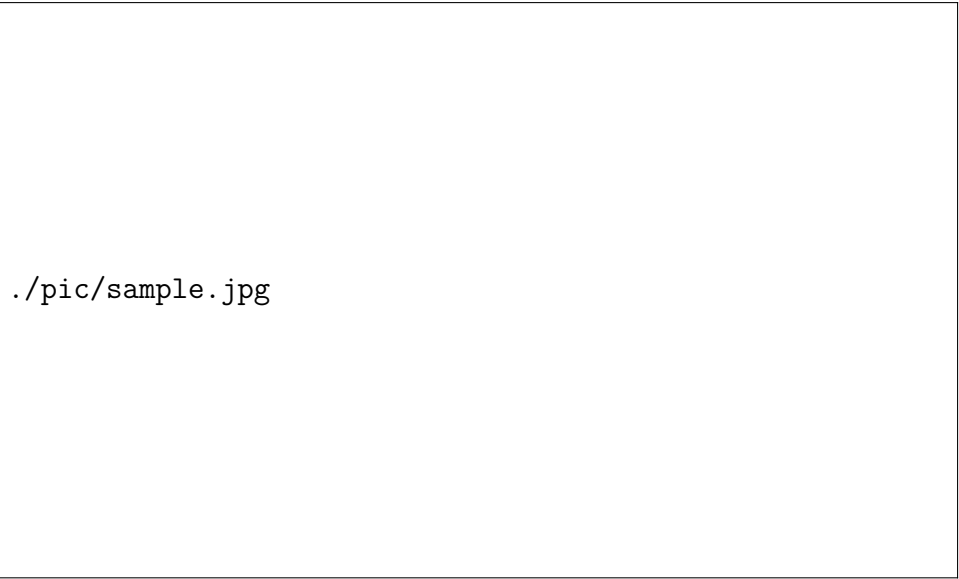
4.3 Speech Enhancement

4.3.1 Lite Audio Visual Speech Enhancement

Lite AVSE algorithm is used for the separation and enhancement of the speech. The system includes two visual data compression techniques and removes the visual feature extraction network from the training model, yielding better online computation efficiency. As for the audio features, short-time Fourier transform (STFT) is calculated of 3-second audio segments. Each time-frequency (TF) bin contains the real and imaginary parts of a complex number, both of which used as input. Power-law compression used to prevent loud audio from overwhelming soft audio. The same processing is applied to both the noisy signal and the clean reference signal.
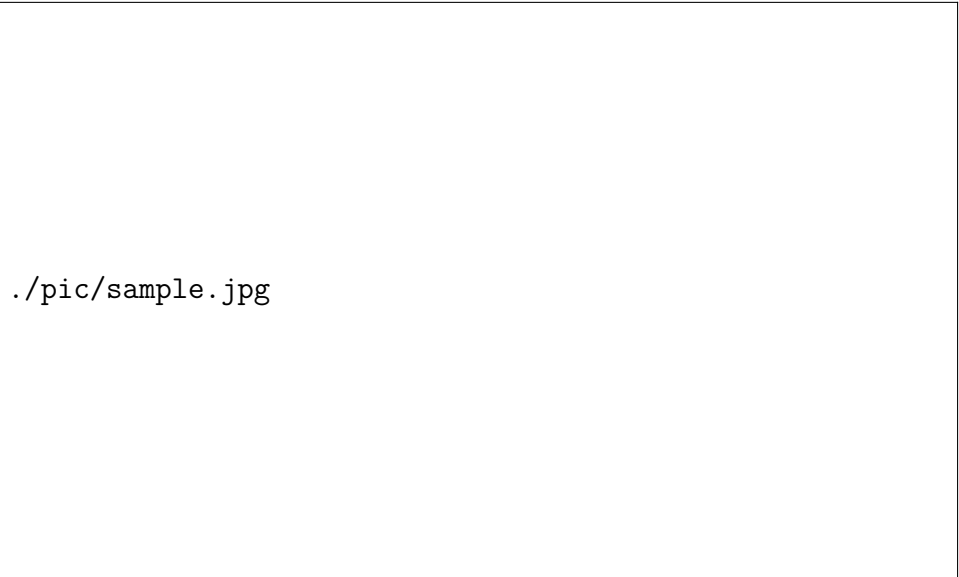
4.3.2 Spectral Subtraction

Spectral subtraction is a technique used in audio signal processing to reduce background noise from an audio signal. It involves estimating the noise spectrum from a noisy signal and subtracting it from the noisy spectrum to enhance the desired signal. The resulting spectrum is then transformed back into the time domain to obtain a cleaner audio signal.

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./pic/sample.jpg
```

Figure 4.3: code snippet for speech enhancement using LAVSE

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```

Figure 4.4: code snippet for speech enhancement using spectral subtraction

4.4   Speaker Detection

The cv2 functions provide methods to load the pre-trained models, apply them to images or video frames, and draw bounding boxes around the detected faces. By leveraging cv2's face detection capabilities, you can automate tasks such as facial recognition, emotion analysis, or face tracking in various applications like surveillance, biometrics, or augmented reality.

Figure 4.5: code snippet for speaker detection

Chapter 5

Results and Discussion

this chapter contains the paragraphs as shown below

5.1   Face detection

Figure 5.1: Face detection

Above figure 8.1 shows initial face detection process using opencv and dlib. It convert the image to grayscale, apply the model using cv2.detectMultiScale(), and draw bounding boxes around the detected faces using cv2.rectangle(). Display or save the result using cv2.imshow() or cv2.imwrite().

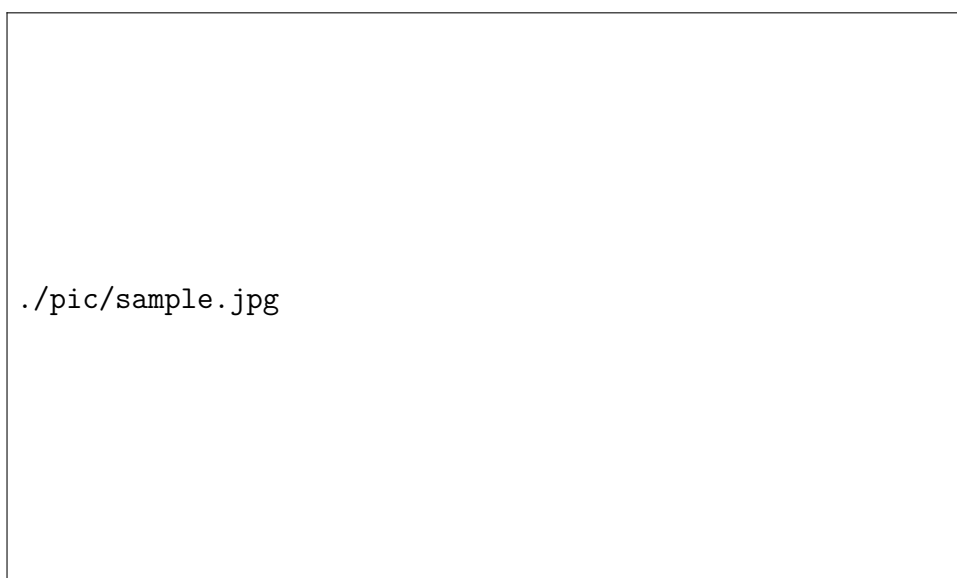## 5.2   Speaker recognition

Figure 5.2: Speaker recognition 1,person 1
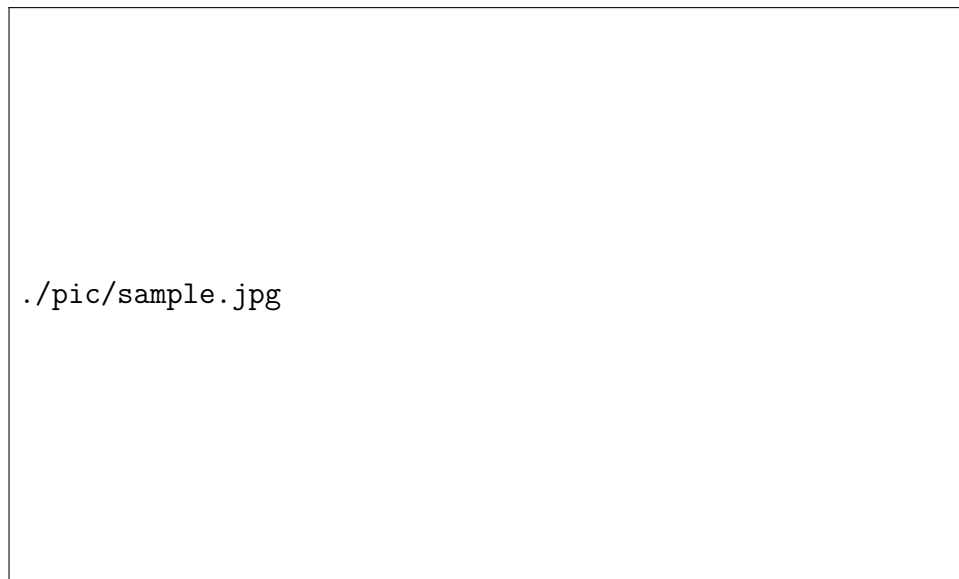

Figure 5.3: Speaker recognition 1,person 2
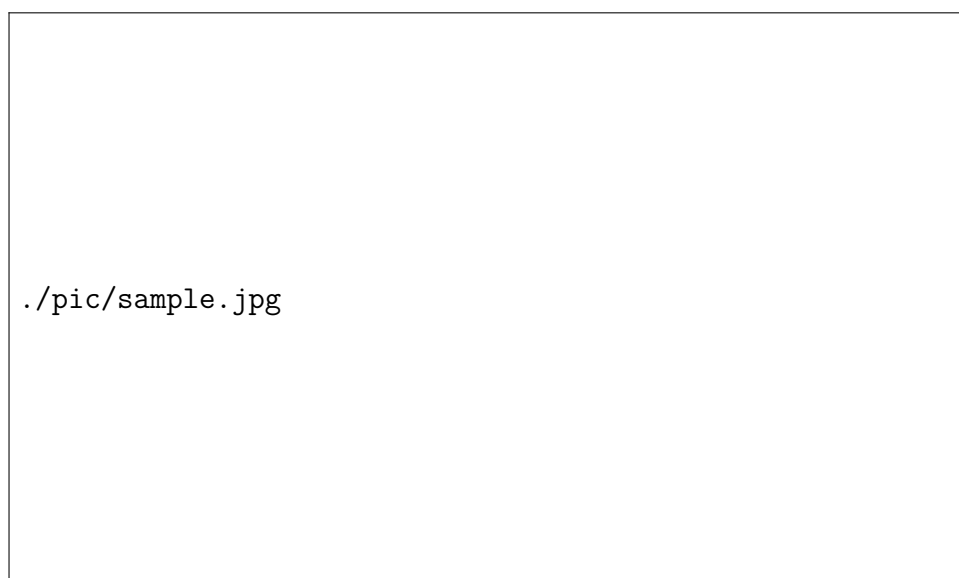
Figure 5.4: Speaker recognition 2,person 1

Figure 5.5: Speaker recognition 2,person 2

./pic/sample.jpg

Figure 5.6: Speaker recognition 3,person 1

./pic/sample.jpg

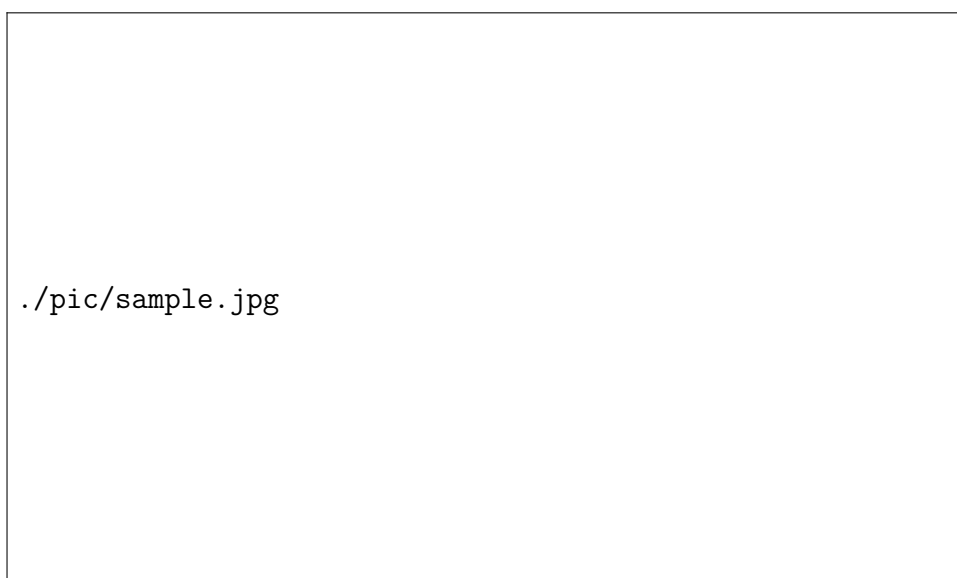Figure 5.7: Speaker recognition 3,person 2

Above figures from 8.2 to 8.7 shows speaker recognition process using opencv and dlib.Speaker detection using cv2 and dlib involves utilizing dlib's pre-trained models along with cv2 functions to detect and locate human faces. By combining face detection with additional techniques such as audio analysis or lip movement tracking, speaker detection can be achieved in various applications like video conferencing or surveillance.

Chapter 6

Conclusion and Future Work

[**bashir2021subjective**] [**mittal2016**] The Project will help in narrowing the imprecise communication problem in real-time data using speech separation and speaker identification technique by Deep Learning and Image Processing algorithms. This will impact the communication and security sectors in a greater extent. Overall, this project aims to develop an application or method that can help to separate the audio-visual speech and enhance it based on speaker identification.

This project can be further developed as:

- By incorporating more real-world testing and gathering feedback from individual units.

- The system can be connected with communication devices or services to enable the users to communicate with others with ease.

[**Tea**] This project has a great potential to make a positive impact on communication and security situations. Its continuous improvement will be important to make this impact even greater

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