



UNIVERSITY OF DHAKA

Department of Computer Science and Engineering

CSE-3111 : Computer Networking Lab

Project Title: ShareNet

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1 Objectives

The main objective of the project is to develop an application that facilitates seamless file sharing over a TCP/IP network. This file sharing application demonstrate the fundamental concepts of computer networking. This application aims to provide users with a reliable and efficient platform for exchanging files across interconnected devices. This project will showcase numerous networking concepts such as socket programming, TCP/IP protocol, client-server architecture and packet routing techniques.

2 Methodology

The methodology of the project involves the following steps:

2.1 Protocols

1. **TCP Reno:** We have implemented TCP Reno for file sharing. It includes slow start, congestion avoidance, fast re-transmit and fast recovery.
2. **UDP:** We have used UDP (User Datagram Protocol) for audio and video sharing. It is because UDP is much lighter than TCP and supports faster data transmission.
3. **Web Socket:** To establish connection between two device we used web socket.
4. **IP Addressing and Routing:** We have employed IP addressing as a means of identifying devices within a network. This code retrieves the hostname of the local computer using the `socket.gethostname()` method and obtains the IP address associated with that hostname using `socket.gethostbyname()`. Subsequently, these IP addresses are utilized to establish connections between the sender and recipient.

2.1.1 Features

1. **Sharing Audio and Video:** The project lets people share their audio and video with other devices that are linked.
2. **File Transfer:** The project lets people share and receive files between devices that are linked together.

3. **GUI Interface:** The Tkinter package is used to make a graphical user interface (GUI) for the project so that it is easy for people to use.
4. **Error Handling:** The project has simple error handling for working with files and socket links.

3 Tools and Techniques

1. **Programming Language:** Python
2. **Libraries:**
 - **pyaudio:** This is commonly used for tasks such as voice recognition, audio processing, and creating audio applications.
 - **cv2:** It is also known as OpenCV (Open Source Computer Vision Library) which is used for video processing task.
 - **socket:** It enables the creation of sockets, which serve as endpoints for sending and receiving data over a network.
 - **threading:** It is used to handle multiple connections simultaneously, allowing the program to perform tasks concurrently and efficiently.
3. **IDE:** VS Code
4. **UI/UX:** tkinter

4 Outcomes

4.1 Snapshots of design

- **Welcome window:** User selects what operation he/she wants to perform.

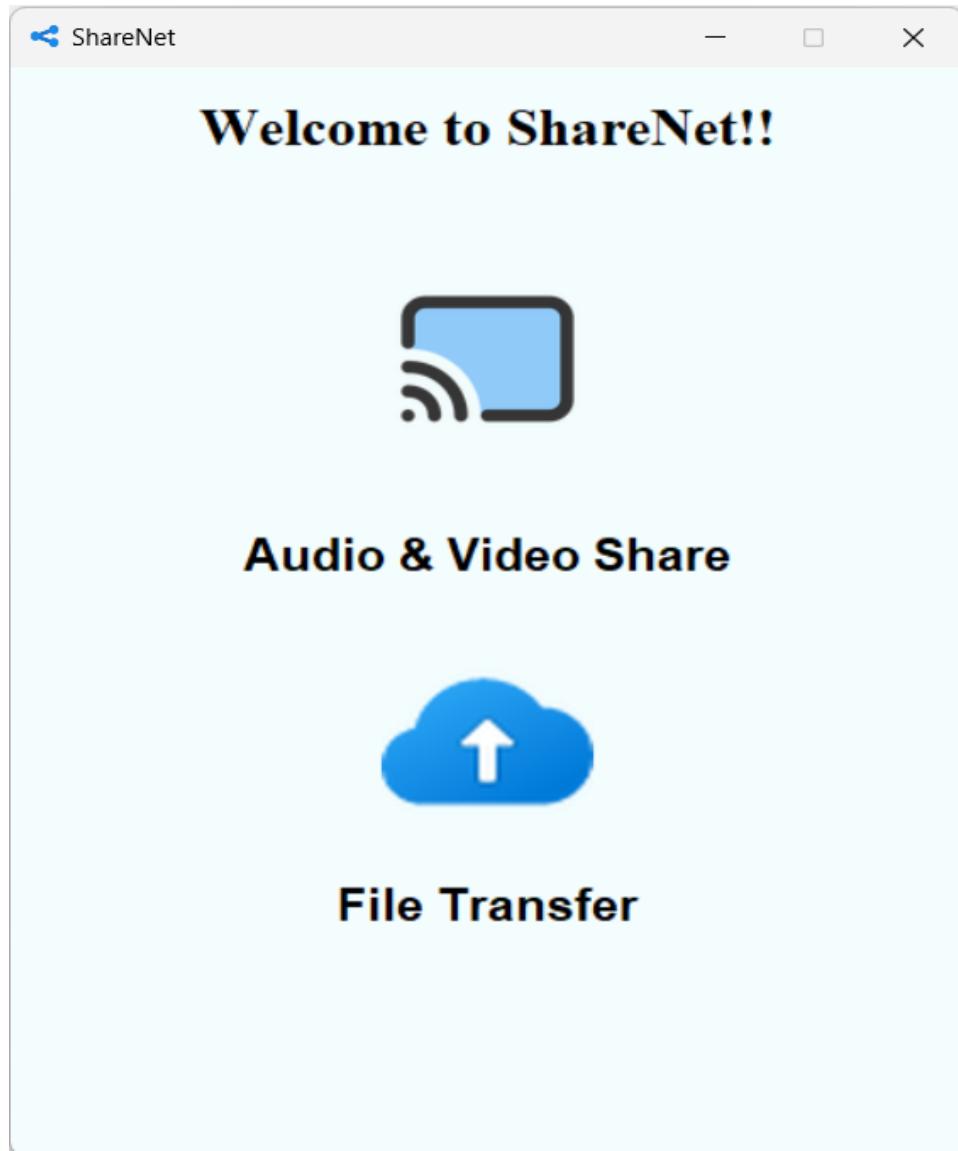


Figure 1: Welcome Landing Page

- **File Transfer:** User selects if he/she wants files to send to or receive from others.

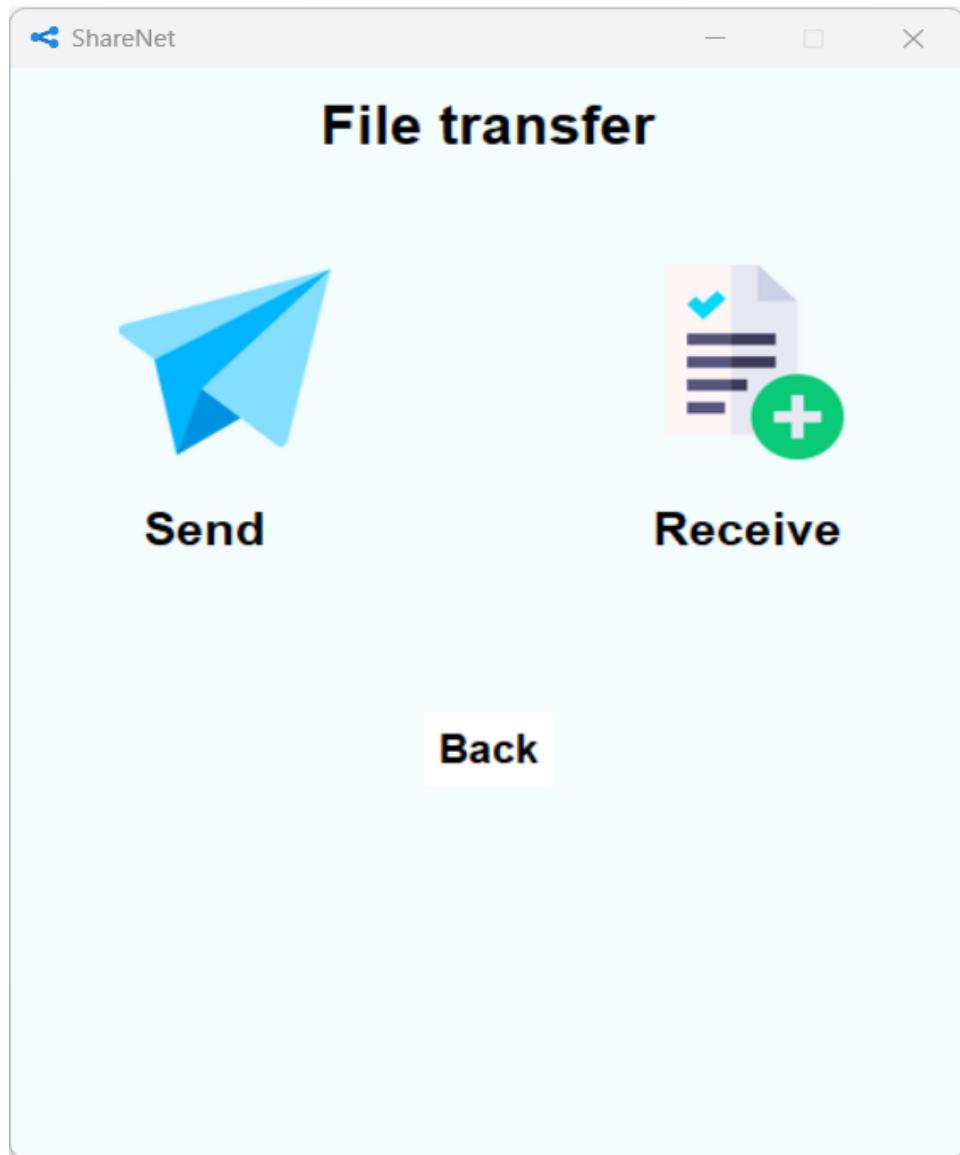


Figure 2: File send/receive selection page

- **Send File:** User selects what file to send and send file.

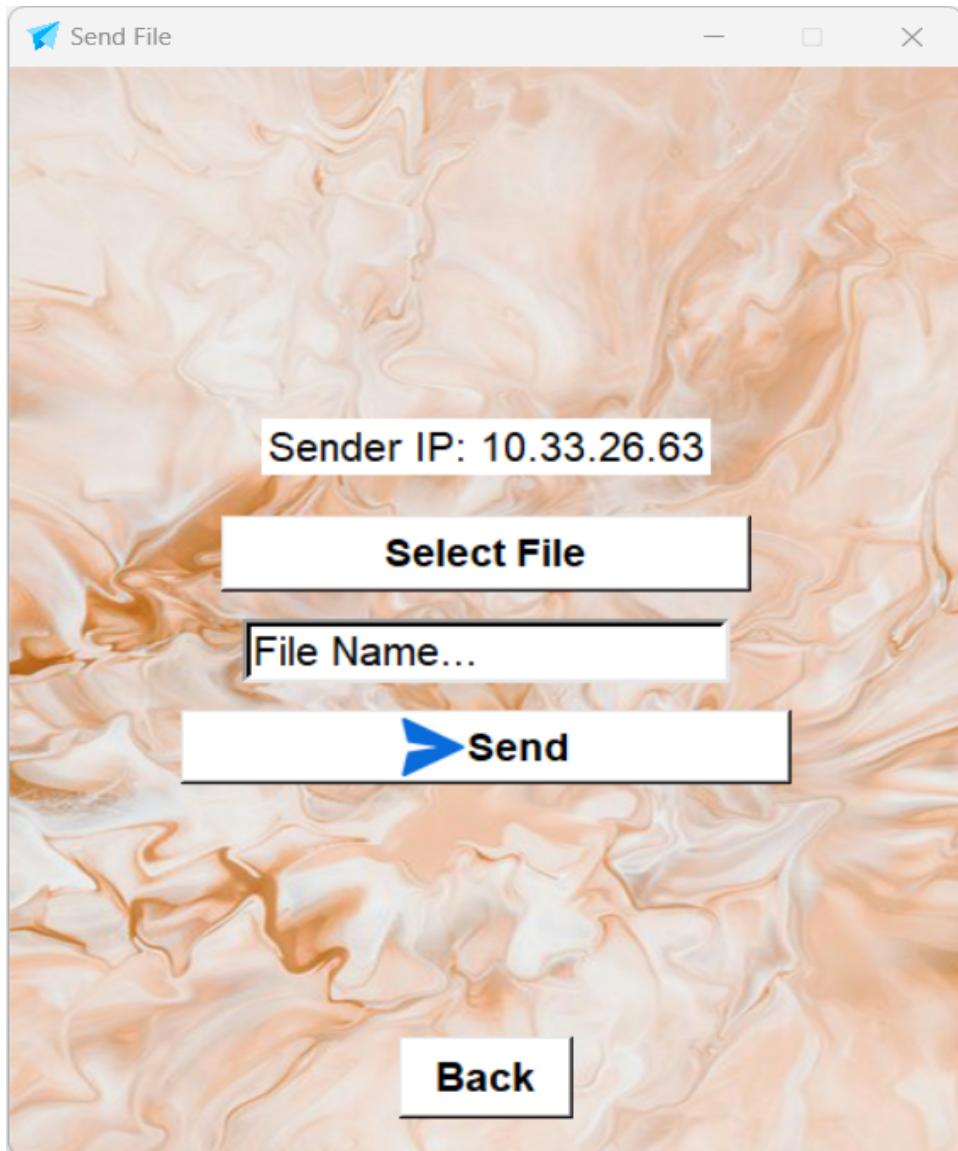


Figure 3: Send File

- **Receive file:** User enters the IP address of the sender and waits to receive the file.

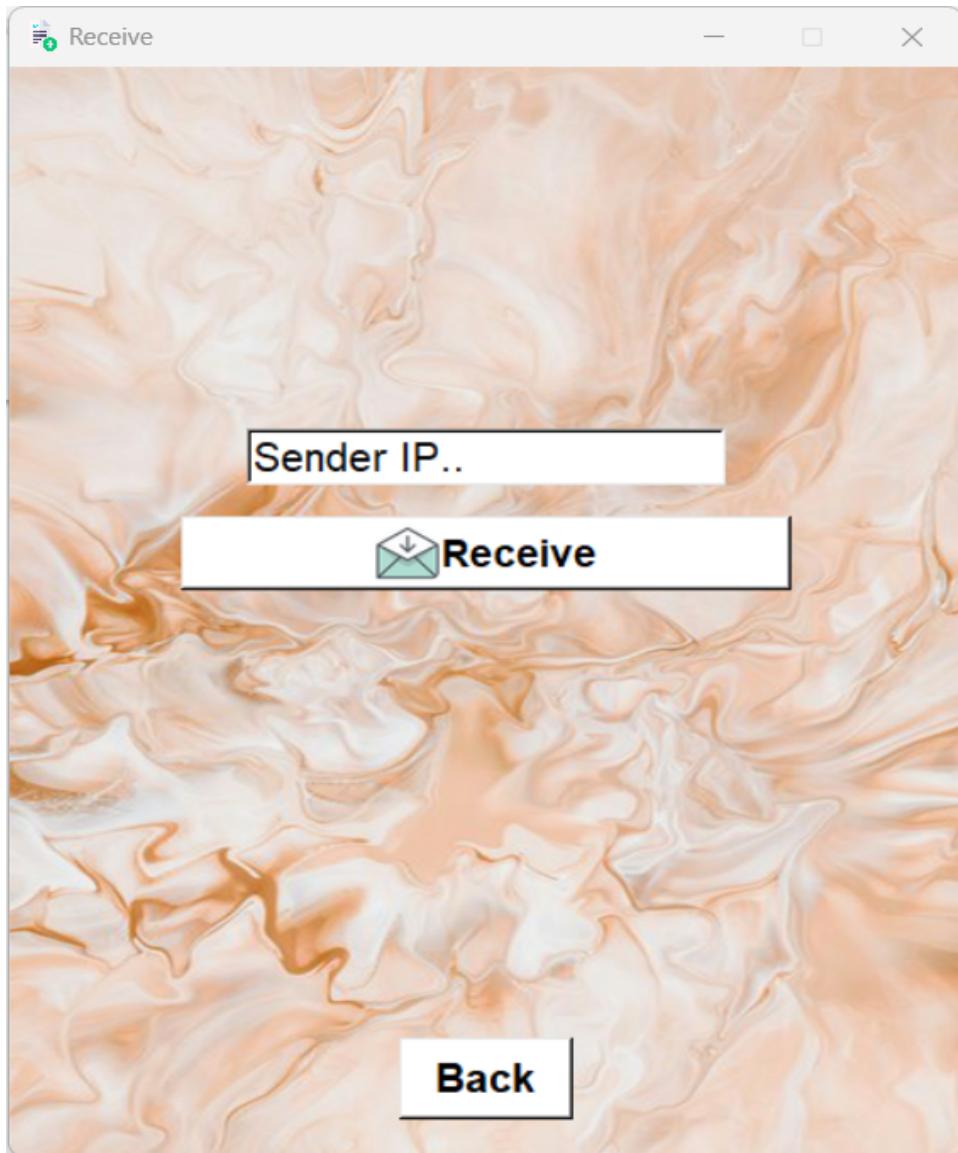


Figure 4: Receive File

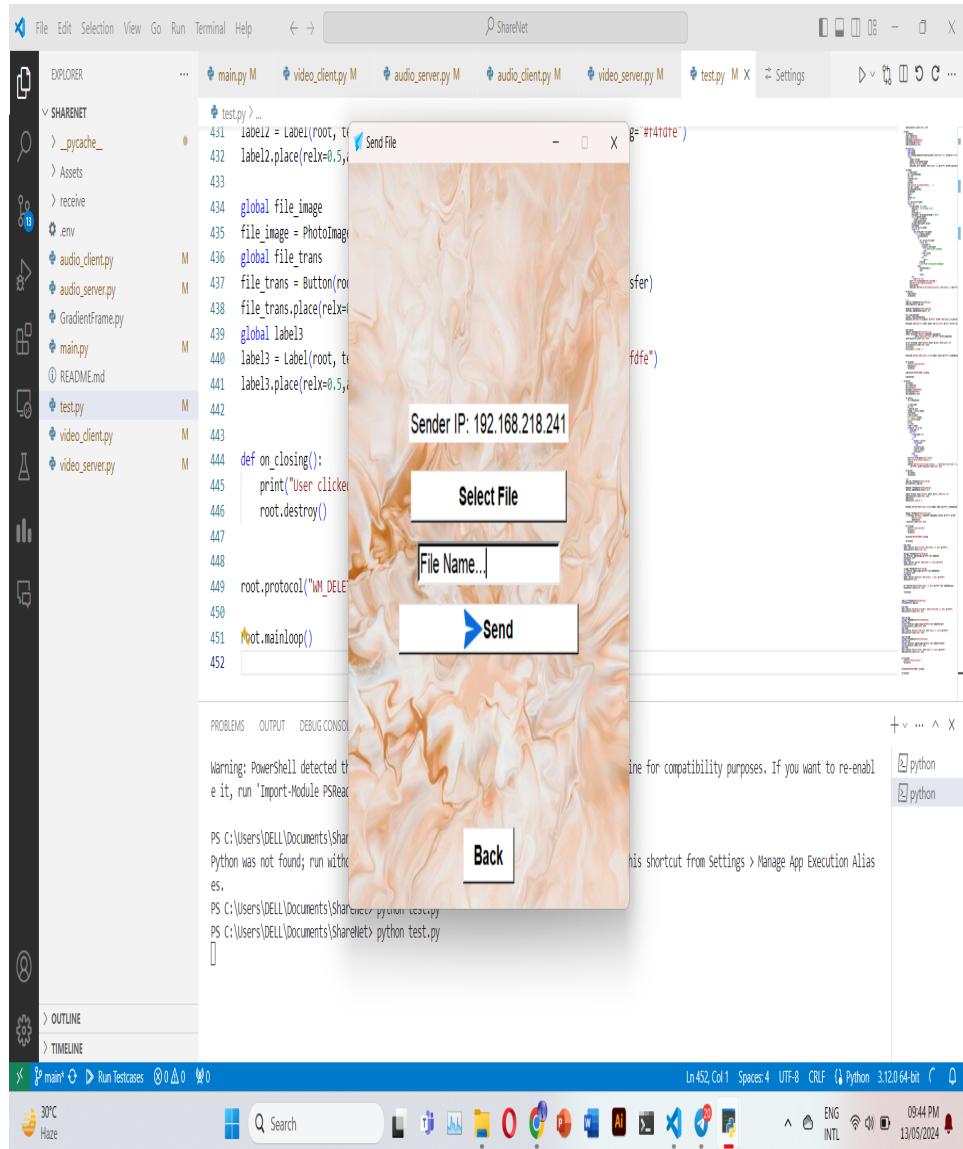
- **Audio and Video call:** A user enters the IP address of another user they want to connect, then press audio or video call button to start a call. To cancel a call, they have to press cancel audio or cancel video.



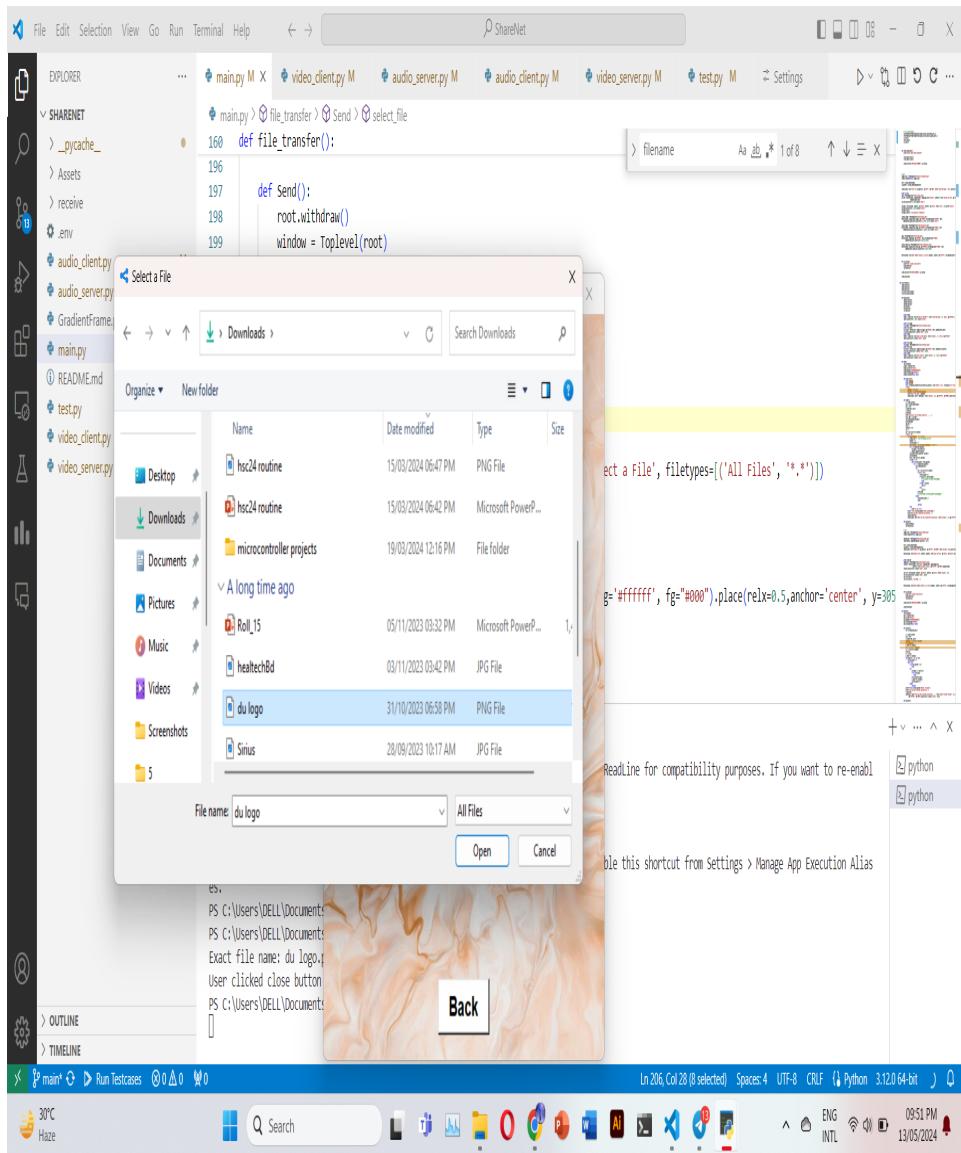
Figure 5: Audio and Video call

4.2 Sample input and Output

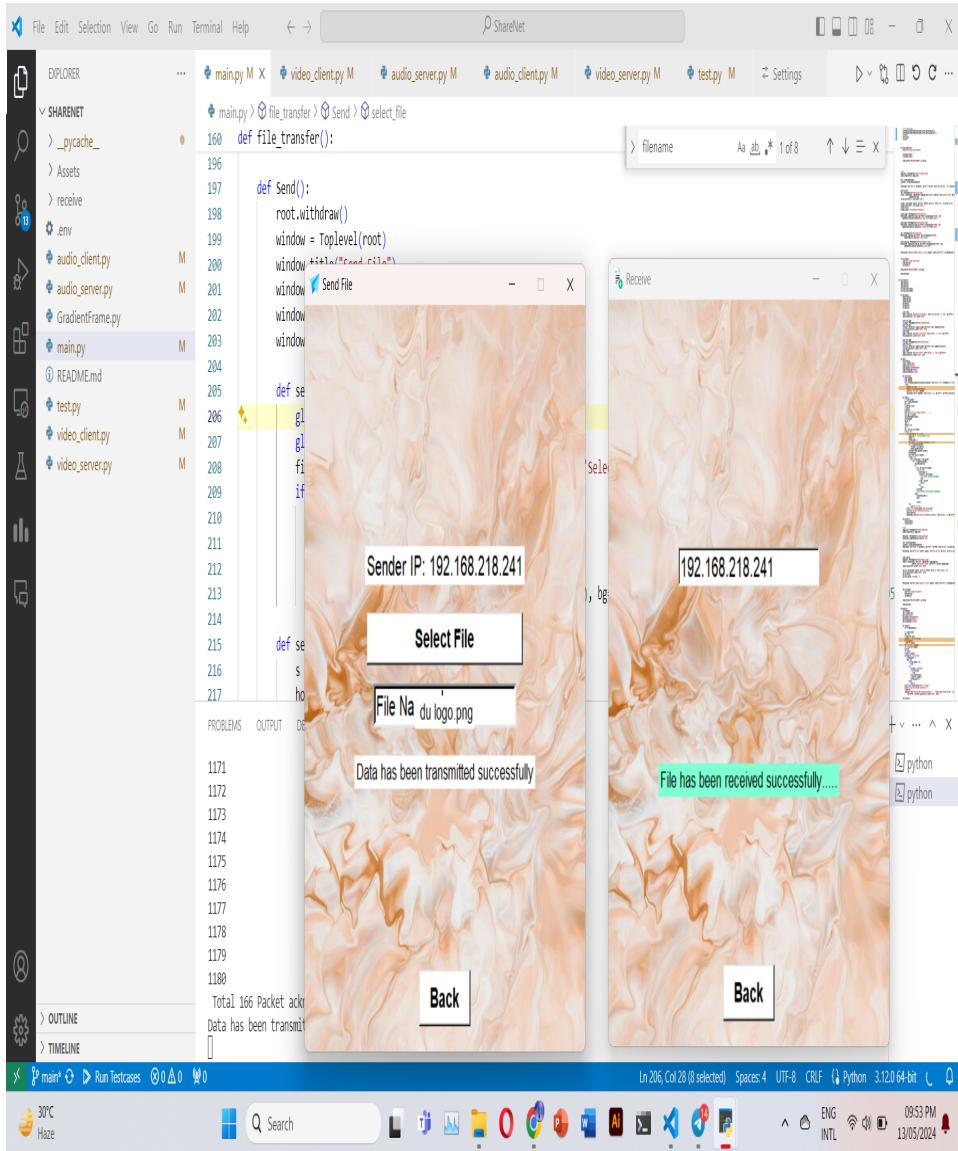
- Send File:



- Select file to transfer:



- Successfully sending and receiving file:



- Change in directory:

SHARENET	
>	_pycache_
>	Assets
▽	receive
	du logo.png
⚙	.env
🐍	audio_client.py
🐍	audio_server.py
🐍	GradientFrame.py
🐍	main.py
ⓘ	README.md
🐍	test.py
🐍	video_client.py
🐍	video_server.py

5 Result

The SahreNet project effectively deploys a fully operational application that facilitates file sharing and audio and video communication. This application exhibits dependable capabilities for file transfer, audio communication, and video transmission.

Amidst the trial phase, the application demonstrates commendable dependability and stability, effortlessly managing the transmission of files, as well as audio and video streaming, devoid of any crashes or performance degradation.

In general, the outcomes of the application verify that the implemented solution is effective at facilitating file sharing and real-time audio and video communication.

6 Analysis and Report

The discussion section examines the implications of the project's findings and investigates prospective areas for improvement as well as topics that may be the subject of further research. Among the most important topics of interest are:

1. **Performance:** The application functions efficiently in transmitting data and facilitating voice and video communication between two users with low latency.
2. **User Experience:** The user interface has been streamlined to enhance user experience.

To ensure the ongoing development and enhancement of the ShareNet Project, it is crucial to consider and tackle these specific issues. This will enable the project to effectively fulfill the changing requirements of its users and stakeholders.

7 Conclusion

The ShareNet project is a collaborative endeavor aimed at facilitating seamless sharing of music, video, and files among users. The program utilizes a collection of libraries such as tkinter, vidstream, and socket to accomplish two primary features: screen sharing and file transfer.

Although the program provides a basic implementation of these functions, there are still places that need improvement. These include implementing strong error handling techniques, optimizing user interface design features, and organizing code structures meticulously for improved maintainability and scalability. Moreover, it is crucial to incorporate strict security measures to ensure the confidentiality and integrity of data during transmission.

The ShareNet project has great potential as a crucial tool for enhancing communication and cooperation by enabling the sharing of audio, video, and file assets. Through continuous attention to improvement and incremental additions, it is ready to become a strong and capable solution, effectively meeting the changing communication demands of contemporary users.