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# PIGEN - A PERSONAL CLOUD STORAGE AND FILE-SHARINGPLATFORM

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Abstract—This project presents the development of personal cloud storage and file transfer systems with the help of Raspberry Pi 3 and Hard disk drive devices. The main aim of the project is to save your files locally on your Hard Disk Drive connected to the Raspberry Pi as well, access files remotely even if you are not connected to the WI-FI which is also connected to Raspberry Pi, and share them with anyone you wish to.

Keywords – Personal Cloud Storage, file transfer, Raspberry Pi 3, Hard disk drive, remote access.

## I. INTRODUCTION

In today's fast-paced world we humans produce a lot of data. The data produced is roughly estimated to be 2.5 quintillion bytes. We make use of cloud services Amazon Web Service (AWS), Microsoft Azure, Google Cloud Platform (GCP), etc. These services are not free and sometimes they are unaffordable for users such as students. We have come up with a solution of making personal cloud storage using the user's new hard disk drives which will also solve the problem of e-waste. Waste hard drives are unique among waste electronic equipment as they store vast amounts of personal information and thus require careful handling to ensure data security, environmental preservation, and sustainable development. An integral part of the services is a file-sharing feature that the user can use to easily share any of the files they want while ensuring that the security and integrity of the file are maintained.

In the constantly changing technological landscape, the security of our data and the need for ample storage space to manage it are paramount concerns. This project focuses on addressing these issues. Third-party cloud services pose privacy risks as they can be accessed by multiple users, offer limited storage and control over our data, and come with a steep cost. By using Raspberry Pi, we can convert our external hard drive into a personal cloud storage solution with full control over the amount of memory available and our data. We can access this data from anywhere with internet access, effectively treating our external hard drive as a cloud storage device. Cloud storage prevents users from carrying unnecessary storage devices, they just have to create an account on one of these cloud as mentioned above services and pay on a monthly or yearly basisto use cloud storage services.

PiGen is the conjunction of two syllables Pi and Gen. Pi comes from raspberry Pi and Gen refers to the new generation. Our project has a file-sharing feature embedded in it, so like in the olden days when pigeons were used for communication or sending important information so our project signifies the work of pigeons.Hence the name PiGen.

## II. PROBLEM STATEMENT

We want to design and implement a personal cloud storage and file-sharing system, with the help of Raspberry Pi 3. In this type of system, the user will have to sign up through our website and then need to connect his hard disk drive to the Raspberry Pi to access it. After logging in to the website he/she can easilyaccess the file or upload the files or share it with other users.

## III. FLOW CHART

It shows the basic flow of our project. The user has been signed in for using our services in this flowchart.

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If the user has not signed in and is new to our services then he/she just has to sign in using credentials such as email-id and he/she also has to create a password so that his/her files as secured and only he can access his files. After that, he will be redirected to the PiGen website page where he can share, upload and store his/her files.

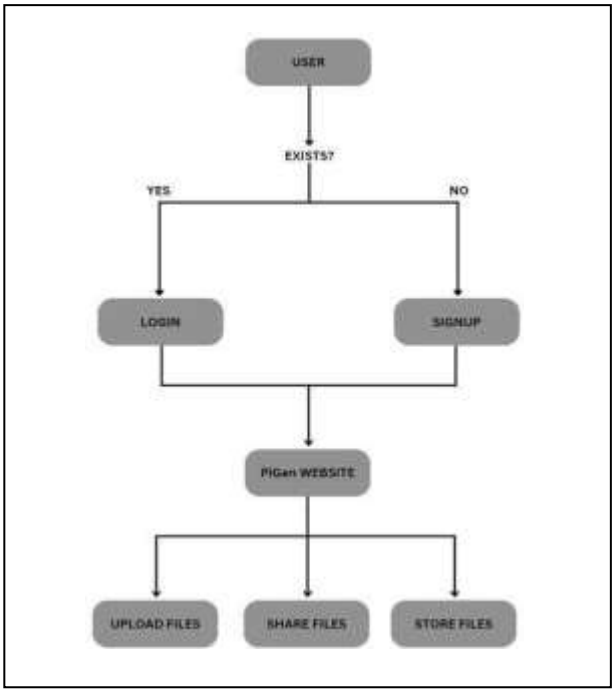


Figure 1 – Flow Chart of the Website

## IV. RELATED WORK

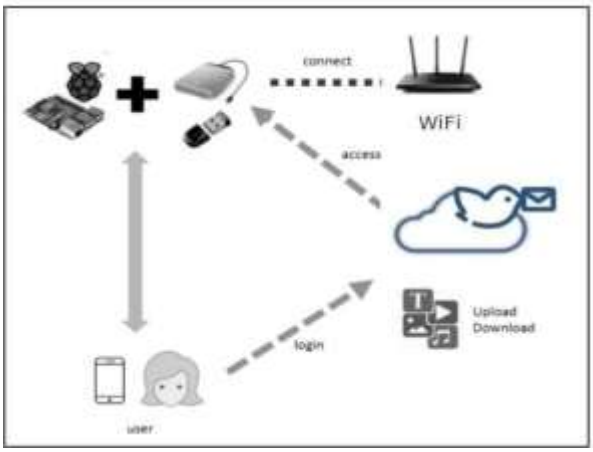


Figure 2 – Project layout [9]

The creation of personal cloud storage requires a careful and thorough approach to determining its components, modules, and data in order to fulfil specific requirements. The design is a comprehensive representation of how the data inputs and outputs, as well as the flow of data, in personal cloud storage, are organized. This design is frequently depicted through the use of Raspberry Pi as a model. The objective of designing personal cloud storage is to produce a technical solution that satisfies the functional needs of cloud storage, including scalability, reliability, security, accessibility, and ease of use. It also

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addresses the problems faced by the developer and outlines the processes, flow, and activities involved in the personal cloud storage process. The design in the above figure depicts that the User has to create his/her account on our PiGen Cloud and log in to upload and download files from it. We use an external hard disk to store its files on the cloud and it is connected to the Raspberry Pi. The Raspberry Pi is wirelessly connected to the Laptop/Mobile through a Wi-Fi connection.

## V. BLOCK DIAGRAM AND DESCRIPTION

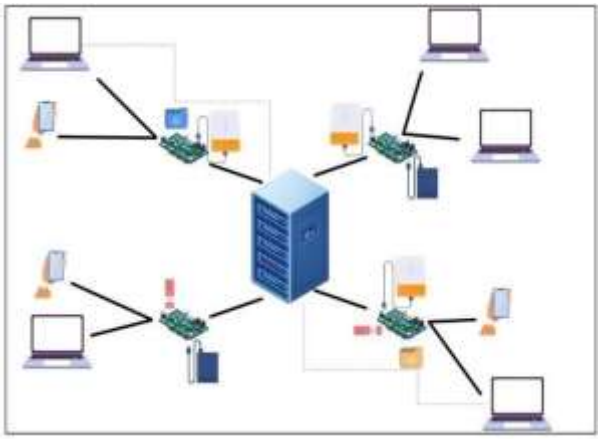

Figure 3 - Block diagram

We will be using a Raspberry Pi and hard disk drive to store our files. All the users will be connected to a server that would act as a central database server and through that, they will be able to share the files. The user can even access the hard disk remotely.

## VI. CIRCUIT DIAGRAM

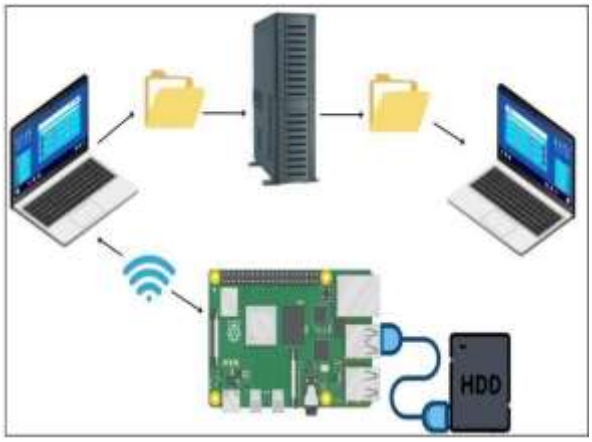


Figure 4 - Circuit diagram

The Hard Disk Drive or storage device can be accessed remotely through our PiGen website. The Raspberry Pi is connected to the User's PC through Wi-Fi technology. The server is used for the sharing offiles present on the Hard Disk Drive to the other user's PC.

## VII. ADVANTAGES

It boasts a straightforward web design compared to other cloud services. Utilizing existing hard drives helps reduce electronic waste. Users have control over their storage space through their own hard drives. Enhanced security features, including encryption, ensure all data is secure. Large hard drives provide

amplestorage for a large amount of data.
Additionally, users can access their personal data from anywhere with this cloud storage solution.

## VIII. APPLICATIONS

*A.* Users can upload files or even folders using our PiGen website.


Figure 5. – File Upload

B. File details

We get full details about the file such as file name, file size, and even the date when the file was uploaded.


Figure 6. – File Details

C. Features ( Download/ Delete / Copy)

We can easily download or delete and even share the file with the generated link.


Figure 7 – Features

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## IX. COMPONENTS

A. SOFTWARE USED

1. VS Code: We have used visual studio code editor as an IDE for writing our HTML, CSS, and JavaScript code for our website, so every individual can easily use it. We have used the above for building the frontendpart of our website.


Figure 8 – Logo of VSCode [10]

2. MongoDB: We have used MongoDB software to store the login credentials of the user and store themsecurely in a database. It will store the user credentials such as email ids, passwords, and usernames.

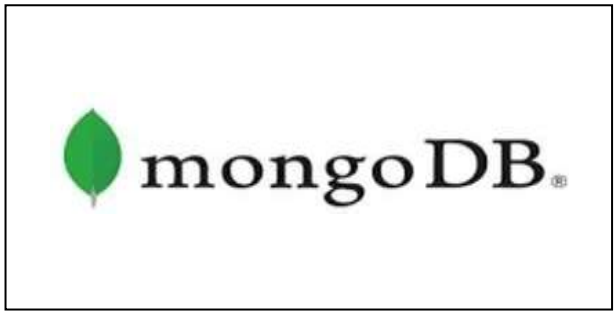


Figure 8 – Logo of mongoDB [11]

B. HARDWARE USED

1. The Raspberry Pi 3 Model B+ is the newest iteration in the Raspberry Pi 3 line and features a powerful 64-bit quad-core processor running at 1.4GHz, as well as dual-band 2.4GHz and 5GHz wireless LAN, Bluetooth 4+ and Low Energy technology, quick Ethernet, and the ability to support PoE through a separate PoE HAT. Its dual-band wireless LAN has built-in certification, making it easier to integrate into end-user products, saving time and money in the process. The physical design of the Raspberry Pi 3 Model B+ is consistent with the Raspberry Pi 2 Model B and Raspberry Pi 3 Model B.

Figure 9 – Raspberry Pi [12]

1. Hard Disk Drives A hard disk drive (HDD) is a computer storage device made of flat disks covered

with magnetic material. It can store large amounts of information. Data is stored on these disks through magnetization. The disk spins and a magnetic head reads and writes binary digits by changing the direction of magnetization on the disk. An HDD consists of multiple disks, heads for reading/writing, a motor and circuitry all protected in a metallic case. The term "hard disk" also refers to a computer's internal storage. In the early 21st century, some personal computers and laptops started using solid state drives (SSDs) which use flash memory instead of HDDs for storage.


Figure 10 – Hard Disk [13]

## X. COMPARISON OF IDEA WITH PRESENT SYSTEM

| Cloud provider | Storage(GB/Month) | File Ownership |
|---|---|---|
| Amazon S3 | $0.023 | Public |
| Azure | $0.021 | Public |
| Google Cloud Platform | $0.023 | Public |
| PiGen | One-time purchase of required components | Private |

Table 1 – Comparison Study with the present system

## XI. FUTURE SCOPE

We can use the leftover storage space of the user and share it with another user who has his storage full and charges them a minimal fee for this service. We can also make it available for mobile users by making mobile applications so that more in-app features can be accessed by the user. For added user privacy on- thefly encryption can be added so that corporate users can adopt this for transferring files safely and in a private manner without worrying about anyone accessing it. Allowing the owner of the Raspberry Pi PiGen cloud to add more users to his account and thus create a “Family” account can also be achieved. A major penetration in the market can be achieved by providing the hardware pre-configured without the user needing to deal with the technical details of the setup. Something like buying and setting up an Alexa can be done here

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## XII. RESULT

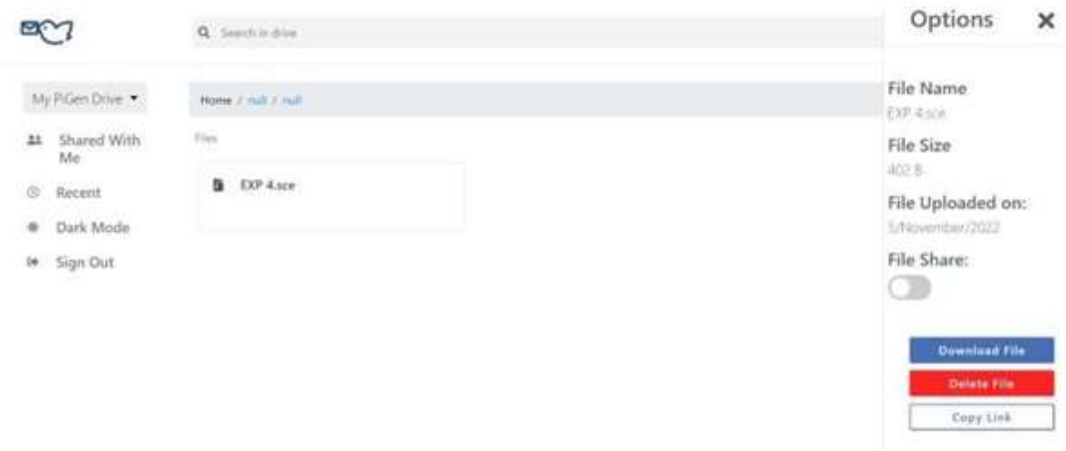


Figure 11 – Pigen Website

We have successfully built the front-end part of our website using HTML/ EJS, CSS, and JavaScript. Built the backend with the help of NodeJs and used EJS to render the output on the client side.

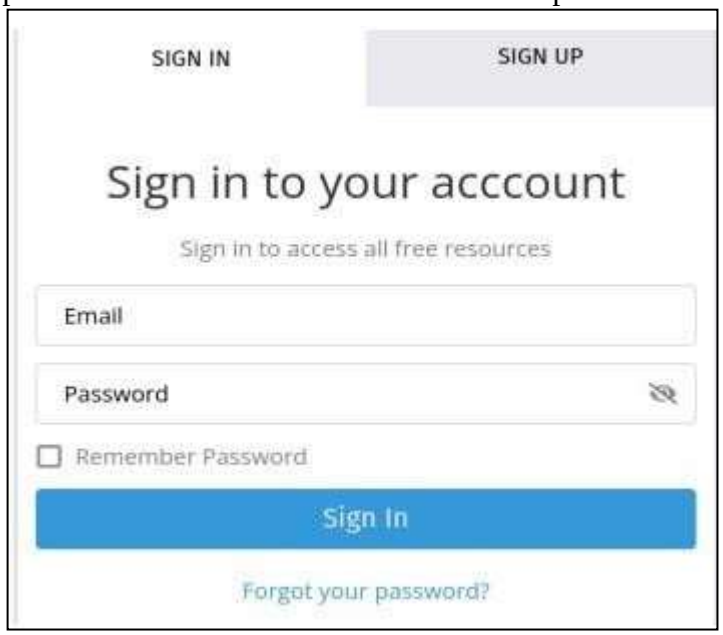


Figure 12 – Sign in and sign up

We have tested the sign-in and sign-up. The authentication of the page also helps in security and increases the efficiency of our website.

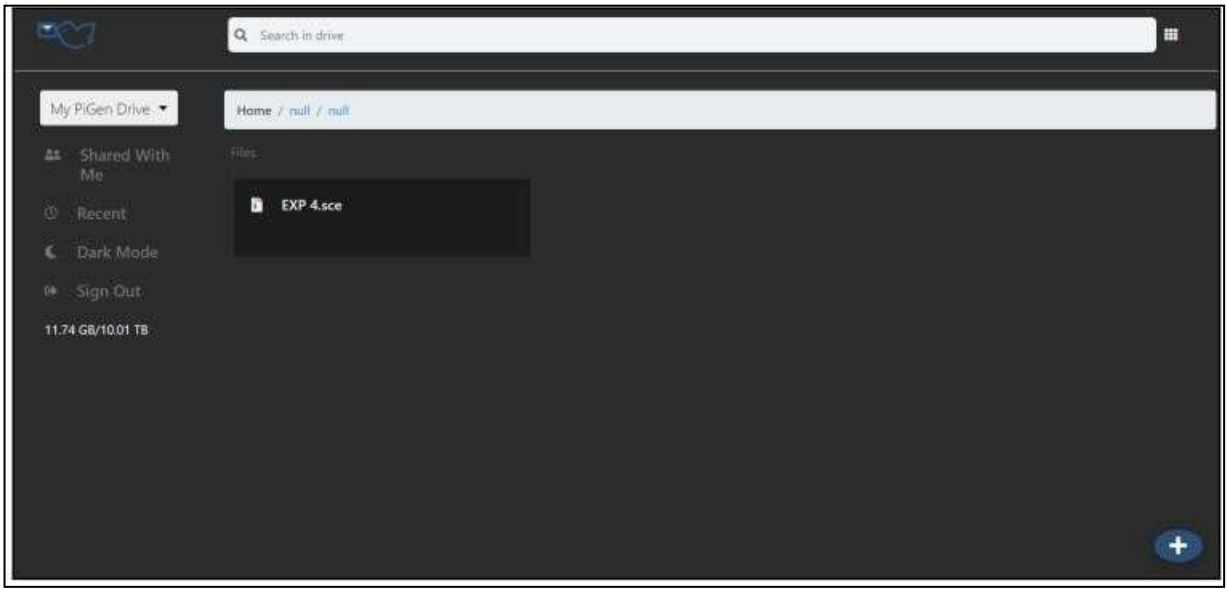


Figure 13 – PiGen Website in dark mode

. We have also tested the dark mode of our website which will help users to work as per his/her preference.

## XIII. CONCLUSIONS

Daily, we read about Google's monopoly on users' data, although lawmakers and governments are starting to take notice of this now it's time we own our data without needing to depend on big tech companies. We have made a personal cloud storage and file-sharing system for the users. A user-friendly website has been added as a layer to the cloud service so that even non-technological users can access the website without any assistance. With features such as downloads, remote access, and link sharing a user can easily adopt this self-hosted cloud storage.

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