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## **QuietZone: The Ultimate Library Discipline Solution**



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## Problem Statement

The problem of noise in libraries is a persistent issue that can greatly disrupt the study and work environment for students and other library users. Despite efforts to enforce quiet rules, noise levels can still be high, making it difficult for users to concentrate and complete their work. The **Sonic Library System** aims to address this problem by providing a simple and effective solution for managing noise levels in libraries.

## Solution

The system consists of a sound sensing device that is installed at each table in the library and connected to a network. The device is equipped with a decibel sensor encoded in an Arduino, which can detect and measure sound levels at each table. The device produces three distinct outputs based on the decibel levels around each table, and this information is sent to a website where it is displayed in real-time. The library manager can use the website to monitor and control the library, receiving notifications when the decibel level at a table exceeds a certain threshold and taking appropriate action to address disruptions.

- ❖ The **Sonic Library System** also includes features such as a user management system, allowing the library manager to add, remove, and update user accounts as needed.
- ❖ Alert notifications can also be sent to the library manager when the decibel level at a table exceeds a certain threshold, alerting them to any disruptions that need to be addressed.
- ❖ Additionally, the website provides a range of tools for analyzing decibel data over time, including graphs, charts, and other visualizations. This allows the library manager to identify trends and patterns, and make informed decisions on how to optimize the library environment.

The **Sonic Library System** is built using modern technologies, including React.js for the front end and Express.js for the back end. It is also designed to be scalable, so it can be used in libraries of any size. Overall, the system represents a simple yet powerful solution for managing noise levels in libraries and creating a peaceful and productive environment for all users.

ELI5 😊

- ❖ For example, imagine you are sitting at a table with your friends, and you are trying to read a book.
- ❖ The sensor on the table will detect how loud you and your friends are talking and send that information to the website.
- ❖ If you and your friends are talking too loudly, the librarian will know and can come over and remind you to be quiet. This way, the library can be a peaceful place for everyone to study and work.

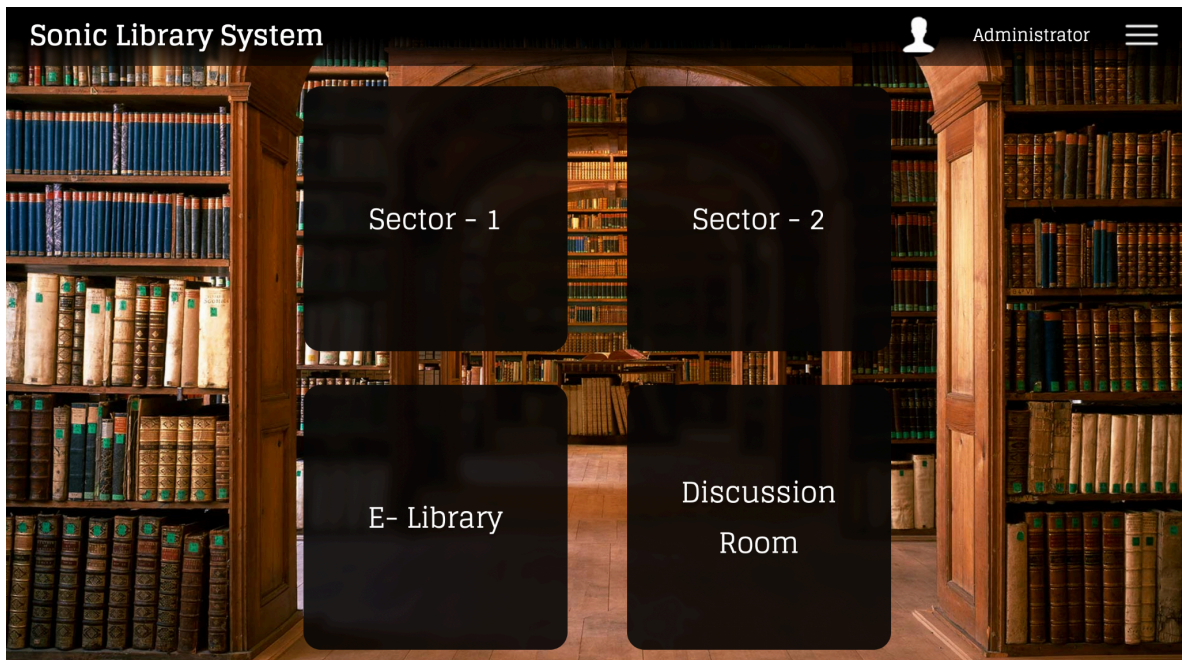
## Source Code

### Github Repository Links:

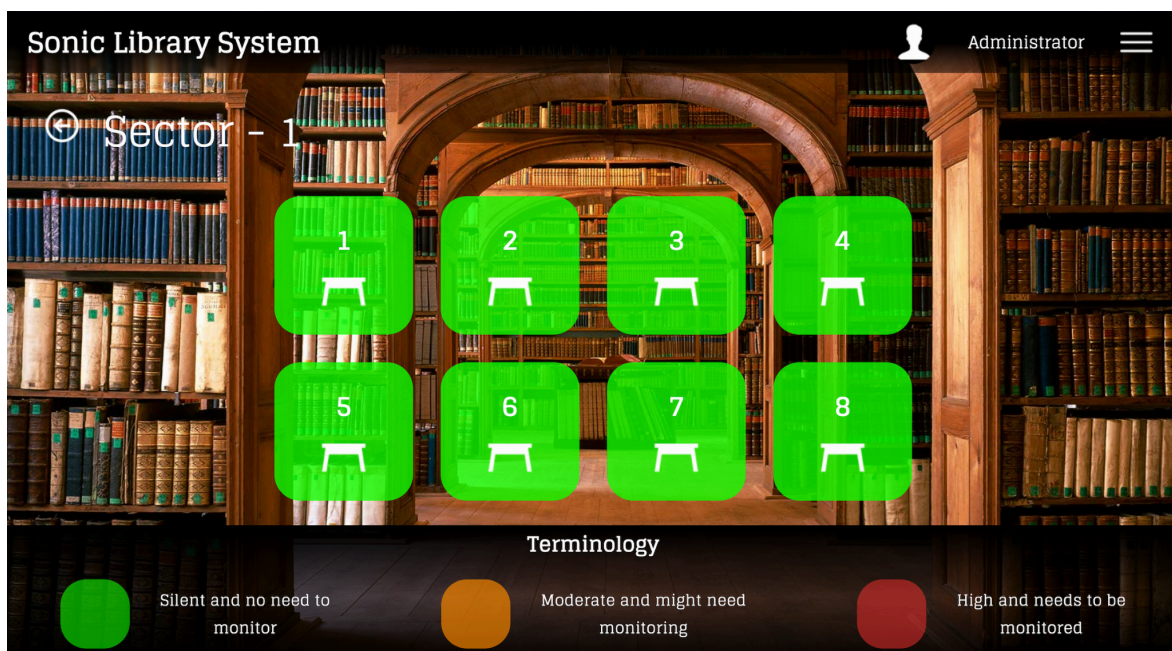
1. <https://github.com/Ashu0Singh/Sonic-Library-System-Frontend>
2. <https://github.com/Ashu0Singh/Sonic-Library-System-Backend>

Deployed @ <http://sonic-library.el.r.appspot.com/SonicLibrarySystem/>

## Screenshots



QuietZone figure 1.1



QuietZone figure 1.2



## Google Cloud Services used

The **Sonic Library System** utilizes several Google Cloud services to effectively manage noise levels in libraries.

### 1. App Engine:

- ❖ App Engine is used to **host the website** where the decibel data is displayed in real-time. The website allows the library manager to monitor and control the library, receiving notifications when the decibel level at a table exceeds a certain threshold.
- ❖ Additionally, the App Engine allows for scalability, so the system can be used in libraries of any size.

### 2. Cloud Storage:

- ❖ Cloud Storage is used to **store the decibel data** collected by the sound sensing devices. The data is stored in a database and can be accessed by the library manager through the website.
- ❖ The data can also be analyzed over time using tools such as graphs, charts, and other visualizations to identify trends and patterns in noise levels allowing library manager to make informed decisions on how to optimize the library environment.

### Steps taken:

1. Setting up a Google Cloud account and creating a new project for the Sonic Library Sensor System.
2. Deploying the website built using React.js and Express.js on App Engine.
3. Connecting the sound sensing devices to the network and configuring them to send decibel data to Cloud Storage.
4. Setting up a user management system and alert notifications through the website.
5. Analyzing decibel data over time using tools such as graphs and charts to identify trends and patterns in noise levels.
6. Making informed decisions on how to optimize the library environment based on the analysis.

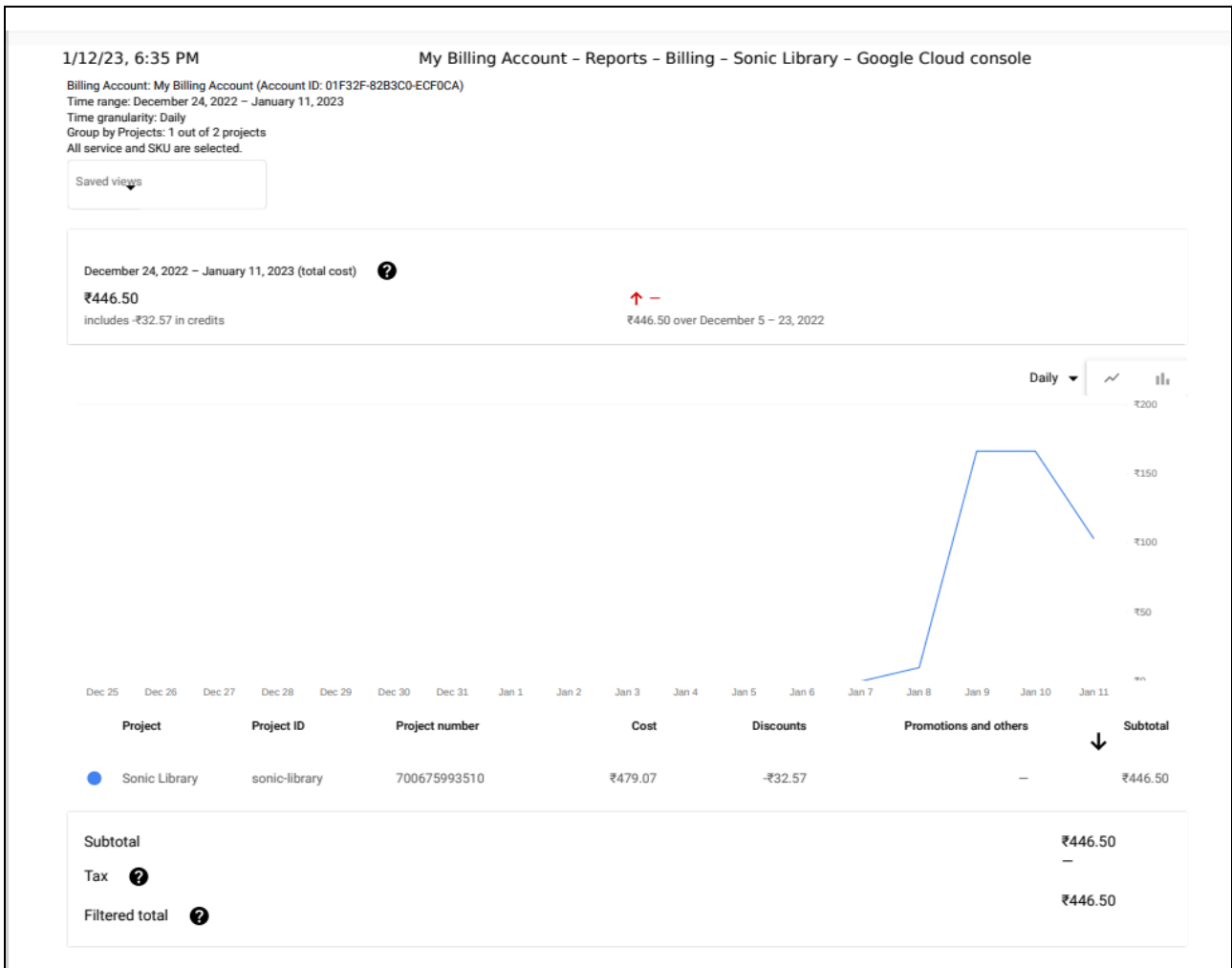
Overall, the use of App Engine and Cloud Storage allows for **real-time monitoring** and control of noise levels in libraries, as well as the **storage and analysis of decibel data** over time. This allows for a more peaceful and productive environment for all library users.

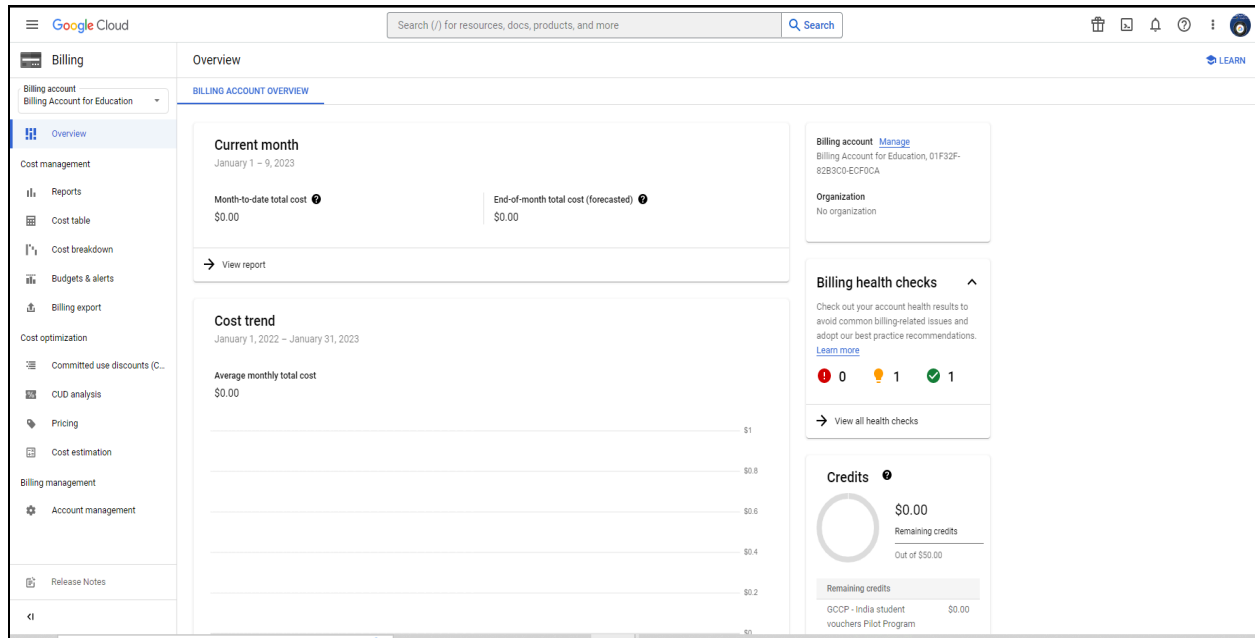
## Future Scope

In the future, there may be opportunities to **expand the capabilities** of the Sonic Library System and its accompanying website.

- ❖ For example, the system could be integrated with other library management systems, such as a **catalog or reservation system**, to provide a more seamless experience for users.
- ❖ The system could also be expanded to include additional sensors or functionality, such as temperature or light sensing, to provide a more **comprehensive view of the library environment**.
- ❖ Additionally, the system could be deployed in multiple locations, allowing a **central management** team to monitor and control multiple libraries from a single interface.

Billing Breakdown





## Links and References

### GitHub Repositories Link:

1. <https://github.com/Ashu0Singh/Sonic-Library-System-Frontend>
2. <https://github.com/Ashu0Singh/Sonic-Library-System-Backend>

### Reference Lab and Quest:

<https://www.cloudskillsboost.google/quests/118>

### Chapter Link:

<https://gdsc.community.dev/vellore-institute-of-technology-ap-campus/>

Fin.



